The Long-Run Effects of Federal Budget Deficits

on National Saving and Private Domestic Investment

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Abstract

The Congressional Budget Office's analyses of the long-term effects of changes in federal fiscal policy include the effects of changes in federal budget deficits on aggregate output and income. Those effects depend on the responses of private saving and net inflows of foreign capital to changes in deficits. This paper reviews empirical estimates of those two effects and explains how changes in private saving and net inflows of foreign capital can offset some of the effects of changes in deficits on national saving and private domestic investment. In its analyses, CBO uses a range of estimates to reflect the high degree of uncertainty surrounding the magnitude of those offsets. On the basis of results published in the empirical literature, CBO concludes that for each dollar's increase in the federal deficit, the effect on investment ranges from a decrease of 15 cents to a decrease of 50 cents, with a central estimate of a decrease of 33 cents.

Introduction

The Congressional Budget Office's (CBO's) estimates of the economic effects of changes in federal fiscal policy often include the short-run consequences of changes in federal taxes and spending and the long-run consequences of the associated changes in the federal budget deficits. Increases in federal budget deficits affect the economy in the long run by reducing national saving (the total amount of saving by households, businesses, and governments) and hence the funds that are available for private investment in productive capital.[1] Deficits thus "crowd out" private domestic investment in the long run. Less investment leads to a smaller stock of capital and lower output. Lower output and lower national saving lead to a lower standard of living for U.S. households than would otherwise be the case.

The amount of crowding out caused by an increase in the federal budget deficit depends on the magnitude of the resulting increases in private saving and in net inflows of foreign capital (foreign purchases of U.S. assets minus U.S. purchases of foreign assets). The offset from private saving represents the amount by which the private sector increases its saving in response to each dollar's increase in the federal deficit. Similarly, the offset from net inflows of foreign capital is the amount by which those inflows increase in response to each dollar's increase in the deficit.

CBO's analysis of the effects of changes in federal fiscal policy use estimates of those offsets based on a review of relevant studies published over the past two decades. To reflect the high degree of uncertainty about the magnitude of the offsets, CBO uses a range of estimates. For each dollar's increase in the federal deficit, CBO's analyses reflect a reduction in national saving, ranging from 39 cents to 71 cents with a central estimate of 57 cents, and a reduction in domestic investment, ranging from 15 cents to 50 cents with a central estimate of 33 cents. CBO's estimates of the long-run effects of decreases in federal deficits are approximately symmetric to the effect of increases, so in CBO's analysis a dollar's decrease in federal deficits raises domestic investment by 15 cents to 50 cents.

The Long-Run Economic Effects of Changes in Federal Budget Deficits

By definition, domestic investment, the components of national saving, and net inflows of foreign capital satisfy the following relationship:

$$I = S + (T - G) - NFI$$

where I is domestic investment (in fixed capital and inventories); S is private (household and business) saving; T is the combined tax revenues of federal, state, and local governments; G is total spending by federal, state, and local governments; and NFI is net foreign investment, which equals net inflows of foreign capital but with the opposite sign.[2] The sum $S + (T - G)$ equals national saving, and the expression $(T - G)$ is the sum of the budget balances of federal, state, and local governments.

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[1] This paper focuses on the long-run negative effects of higher deficits on national saving and domestic investment. The short-run effects of higher deficits can be quite different, especially if the economy is significantly underusing capital and labor resources. See Reichling and Whalen (2012).

[2] When *NFI* is negative, for example, foreign investors are investing more money in the United States than U.S. investors are sending abroad, and thus net inflows of foreign capital are positive.

If private saving, net inflows of foreign capital (equivalently, net foreign investment), and the budget balances of state and local governments were constant, then a dollar's increase in the federal budget deficit would lead to a dollar's decrease in national saving and a dollar's decrease in investment. Private saving and net inflows of foreign capital, however, do not remain constant when the federal deficit increases. In the long run, private saving increases and offsets some of the decline in national saving, which reduces the impact of a higher deficit on investment, output, and income. Net inflows of foreign capital similarly increase with an increase in the federal deficit in the long run and further offset some of the decline in investment, output, and income; however, some of the income created by the additional net inflows of foreign capital will be paid to foreign investors rather than to U.S. households. Because those offsets are only partial, the net effect of higher deficits is less national saving and private domestic investment, which results in a smaller capital stock, lower output, and higher interest rates over time than would otherwise be the case.

