Lecture Notes: Chapter 14: The Budget Balance, the National Debt, and Investment

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Introduction

The *national debt*--the amount of money that the government owes those from whom it has borrowed—changes each year. In a year when government spending is less than tax collections, the difference is the *government surplus*. The national debt shrinks by the amount of the surplus. In a year when government spending is greater than tax collections, the difference is the *government deficit*. The national debt grows by the amount of the deficit. Call the debt "D" and the deficit "d" (and recognize that a surplus is a negative value of d). Then the relationship between the debt and the deficit is:

$$\Delta D = d$$

where Δ is, as before, a standard symbol for "change". The change in the debt from year to year is equal to the deficit.

A government spending more than it collects in taxes (including the *inflation tax* noted in chapter 8) must borrow the difference in order to finance its spending. A government borrows by selling its citizens and foreigners bonds: promises that the government will repay the principal it borrows with interest. These accumulated promises to pay make up the national debt.

Economists are interested in the debt and the deficit for two reasons. First, the deficit is a convenient and often handy--though sometimes treacherous--measure of fiscal policy's role in stabilization policy. It is an index of how government spending and tax plans affect the position of the IS curve. Second, the debt and deficit are closely connected with national savings and investment. A rising debt—a deficit--tends to depress capital formation. It lowers the economy's long-run steady-state growth path and reduces the steady-state GDP per worker. Moreover, a high national debt means that taxes in the

future will be higher to pay higher interest charges. Such higher taxes are likely to further discourage economic activity and reduce economic welfare.

What to do about the national debt is one of the current flashpoints of American politics. The United States ran its national debt up by an enormous amount during the high-deficit Reagan and Bush administrations. One of the main questions facing American voters and politicians now that the era of deficits is over is: what (if anything) should be done to undo the rise in the debt? Should the government run large surpluses in order to push the debt down to its late-1970s level (or even lower)—as Democratic politicians have argued in recent years? Or should the government cut taxes and not worry as much about reducing the national debt—as Republican politicians have argued in recent years? At the moment this issue hangs in the balance.

The Budget Deficit and Stabilization Policy

An increase in government purchases increases aggregate demand. It shifts the IS curve out and to the right, increasing the level of real GDP for each possible value of the interest rate. A decrease in government tax collections also increases aggregate demand, also shifts the IS curve out. The government's budget deficit is equal to purchases minus net taxes. Why bother with two measures of fiscal policy—purchases and taxes—when you can just keep track of their difference?

This drive for the simplification is the reason for focusing on the government's budget balance as a measure of fiscal policy. But it turns out that the right measure of budget balance is not the government's actual deficit (or surplus). Instead, the right measure of fiscal policy is the full-employment or cyclically-adjusted deficit (or surplus): what the government's budget balance would be if the economy were at full employment.

Unfortunately, the government budget bottom line reported in the newspapers is either the "unified cash" balance or the excluding-Social Security balance. The first of these bottom lines is the difference between the money that the government actually spends in a year and the money that it takes in. This balance is called "unified" because it unifies all of the government's accounts and trust funds (including Social Security). This balance is

called "cash" because it does not take account of changes in the value of government-owned assets or of the future liabilities owed by the government: it is just cash in minus cash out. The second of these bottom lines is equal to the unified cash balance minus the revenues and plus the expenditures of the Social Security program. It takes the Social Security system "off budget."

Why is the full-employment budget balance a better index than either of the more frequently mentioned cash balance measures? Consider a situation in which the government does not change either its purchases or its tax rates, and so there is no change in government fiscal policy. But suppose that monetary policy tightens: real interest rates are raised, and so the economy moves up and to the left along a stable IS curve. As the economy moves along the IS curve real GDP falls and tax collections fall too. The government's cash deficit increases, even though there has been no change in government policy to shift the IS curve. The full-employment budget balance, however, remains constant. The fact that the cash budget balance changes as the economy moves along a constant IS curve means that it is not a good indicator of how the government's fiscal policy is affecting the location of the IS curve: the full-employment budget balance is better.

