Since the early eighties no economic variable has received more attention than the federal government's budget deficit. The popular press is filled with conflicting reports about the relationship between deficits and other economic variables. Debates persist over whether deficits have harmful, neutral, or helpful effects on the economy. In this chapter we examine the economics of the budget deficit. We cannot hope to resolve the differences of opinion, but we do hope to clarify the underlying causes of the differences.

We begin with a discussion of the measurement of the deficit. The figures typically reported in the press contain a bias that overstates the deficit. We then turn to the analysis of how the deficit affects the economy, and in what sense it may be a burden to future generations.

**Some Measurement Issues**

a. *the Eisner adjustments*

The official deficit is based on the national income and product accounts (nipa) and it is just the difference between total dollar outlays and total dollar revenues of the federal government. For the U.S. in 1993 this figure was about $225 billion. Recently, the economist Robert Eisner has argued that the official numbers are very misleading.\(^{28}\) He cites three serious deficiencies.

First, the figure is only the federal deficit, and so omits any deficits or surpluses at the state and local levels of government. To get a better picture of the deficit, you need to include the state and local numbers, and, since state and local governments typically run surpluses, they

\(^{28}\) The problems with regard to the measurement of the federal deficit are discussed in detail in his *How Real is the Federal Deficit?* New York: The Free Press (1986).
tend to offset the federal deficit. Indeed, state and local surpluses were quite large in the 1980s averaging about $40 billion a year. However, they have since fallen to less than $10 billion per year in the early 1990s.

Second, the federal government treats capital expenditures in an odd way. If the government spends $100 million on a new federal building, they count it as a current expense. The $100 million building is treated in the same way as spending on wages or utilities. But, there is a big difference between wages or utility bills, and a capital expense. The building still stands at the year's end and could be sold. For instance, if after the first year the building could be sold for $95 million, the cost to the government of using the building over the year was $5 million, not $100 million.\(^2\)\(^9\) The federal government should count depreciation as a cost, not the capital expense, and since capital expenses are typically larger than depreciation, this leads to an overestimate of the deficit.

Third, inflation erodes the real value of any debt. For example, suppose you owe $10,000 in student loans and the price of a big screen TV is $1,000. Your debt represents 10 TVs. If over the next year a 10% inflation pushes the price of big screen TVs up to $1,100, your debt at the end of the year represents just 9.1 big screen sets. You are better off because you owe nearly one less TV than you did the previous year. The real value of your debt has fallen by the same 10% that prices rose.\(^3\)\(^0\)

The federal government gains in the same way when inflation reduces the real value of its debt, and the deficit should be adjusted accordingly. To obtain the real deficit, the inflation gain must be subtracted from the official figure. In particular,

\[
\text{real deficit} = \text{official deficit} - \pi_t \cdot B^t_{t-1}
\]

This adjustment can be large. For example, in 1993 the value of the federal debt held by the private sector was about $2,966 billion and the inflation rate over the same year was 2.5%, measured by the CPI. The inflation gain to the federal government over this period was $74.1

\(^2\) We are ignoring here the interest income foregone because the $100 million is in the building and not in an interest earning asset (or, more likely in this case, the $100 million could have been used to reduce the national debt and thereby save some interest payments on it).

\(^3\) To get the 10% figure note that $10,000/$1,100 = 9.090909..., and the percent change in this case is % change = [(9.090909 - 10)/9.090909]100 = -10%
billion (.025×$2,966). The official deficit over the same period was about $226 billion so that the real deficit was $151.9 billion. The $74.1 billion overstatement amounts to an error of about 33%.

Often times measurement error is unavoidable. We have met such cases in GDP, the CPI, and the unemployment rate. For these variables it would be very costly to improve the estimates, so we make do with the existing numbers. The adjustment in the treatment of the federal government's capital would also be costly, and controversy would plague the estimation of the depreciation figures. However, there is no such argument for the inflation adjustment and the recognition of state and local government surpluses.