CBO uses the offsets from private saving and net inflows of foreign capital with its Solow-type growth model to analyze the long-run effects of changes in federal fiscal policy.[3] In that model, economic output is determined by the number of hours of labor that workers supply, the size and composition of the capital stock (for example, factories and computers), and total factor productivity (the combined productivity of labor and capital). In the model, people base their decisions about working and saving primarily on current economic conditions—especially wage levels, interest rates, and government policies.[4] In addition, people in the model respond to current developments as they have, on average, in the past. Those past responses have reflected, in part, an anticipation of other policies that might follow; for example, the degree to which people have increased their consumption in response to tax cuts has depended partly on their anticipation of future tax policy. Therefore, the responses in the model reflect people's anticipation of future policies in a general way, but the model does not incorporate an assumption that people anticipate the exact nature of future policies in detail.

Offset From Private Saving
In CBO's analyses, an increase in the federal deficit leads to greater private saving, which increases the amount of funds available to purchase the additional government debt and to finance domestic investment. Increased deficits lead to greater private saving for three reasons. First, some people expect that policymakers will raise taxes or cut spending in the future to cover the cost of paying interest on the additional federal debt, so those people increase their saving to prepare for paying higher taxes or receiving less in benefits. Second, many policies that give rise to larger deficits (such as tax cuts or increases in government transfer payments) put more money

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[3] CBO's Solow-type model is an enhanced version of a widely used model originally developed by Robert Solow. For a detailed description, see Congressional Budget Office (2001). CBO also uses a life-cycle model—an overlapping-generations, general-equilibrium model based on another standard model of the economy—in its analysis of the economic effects of deficits; see Nishiyama (2013).

[4] For discussion of the ways in which the supply of labor responds to changes in fiscal policy in CBO's modeling, see Congressional Budget Office (2012).

in private hands, some of which is saved. Finally, additional federal borrowing tends to raise interest rates, which boosts the return on saving.[5]

Offset From Net Inflows of Foreign Capital
In CBO's analyses, an increase in the federal deficit leads to additional net inflows of foreign capital, which increases the amount of funds available to purchase the additional government debt and to finance domestic investment. Those additional inflows are partly a response to higher interest rates that accompany larger federal deficits. Unlike U.S. investors, however, foreign investors are not motivated by the need to increase their saving in anticipation of future tax increases or spending cuts.

Although flows of capital into the United States help to moderate the decline in private domestic investment, the income earned on the additional investment that is financed by the inflows does not accrue entirely to U.S. residents. Greater net inflows of foreign capital increase nonresidents' claims on the United States, and the income from those claims generally flows back to foreign investors. Consequently, the greater the offset from net inflows of foreign capital, the larger the difference between the long-run effect of deficits on output and income in the United States.[6]

Deficits and Interest Rates
In the long run, an increase in federal deficits leads to higher interest rates because the smaller amount of investment means that the stock of productive capital will be smaller than it would have been had the federal deficit not increased. In particular, the productivity of existing capital is greater because more workers make use of each unit of capital—for example, each computer, piece of machinery, or structure—and that greater productivity raises the return on capital. That higher return boosts the return on equity shares in the ownership of capital and on other investments (such as interest rates on federal debt) that compete for people's savings.[7]

CBO's ranges of responses to higher federal deficits by private saving and net inflows of foreign capital imply a range of effects on interest rates. CBO's central estimate of the effect of higher deficits on investment implies that an increase in the deficit equal to 1 percent of output raises the interest rate on new government debt by 2 basis points (100 basis points is equivalent to one percentage point) when the economy is operating at its maximum sustainable level; the effect is 1 basis point with the small effect of deficits on investment and 4 basis points with the large effect.

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[5] A higher interest rate increases the rate of return on saving, strengthening people's incentive to save. However, higher interest also means that people do not need to save as much to have the same future standard of living, which tends to reduce their saving. CBO concludes, as do most analysts, that the former effect outweighs the latter, such that a higher interest rate increases saving.