To turn the cash balance into the full-employment balance, we must adjust the budget deficit (or surplus) for the automatic reaction of taxes and spending to the business cycle. When unemployment is high taxes are low and social welfare spending high. The budget balance swings toward deficit. When unemployment is low taxes are high and the budget balance swings toward surplus.

In addition to cyclical adjustment, there are three other adjustments to the reported budget balance that we would consider making.

One adjustment economists make is to correct the officially-reported cash budget balance for the effects of inflation. A portion of the debt interest paid out by the government to its bondholders merely compensates them for inflation's erosion of the value of their principal.

Yet another adjustment corrects for an asymmetry between the treatment of private and public assets. Private spending on long-lived capital goods is called "investment." A business that has total sales of $100 million, costs of goods sold of $90 million, and

spends $20 million on enlarging its capital stock reports a profit of $10 million--not a deficit of $10 million. Standard and sensible accounting treatment of long-lived valuable assets in the private sector is definitely not to count their entire cost as a charge at the time of initial purpose, but instead to spread the cost out--a process called "amortization"--over the useful life of the asset. The government should do its accounting the same way, like a business, and amortize rather than expense its spending on long-lived assets.

All of the issues surrounding capital budgeting appear again whenever the long-run future of the government's budget is considered. Back when I worked at the Treasury Department, some $10,000 a year was set aside for me in my Treasury pension account. It is as if my income had been $10,000 a year higher, and I had invested that extra $10,000 in U.S. government bonds. Bonds issued by the government appear on the books as part of the government's debt. But pension fund liabilities that the government owes to ex-workers do not.

Thus there is a sense in which the right way to count the government's debt is to look not just at the bonds that it has issued but at all of the promises to pay money out in the future that it has made. Indeed, a large chunk of the government's expenditures—those by the Medicare and Social Security Trust Funds, for example—are presented to the public in just this way. The Social Security deficit reported by the Trustees of the Social Security System every spring is not the difference between social security taxes paid in and social security benefits paid out, but is instead the long-run, seventy-five-year balance between the estimated value of the commitments to pay benefits that the Social Security System has made and will make, and the estimated value of the taxes that will be paid into the Social Security Trust Fund.

But the Social Security Trustees' *Report* covers just one program—albeit a big program. And great confusion is created by the fact that the Social Security systems expenditures and revenues are also included within the unified budget balance. Wouldn't it be better to bring all of taxation and spending within a long-run system like that currently used by Social Security?

Economists like Laurence Kotlikoff and Alan Auerbach say "yes!" They propose--instead of the year-by-year budget balances--that the United States government shift to a system of "generational accounting." Generational accounting would examine the lifetime impact of taxes and spending programs on individuals born in specific years, and that would

come up with a final balance that could be used for long-term planning. It is hard to escape the conclusion that Auerbach and Kotlikoff have a very strong case. Yet few analysts of the budget use their generational accounting measures. Generational accounting is thus not part of the present state of macroeconomics, but I hope that it is part of its future.

Analyzing Debts and Deficits

The first question to ask about a government that is running a persistent deficit is: "Can it go on?" Is it possible for the government to continue running its current deficit indefinitely, or must policy change--possibly for the better, but also quite possibly for the worse?

The variable to look at to assess whether the government's current fiscal policy is *sustainable* is the time path of the ratio of the government's total debt to GDP, the debt-to-GDP ratio, D/Y. Fiscal policy is *sustainable* if the debt-to-GDP ratio is heading for a steady state.

As in chapters 4 and 5, we can analyze the debt-to-GDP ratio D/Y by looking to see if it heads for some steady-state value. At a steady state value, both the numerator D and the denominator Y will be growing at the same proportional rate. We know that real GDP grows in the long run at a proportional annual rate n + g, where n is the annual rate of growth of the labor-force and g is the annual rate of growth of the efficiency of labor.