The official deficit, the real deficit, and the combined real and state and local deficits are pictured in Figure 18.1. The various measures move together over time, small fluctuations around a balanced budget until around 1970 when there is a distinct tendency toward deficits. However, the magnitudes of the deficits are quite different. The average official deficit from 1970 through 1991 was $97 billion, while the average real deficit was less than half as large at $46 billion. The average combined deficit was smaller yet at $24 billion. It is also interesting to note that the combined deficit was actually in surplus as late as 1988 when the real deficit was nearly $100 billion less than the official figure.
b. the cyclically adjusted deficit

When a recession begins the federal budget automatically changes. With the fall in income, income tax revenue declines as does revenue from the Social Security tax and the corporate income tax. At the same time more families become eligible for food stamps and other income support programs, and outlays on transfer payments increase. Since outlays increase and revenues fall, the deficit increases. In general, when income decreases, the deficit rises, and when income rises the deficit shrinks. This occurs automatically. It does not require an act by Congress or the president.

This poses a problem. Suppose you observe an increase in the deficit from, say, $140 billion to $200 billion. Does this mean that policy makers have passed new spending programs or cut tax rates? We cannot know unless we have information about the state of economy. The $60 billion increase in the deficit could also be the result of a recession or a slowdown in the economy. To isolate the consequences of policy decisions on the deficit, we need to "take out" the effects of changes in income on the deficit.

To take out the effects of movements in total output we do the following. First, select the unemployment rate that you guess would prevail during normal times. Currently this may be about 5% or 5 1/2%. Given this unemployment rate, estimate the level of real GDP, say by using Okun's law. We then estimate what total outlays and total tax revenues would be at this level of real GDP. We call these estimates cyclically adjusted or high employment outlays and revenues. The cyclically adjusted or high employment deficit is just the difference between the two

\[
\text{cyclically adjusted deficit} = \text{cyclically adjusted outlays} - \text{cyclically adjusted revenues}
\]

There are two important things to notice about the cyclically adjusted deficit. First, it is a hypothetical number based on estimates of several different factors. Second, the cyclically adjusted deficit does not change when income changes. It is this last feature that motivated its construction. Changes in this deficit occur only if policy changes affect our estimates of high employment outlays or high employment revenues. For this reason, when you want to examine
how policy affects the deficit, you need to look at the cyclically adjusted or high employment
deficit, not the official one.

In general, the official deficit moves in the same direction as the high employment
deficit. This is shown in Figure 18.2. However, over short periods of time this need not be true.
For example, the economy fell into a recession in the last half of 1990 that lasted into 1991, and
the deficit over this period increased from $162 billion to about $181 billion. At the same time
policy shifted to reduce the deficit, and the high employment deficit fell from $186 billion to
$122 billion. So, policy changed to lower the deficit, but the recession more than offset these
policy effects and produced an increase in the deficit of $19 billion.

**Ricardian Equivalence**

Confusion over the effects of a deficit is not surprising since the same recorded "deficit"
can result from a wide variety of different monetary and fiscal policies. Each of these policies
will have different effects on the economy. This, in part, explains the apparent contradictions.
When people argue about deficits, they often are not thinking about the same underlying policy.
Each time the reported deficit changes, one must first take care to understand the nature of the
change. Has government spending increased without an accompanying increase in taxes? Was
the increase in government spending on infrastructure goods? Have taxes been cut with no
similar cut in spending? Agreement must first be reached on these issues before a meaningful analysis of the deficit can take place.

We know from our study of the government budget constraint that when the deficit increases something else must change. Government spending or transfers could rise, taxes could fall, or money growth could slow. We also know that changes in spending and income taxes have effects on the economy even when they don't affect the deficit. To isolate the effect of the deficit, we must be careful to account for any changes in spending and income tax rates. To do this we take the easy way out, and keep government spending and income tax rates constant. So, we assume that the increase in the deficit is financed, or accounted for, by a decrease in lump sum taxes. In this way we avoid attributing to the deficit effects that are really coming from changes in tax rates or spending.

To begin we conduct the following simple experiment. We lower lump sum taxes by $1 today and finance the shortfall by increasing borrowing for one period. This increases the deficit by $1. The $1 increase in the deficit means that next period taxes must be raised by $(1+R)$ to pay the interest and the principal on the new debt.\textsuperscript{31} This experiment is shown in Figure 18.3.