[6] In assessing the long-run effects of spending and tax policies on output, CBO focuses on gross national product (GNP). Unlike the more commonly cited gross domestic product (GDP), GNP includes the income that U.S. residents earn abroad and excludes the income that foreigners earn in this country. GNP is therefore a better measure of the additional resources available to U.S. households. Other things being equal, increases in foreign claims on the United States cause a greater reduction in GNP (and the well-being of U.S. households) than in GDP, and reductions lead to a greater increase in GNP than in GDP.

[7] Larger federal deficits may also raise interest rates for other reasons, such as concerns about the government's commitment or ability to repay its debt. Those other channels are not reflected in CBO's Solow-type growth model. For additional discussion, see Congressional Budget Office (2010).

Evidence of the Effects of Federal Budget Deficits on Saving and Foreign Capital Inflows

CBO's ranges of offsets from private saving and net inflows of foreign capital, and hence the magnitude of the crowding-out effects of federal deficits, are based on the agency's assessment of relevant studies published over the past two decades. The authors of those studies typically used the experiences of a large number of countries, many economic indicators covering long periods, and a variety of statistical techniques.[8] The authors reported a wide range of estimates, within and across studies, which are very sensitive to their assumptions. The studies used by CBO are described here in chronological order.

Edwards (1996) reports an estimate of the private-saving offset of 55 cents for each dollar of additional deficit, based on the regression in his study that is most applicable to the United States. Regressions that follow a variety of alternative specifications produce estimates that range from 36 cents to 58 cents. Those end points are less relevant to the United States because they are based on a sample that includes only developing economies. When the estimation sample includes all countries, most of the estimates cluster around 55 cents per dollar of additional deficit.

Loayza, Schmidt-Hebbel, and Servén (2000) report that it takes time for the private sector to change its saving behavior in response to changes in deficits and that the saving offset is small in the same year but larger over the longer term. Their estimate of the short-run offset that is most related to the saving-offset parameter used by CBO is between 6 cents and 39 cents per dollar of additional deficit. For the long run, their estimate of the offset is larger—between 34 cents and 93 cents. When the authors restrict their sample to the member countries of the Organisation for Economic Co-operation and Development, the short-term offset is just 11 cents per dollar, increasing to about 34 cents in the long run.[9]

Lopez, Schmidt-Hebbel, and Servén (2000) find that private saving does not fully offset additional government deficits, meaning that government deficits affect investment. However, they find that the private sector in industrialized countries is likely to save more in anticipation of higher future taxes or lower transfers accompanying larger government deficits than is the private sector in developing economies. They do not report specific estimates for the sizes of the private-saving offsets.

Giavazzi, Jappelli, and Pagano (2000) report that the private-saving offset ranges from 10 cents to 50 cents when increases in deficits come from greater government spending on consumption goods and services and that it ranges from 50 cents to 97 cents when increases in deficits come from lower taxes. The high ends of those two ranges correspond to episodes of particularly large reductions in spending and increases in taxes.

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[8] Most used a regression analysis with instrumental variables, a statistical approach that attempts to isolate the causal effect of changes in deficits on saving and to distinguish the causal effects that may be jointly affected by another factor such as a recession.

[9] The Organisation for Economic Co-operation and Development currently has 34 member countries, including many of the world's largest economies but also a number of emerging economies, such as Mexico, Chile, and Turkey. Current membership is listed at www.oecd.org/about/membersandpartners/.

Chinn and Prasad (2003) estimate that national saving decreases by about 36 cents for every dollar's increase in the government budget deficit. That estimate is equivalent to a private saving offset of about 64 cents, in CBO's model. They also estimate that the private saving offset is about 56 cents when the sample is restricted to industrialized countries. Furthermore, they estimate that an additional dollar of government deficit from additional federal spending raises net foreign capital inflows by between 31 cents and 38 cents. That amount, however, drops to a statistically insignificant 13 cents to 14 cents when the sample is restricted to industrialized countries.