What is the proportional growth rate of the debt, D? Adding time subscripts to keep things clear, the debt next year will be equal to:

$$D_{t+1} = (1-\pi)D_t + d$$

The real value of the debt shrinks by a proportional amount π as inflation erodes away the real value of the debt principal owed by the government, and grows by an amount equal to the officially-reported cash deficit, d. As the economy grows, tax revenues grow roughly in proportion to real GDP and spending grows in proportion to real GDP too. So

it makes sense to focus not on the deficit itself but on the deficit as a share of GDP, call it little delta, δ:

$$\delta = d/Y$$

Then the proportional growth rate of the debt is:

$$\frac{D_{t+1} - D_t}{D_t} = -\pi + \delta \times \left(\frac{Y_t}{D_t}\right)$$

The debt-to-GDP ratio will be stable when these two proportional growth rates—of GDP and of the debt—are equal to each other:

$$n + g = -\pi + \delta \times (Y/D)$$

Which happens when:

$$\frac{D}{Y} = \frac{\delta}{n + g + \pi}$$

This is the steady-state level toward which the debt-to-GDP ratio will head. This is the level consistent with a constant cash-balance deficit of δ percent of GDP in an economy with long run inflation rate π, and with long run real GDP growth rate $n+g$.

Why then do economists talk about deficit levels as being "unsustainable"? For any deficit as a share of GDP δ, the debt-to-GDP ratio heads for its well-defined steady-state value $\delta/(n+g+\pi)$.

This, however, is only half the story. The ratio of the debt that the government wants to issue to GDP heads for a stable value, yes. But are there enough investors in the world willing to hold that amount of debt? The higher the debt-to-GDP ratio, the more risky an investment do financiers judge the debt of a country. The less willing they will be to buy and hold that debt.

A higher debt-to-GDP ratio makes investments in the debt issued by a government more risky for two reasons. First, revolutions--or other, more peaceful changes of government--happen. One of the things a new government must decide is whether it is going to honor the debt issued by previous governments. Are these debts the commitments of the nation, which as an honorable entity honors its commitments? Or are these debts the reckless mistakes made by and obligations of a gang of thugs, unrepresentative of the nation, to whom investors should have known better than to lend money for the thugs to steal? The

holders of a government's debt anxiously await every new government's decision on this issue.

The higher the debt-to-GDP ratio, the greater the temptation for a new government to *repudiate* debt issued by its predecessor. Hence the riskier is buying and holding a portion of a country's national debt.

Second, even if there is no change in government, it is still the case that a government can control the real size of the debt it owes through controlling the rate of inflation. The (nominal) interest rate to be paid on government debt is fixed by the terms of the bond issued. The real interest rate paid on the debt is equal to the nominal interest rate minus the rate of inflation—and the government controls the rate of inflation.

Thus a government that seeks to redistribute wealth away from its bondholders to its taxpayers can do so by increasing the rate of inflation. Te more inflation, the less is the government's debt worth and the lower are the real taxes that have to be imposed to pay off the interest and principal on the debt. Whether a government is likely to increase the rate of inflation depends on the costs and benefits—and raising the rate of inflation does have significant political costs. But the higher the debt-to-GDP ratio, the greater the benefits to taxpayers of a sudden burst of inflation. When the debt-to-GDP ratio is equal to 2, a sudden 10% rise in the price level reduces the real wealth of the government's creditors and increases the real wealth of taxpayers by an amount equal to 20% of a year's GDP. By contrast, when the debt-to-GDP ratio is equal to 0.2 the same rise in the price level redistributes wealth equal to only 2% of a year's GDP.

Thus the government's potential creditors must calculate that the greater the debt-to-GDP ratio, the greater are the benefits to the government of inflation as a way of writing down the value of its debt. The higher the debt-to-GDP ratio, the more likely is the government to resort to inflation. Thus the higher the debt-to-GDP ratio, the more risky are investments in a government's debt.

A deficit is *sustainable* only if the associated steady-state debt-to-GDP ratio is low enough that investors judge the debt safe enough to be willing to hold it. Think of each government as having a *debt capacity*--a maximum debt-to-GDP ratio at which investors are willing to hold the debt issued at reasonable interest rates. If this *debt capacity* is exceeded then the interest rates that the government must pay on its debt spike upwards.