How will households respond to these changes? We do not expect any substitution effects because lump sum taxes do not affect the relative rewards of work versus leisure, or consumption today versus consumption tomorrow. What happens to wealth? The household's wealth increases by $1 today because of the tax cut. But, next period taxes go up by $(1+R)$ to pay the interest and principal on the new debt. To find the total change in wealth, we cannot just add the two figures together because they come at different points in time. To make the future

\textsuperscript{31} We are assuming here that there is no inflation so that the real and nominal rates of interest are the same, $R=r$. 

Figure 18.3  Deficit Experiment
tax hike comparable to the current tax cut, we must take its present value. With this in mind the total change in the household's wealth is

\[
\text{change in household wealth} = +$1 - \frac{(1+R)}{(1+R)}
= +$1 - $1
= $0.
\]

The deficit does not change the household's wealth because it doesn't change the present value of the household's tax payments. Since wealth has not changed, the household's consumption and work effort decisions will also not change. In effect, the household will just increase its savings by the amount of the tax cut, $1 in this case, in anticipation of the tax hike next period.

Suppose we complicate the experiment by not repaying the debt for two periods. Will change things? In this case the interest and principal payments grow to $(1+R)(1+R)$ after two periods. But, since taxes will not be raised for two periods, we now discount by $(1+R)(1+R)$, and the present value of the future tax liability remains $1. In short, extending the time it takes to pay the interest and principal does not change our results.

The deficit changes the timing of tax payments, but it does not change their present value; so in the present setting deficits do not affect wealth. Since wealth is not affected, the deficit does not affect the household's work effort or consumption decision. The production function and the profitability of investment projects are also left unaffected by deficits. In short, the deficit does not change the demand or supply of goods, labor, or money; and so the interest rate, real output, work effort, the real wage, and the price level do not change either. The deficit is neutral and the timing of taxes does not matter. When the timing of tax payments does not matter we say that Ricardian equivalence holds; Ricardian after the British economist David Ricardo who first noticed this result more than 150 years ago, and equivalence because debt financing does not shift any of the demand and supply curves.

**Ricardian failures**

If the deficit has any effects at all on interest rates and so forth, Ricardian equivalence must fail. There are two critical assumption underlying the equivalence or neutrality result.
First, the households who receive the tax cut are also the ones who must pay the tax hike in the future. Second, households can borrow up to their current wealth at the going rate of interest. These assumptions may fail if

1) some households have finite planning horizons
2) some households are credit constrained.

We will look at each of these failures in turn.

First, suppose that some households have finite planning horizons, perhaps they have no children. They may expect that when taxes are raised in the future to pay for current deficits, they will be dead and gone. This means that they get the benefit of the tax cut without the burden of the future tax increase, and so their wealth increases. As with any wealth increase, this encourages consumption and discourages work effort. The deficit is no longer neutral, and it matters whether spending is financed by lump sum taxes or by borrowing.

The deficit also fails to be neutral if some households are credit constrained. A household is credit constrained if they want to increase their current spending beyond their current income, but cannot get a loan. Perhaps the family is young and without a credit history, or is currently out of work with uncertain prospects for future employment. Alternatively, parents may expect their children to earn higher incomes than they do. In this case the parents would like to borrow on the basis of their children's income to increase the family's current consumption. But, fortunately, parents do not have a legal right to their children's income, and so loans will not be made on the promise of repayment by descendants.

Now, suppose the credit constrained household receives a tax cut of $100. What will they do with this income? The tax cut substitutes for the loan that they cannot get, and in this way the tax cut makes these households better off. They will respond to this increase in their wealth in the usual way by increasing their consumption and decreasing their work effort.

With either Ricardian failure some households are made better off by the deficit, and so experience a wealth effect. The wealth effect reduces the work effort supplied by these households and raises their consumption. These effects lead to others. The wealth effect on consumption shifts the $Y^d$ curve up and to the right, while the wealth effect on work effort shifts the $Y^s$ curve back and to the left. These shifts are shown in Figure 18.4. The shift in aggregate demand
tends to increase output, but the shift in aggregate supply tends to reduce it. Without knowing
the relative strengths of the two shifts we cannot predict the effect on real output, but we know
that the interest rate increases.

It is the increase in the interest rate that may impose a cost on future generations. The
higher interest rate leads to lower investment. This means that future generations will inherit
fewer factories and machines with which to work, fewer homes in which to live, and a less
advanced technology than they otherwise would. In this way current deficits harm later genera-
tions. It is important to note, however, that net investment remains positive and technology still
advances so that real per capita GDP continues to grow. Members of future generations will still
be better off on average than their current counterparts, but in the presence of Ricardian failures
the margin of improvement will not be as large.