Chinn and Ito (2005, 2007) estimate a smaller amount of crowding out than is implied by the other studies cited here. They report that private saving increases by approximately 80 cents for every dollar's increase in the federal deficit, for industrial and developing economies alike. They also report that the change in net inflows of foreign capital is about 15 cents or 20 cents for every additional dollar of federal deficit, based on the full sample and the industrialized-country sample, respectively. Their findings suggest that the total drop in investment from a dollar's increase in the deficit is, at most, a few cents.

Röhn (2010) reports an average saving offset of about 40 cents for every dollar of additional deficit. However, his estimates vary widely by country and by the type of policy driving the change in the deficit. He estimates a very high offset in response to policies that affect government revenues and very low offsets from other policies that affect deficits, such as changes in spending on public investment. Röhn's review of earlier studies identified a wide range of the saving offset, from 33 cents to 90 cents.

Chinn, Eichengreen, and Ito (2011) estimate that each dollar's increase in the deficit leads to a 57 cent increase in private saving and a 30 cent increase in net inflows of foreign capital. When they restrict their sample to developed economies, the estimates decline to a 52 cent increase in private saving and a 29 cent increase in net inflows of foreign capital. Moreover, they report that although a dollar's increase in the deficit has a statistically insignificant effect on investment in the full sample of countries, it causes a 30 cent decrease in investment in developed economies.

CBO's Ranges for the Effects of Federal Budget Deficits on Saving and Investment

CBO's ranges for the responses of private saving and net inflows of foreign capital to changes in federal deficits are intended to cover roughly the middle two-thirds of the likely values, based on CBO's evaluation of the empirical evidence cited in the previous section and other economic research. Estimates of the offsets that lie outside those ranges include some—for example, the findings of Chinn and Ito (2005)—implying negligible effects of deficits on investment and interest rates as well as others implying large effects of deficits on interest rates or other aspects of the economy.[10]

CBO's central estimate of the effect on investment is 33 cents for each dollar's increase in the deficit— the large estimate of the effect is a decline in investment of 50 cents and the small estimate is a decline of 15 cents. Those estimates reflect CBO's ranges of 29 cents to 61 cents for the increase in private saving and 21 cents to 24 cents for the increase in net inflows of foreign

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[10] Engen and Hubbard (2005) and Laubach (2009) estimate large effects of deficits on interest rates, for example.

capital.[11] In particular, CBO's analyses of the long-run effects of changes in federal fiscal policy use the following:

- *Small estimate of the effect of deficits on investment*. Each additional dollar of deficit leads to a 15 cent decline in domestic investment. In particular, every additional dollar of deficit is projected to increase private saving by 61 cents and to reduce national saving by 39 cents, and every dollar's decline in national saving is projected to lead to a 61 cent increase in the amount of foreign capital invested in the United States. Together, those estimates imply that a dollar's increase in the federal deficit results in a 61 cent increase in private saving, a 24 cent increase in net capital inflows (that is, 39 cents times 0.61), and a 15 cent decline in domestic investment.

- *Central estimate of the effect of deficits on investment.* Each additional dollar of deficit leads to a 33 cent decline in domestic investment. In particular, every additional dollar of deficit is projected to increase private saving by 43 cents and reduce national saving by 57 cents, and every dollar's decline in national saving is projected to lead to a 24 cent increase in the amount of foreign capital invested in the United States. Together, those estimates imply that a dollar's increase in the federal deficit results in a 43 cent increase in private saving, a 24 cent increase in net capital inflows (that is, 57 cents times 0.43), and a 33 cent decline in domestic investment.

- *Large estimate of the effect of deficits on investment*. Each additional dollar of deficit leads to a 50 cent decline in domestic investment. In particular, every additional dollar of deficit is projected to increase private saving by 29 cents and reduce national saving by 71 cents, and every dollar's decline in national saving is projected to lead to a 29 cent increase in the amount of foreign capital invested in the United States. Together, those estimates imply that a dollar's increase in the budget federal deficit results in a 29 cent increase in private saving, a 21 cent increase in net capital inflows (that is, 71 cents times 0.29), and a 50 cent decline in domestic investment.

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[11] All offsets are rounded to the nearest cent.

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