The government is faced with a much larger deficit than planned (as a result of higher interest costs). Either the government must raise taxes, or it must resort to high inflation or hyperinflation to write the real value of the debt down.

Effects of Deficits

Even if a given deficit as a share of GDP is *sustainable,* it still may have three types of significant effects on the economy. It may affect the political equilibrium that determines the government's tax and spending levels. It may, if the central bank allows it, affect the level of real GDP in the short run. And it will (except in very special cases) affect the level of real GDP in the long run.

Deficits: Political Consequences

One thread of political economy analysis holds that deficits have destructive political consequences: the possibility of financing government spending through borrowing makes the government less effective at advancing the public welfare. Electoral politics suffers from a form of institutional voter myopia: the benefits from higher government spending now are clear and visible to voters, while the costs of the higher taxes later that will be needed to finance the debt built up via deficit spending are distant, fuzzy, and excessively discounted. Moreover, the unborn and underage do not vote: many of those who will be obligated to pay taxes to pay interest on tomorrow's national debt do not vote today. The principle of "no taxation without representation" would seem to call for no long-term national debt--or, rather, for a national debt that is not larger than the government's capital stock.

Thus economists like Nobel Prize-winner James Buchanan have argued for a stringent balanced-budget rule. In Buchanan's view, only if political dialogue must simultaneously confront both the benefits of spending and the pain of the taxes needed to finance that spending can we expect a democratic political system to adequately and effectively weigh the costs and benefits of proposed programs.

Since the start of the 1980s, another argument has appeared: an argument for deficits created by tax cuts. The political system, its proponents argue, delivers steadily-rising government spending unless it is placed under immediate and dire pressure to reduce the

deficit. Therefore the only way to avoid an ever-growing inefficient government share of GDP is to run a constant deficit that politicians feel impelled to try to reduce. And should they ever succeed, the appropriate response is to pass another tax cut to create a new deficit. Only by starving the beast Leviathan that is government can it be kept from indefinite expansion.

The U.S. experience of the 1980s and 1990s tends to support James Buchanan's position, and to count against the alternative position. Few today are satisfied with the decisions about government spending and tax policy made in the 1980s and 1990s. Moreover, the deficits of the 1980s do not seem to have put downward pressure on federal spending. *Program* spending fell, but total spending rose because of the hike in interest payments created by the series of deficits in the 1980s. Because of the fact that interest payments are part of government spending, the deficits of the 1980s appear to have put not downward but upward pressure on the size of government.

Deficits: Short Run Consequences

In the short run, the income-expenditure diagram tells us that a deficit produced by a tax cut stimulates consumer spending. A deficit produced by an increase in government spending increases government purchases. Either way, it shifts the IS curve out and to the right: any given interest rate is associated with a higher equilibrium value of production and employment. If monetary policy is unchanged—if the LM curve does not shift—then output and employment rise in response to the tax cut. A deficit is expansionary in the short run.

Of course, the belief that deficits are expansionary--increase production and employment--in the short run hinges on the Federal Reserve's maintaining monetary policy unchanged in response to the rise in the deficit. If the Federal Reserve does not want inflation to rise, it will respond to the rightward expansionary shift in the IS curve by tightening monetary policy and raising interest rates, neutralizing the expansionary effect of the deficit. Because the decision making and policy implementation cycle for monetary policy is significantly shorter than the decision making and policy implementation cycle for discretionary fiscal policy, the central bank can keep legislative actions to change the deficit from affecting the level of production and unemployment. The question is whether it will. The answer is "yes." The central bank is trying its best to guide the economy

along a narrow path without excess unemployment and without accelerating inflation. It has made its best guess as to what level of aggregate demand leads along that path. In all likelihood its senior officials are uninterested in seeing the economy pushed away from that path by the fiscal policy decisions of legislators.