Even with Ricardian failures, the deficit is unlikely to cause significant damage over a
short period of time. We know that investment is a relatively small fraction of capital, on the
order of 4%, and an increase in the deficit will not wipe out investment, but only cause it to be a
bit lower than it otherwise would be. Over a relatively short period of time, say several years, it
will not change the capital stock in any significant way, and so not affect the economy's capacity
to produce goods and services. To the extent that deficits are harmful, they are harmful because
of their cumulative effects over a period of decades. The insidious nature of the deficit renders
political efforts to reduce it even more diffi-
cult because no crisis arises to prompt
action.

Another implication of the analysis
is that there will be groups who favor
deficits. In particular, households with
finite planning horizons and households
who are credit constrained are made better
off by deficits and so would support them.
Moreover, the larger the Ricardian failure,
the larger will be the groups who favor
higher deficits. This adds yet another diffi-
culty for those who wish to cut deficits.
Extensions

a. deficits and the inflation

Some analysts argue that deficits cause inflation. This may be true, but it is not necessarily so. When a country runs deficits, it accumulates a debt. The interest, and perhaps the principal as well, must eventually be paid. As we emphasized in our discussion of the government budget constraint, this implies that the government must increase its revenues or decrease its expenditures in the future. One possibility on the revenue side is to raise taxes, but another is to print money. We know from our earlier analysis that if more money is printed, the price level will rise. So, if the future revenue that will be needed to pay the interest and principal on the debt comes from money creation, deficits are inflationary. However, if the future revenue comes from, say, higher income taxes or future expenditures fall, then a deficit is not inflationary.

b. a problem of interpretation

The economist Laurence Kotlikoff has recently argued that the deficit is an inherently arbitrary concept, which cannot be rescued by a few measurement adjustments. His argument can be illustrated with the following simple example. Imagine that households live for two periods. Suppose that in any one year there is a household in its first period of life, a "young" household, and a household in the second period of life, an "old" household. Thus, generations overlap or co-exist over a year, just as in the real world. Now suppose that the government decides to transfer $1 from the young generation to the old generation. This will increase transfer payments by $1, and there are at least two ways to finance it. First, the government could tax the young. This option would not change the deficit. Second, the government could borrow the $1 from the young and raise taxes next period by $(1+R) to pay the interest and principal on the debt. This option raises the deficit. The policy in both cases is the same - reduce the wealth of young households by $1 and transfer it to the old - but in one case a deficit grows, while in the other it does not.
This example may seem contrived, but in effect the current Social Security system works very much like it. The government currently taxes workers and transfers the revenue to retirees. If instead the government recorded the Social Security tax as a Social Security bond sale, which would not alter the essential features of the system, the budget deficit over the past twenty or thirty years would be much larger. Thus, the deficit may not tell us very much about the nature of the underlying fiscal policy.

Summary

At best, the deficits reported in the popular press are a very crude measure of government dissavings. In addition, deficits may rise and fall for a whole host of reasons, all of which imply something different about the economy. When you notice sharp changes in the deficit, the safest thing to do is to ask whether or not there has been a significant change in the state of the economy. Has a recession begun? Is a boom occurring? If not, then a policy change may have occurred, and it is important to find out the details of the policy change to predict the plausible effects on the economy as a whole.

Review Questions

1) Fill in the blanks

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2) Suppose parents believe their children and grandchildren will make substantially greater incomes than they do. Given the desire to "smooth" consumption, what would these parents wish to do; that is, do they wish to borrow or lend? Will they be successful in doing what they wish? How will they react to an increase in the exemption for children?

3) It appears that more couples today plan to have no children than did their predecessors. What is the likely consequence of this change on the effect of federal deficits?

4) Suppose that there are no Ricardian failures. Then, an increase in the deficit caused by a reduction in lump sum taxes will

   a) increase private savings
   b) increase the interest rate
   c) increase consumption
   d) increase investment

5) What are the three adjustments that Robert Eisner suggests to get a clearer picture of the deficit?

6) How does a deficit make future generations worse off? Can parents protect children from this harm? How?