Deficits: Open-Economy Effects
Such an increase in the government's budget deficit also leads to an increase in the trade deficit. The outward shift in the IS curve pushes up interest rates. Higher interest rates mean an appreciated dollar--a lower value of the exchange rate and of foreign currency--therefore imports rise and exports fall.

Up to now we have implicitly assumed that the composition of aggregate demand has no effect on the productivity of industry. Businesses have been implicitly assumed to be equally happy and equally productive whether they are producing consumption goods, investment goods for domestic use, goods and services that the government will purchase, or for the export market. Yet this is unlikely to be true. As you will recall from your microeconomics courses, the point of international trade is to export those goods which your economy is especially productive at making for goods which your economy is relatively unproductive at making.

As large deficits that increase interest rates raise the value of the exchange rate, export industries--likely to be highly productive--shrink as exports shrink. This presumably reduces total productivity. Nobody, however, has a very sound estimate of how large these effects might be.

Long-Run Effects of Deficits
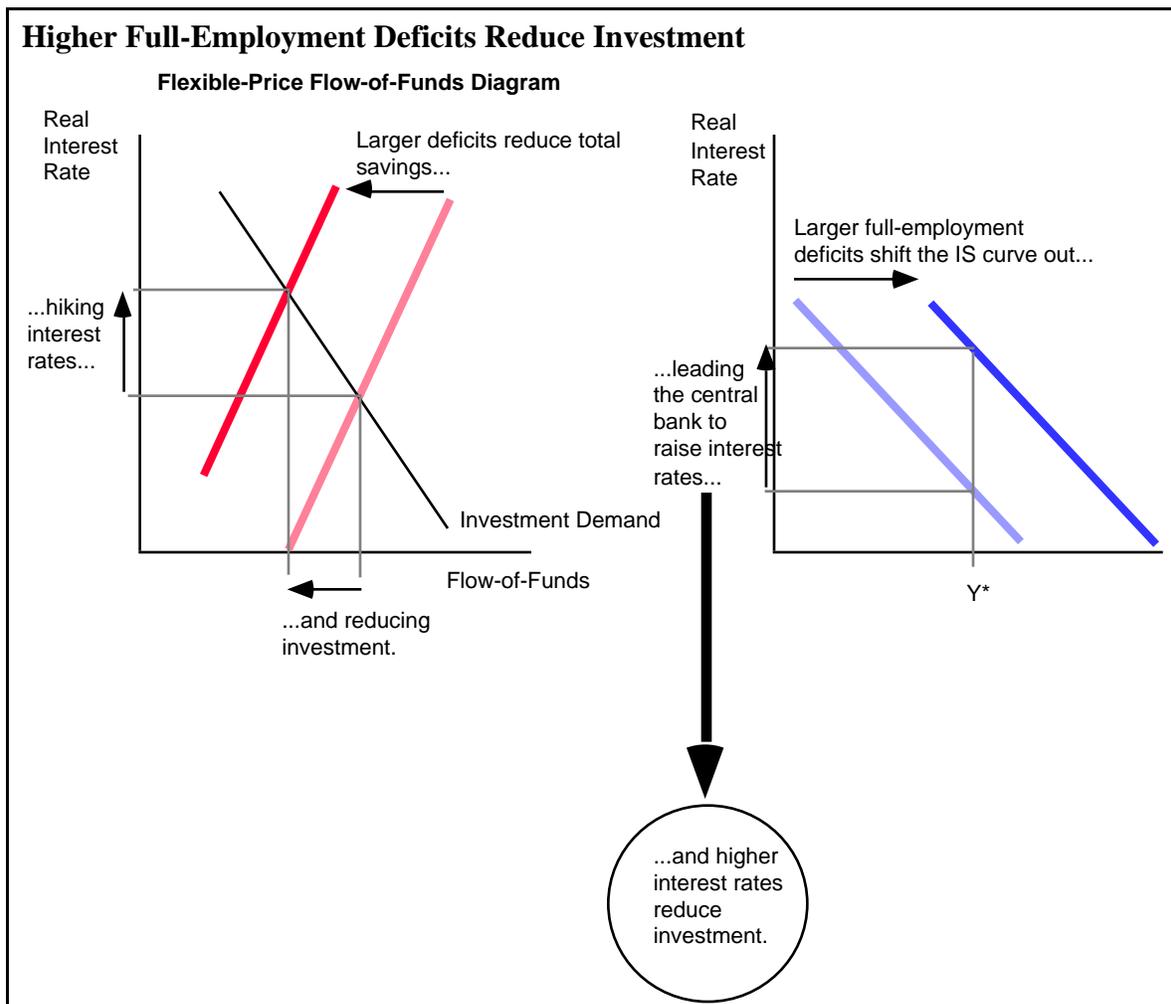*The Policy Mix: Deficits and Economic Growth*
Higher full-employment deficits lead to low investment. On the IS-LM diagram, a deficit--whether from more government purchases or lower taxes--shifts the IS curve to the right. In any run long enough for the full-employment flexible-price model of chapter 7 to be relevant, large full-employment deficits leads to lower total savings, higher real interest rates, and lower investment.

In the flexible-price context the analysis of persistent deficits is straightforward. Such deficits reduce national savings. Flow-of-funds equilibrium thus requires higher real interest rates and lower levels of investment spending.

Even in a sticky-price context it may well be that higher deficits reduce investment. The central bank can, and probably will, change monetary policy to neutralize the effect of the higher deficit on real GDP. The central bank chose its baseline monetary policy in order to try to strike the optimum balance between the risk of higher-than-necessary unemployment and the risk of rising inflation. The central bank does not want this balance disturbed by shifts in the IS curve, hence it is highly likely to use monetary policy to offset the effect of the deficit-driven shift in the IS curve on the level of real GDP and employment. The IS curve shifts out, but interest rates rise, leaving real GDP unchanged and investment lowered.

Low investment reduces capital accumulation and productivity growth, putting the country on a trajectory to a lower steady-state growth path. Since the early 1960s, economists have argued that economic growth is fastest and the economy is best off when the policy mix pursued by the government and the central bank is one of tight fiscal policy (a government surplus) and loose monetary policy (a relatively low interest rate). Together this policy mix can produce full employment, high investment, and relatively rapid economic growth.

Over the course of time, its has seemed that the U.S. government has the opposite bias. Certainly for a period of a decade and a half beginning with the Reagan tax cuts of the early 1980s, the U.S. economy has had loose fiscal policy and tight monetary policy. Now the U.S. has a budget surplus and relatively high investment. Partly these are a result of good luck, but partly they are a result of politicians' taking economists' advice on the policy mix for the first time in more than a generation.

Higher Full-Employment Deficits Reduce Investment

Flexible-Price Flow-of-Funds Diagram

Real
Interest
Rate

Larger deficits reduce total savings...

...hiking interest rates...

Investment Demand

Flow-of-Funds

...and reducing investment.

Real
Interest
Rate

Larger full-employment deficits shift the IS curve out...

...leading the central bank to raise interest rates...

Y*

...and higher interest rates reduce investment.

If the deficits continues for long, they will begin to have an effect on the economy's capital intensity. The reduction in national savings as a share of GDP will reduce the economy's steady-state capital-output ratio, which you will recall is equal to:

$$\kappa^* = \frac{s}{n + g + \delta}$$

Long-Run Effects of Persistent Deficits on Economic Growth
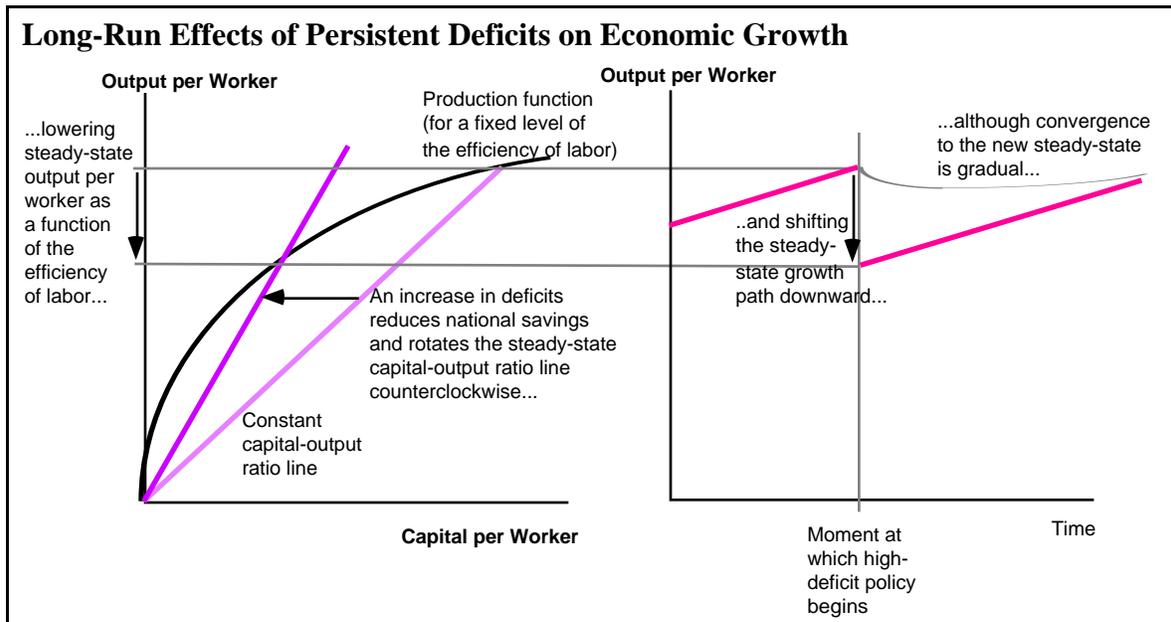
A lower steady-state capital-ouput ratio implies a lower level of output per worker along the steady-state growth path for any given level of the efficiency of labor. Thus a policy of persistent deficits will--as long as the rise in the deficit reduces national savings--reduce the level of output per worker in the long run below what it would otherwise have been. (This, at least, is the conventional analysis of the interaction between deficits and long-run growth. It has been challenged by a group of professors centered on Harvard's Robert Barro--as is discussed below in the chapter on the future of macroeconomics.)

Debt Service, Taxation, and Real GDP

But there is still more. A higher deficit means a higher debt, which means that the government owes more in the way of interest payments to bondholders. Over time--even if the level of the deficit is kept constant--the increase in interest payment will require tax increases. And these tax increases will discourage entrepreneurship and economic activity. In addition to the reduction in output per worker resulting from the lower capital-output ratio, there will be an additional reduction in output per worker: the increased taxes needed to finance the interest owed on the national debt will have negative supply-side effects on production.

The interaction of macroeconomic policy, tax policy, incentives for production, and the level of real GDP deserves more space. No discussion of fiscal policy could be complete without noting, for example, a possible drawback of the progressive tax rates that create strong fiscal automatic stabilizers. The higher the marginal tax rate, the greater the danger that at the margin taxes will discourage economic activity--leading either to hordes of lawyers wasting social time executing negative-sum tax-avoidance strategies, to a shift away from aggressive entrepreneurship toward more cautious, less growth-promoting activities taxed at lower rates, or to a depreciated exchange rate (and thus less power to purchase imports) as capital flows across national borders to jurisdictions that have lower tax rates at the margin.

Thinking through these issues is complicated. Are government expenditures on infrastructure, basic research, and other public goods themselves productive? Do they raise total output by more than the increased tax rates threaten to reduce it? And what is the government's objective? After all, maximizing measured total output is the same thing as maximizing social welfare only if externalities are absent, and only if the distribution of total wealth corresponds to the weight individuals have in the social welfare function—with the tastes and desires of the rich being given more weight.

These topics are traditionally reserved for public finance courses, and are not covered in macroeconomics courses. But no one should think that an analysis of fiscal policy can start and end with the effects of discretionary fiscal policy and automatic stabilizers on the business cycle, and the effects of persistent deficits on national saving. There is much more to be thought about.