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Analyzing the Economic and Budgetary Effects of a 10 Percent Cut in Income Tax Rates

Summary

Changes in tax policy can influence the economy, and those economic effects can in turn affect the federal budget. Although conventional estimates of the budgetary effect of tax policies incorporate a variety of behavioral effects, they are, nonetheless, based on a fixed economic baseline. For that reason, they do not include the budgetary impact of any possible macroeconomic effects of tax policies.

This brief by the Congressional Budget Office (CBO) analyzes the macroeconomic effects of a simple tax policy: a 10 percent reduction in all federal tax rates on individual income. Because there is little consensus on exactly how tax cuts affect the economy, CBO based its analysis on a number of different sets of assumptions about how people respond to changes in tax policy, how open the economy is to flows of foreign capital, and how the revenue loss from the tax cut might eventually be offset. Under those various assumptions, CBO estimated effects on output ranging from increases of 0.5 percent to 0.8 percent over the first five years on average, and from a decrease of 0.1 percent to an increase of 1.1 percent over the second five years. The budgetary impact of the economic changes was estimated to offset between 1 percent and 22 percent of the revenue loss from the tax cut over the first five years and add as much as 5 percent to that loss or offset as much as 32 percent of it over the second five years.

—Douglas Holtz-Eakin
Director

Tax policy affects the economy in a variety of ways. Changes in marginal tax rates and changes in after-tax incomes affect people's choices about how they divide their time between work and leisure and how they divide their income between consumption and saving. Those choices in turn affect the amount of labor and productive capital available to generate economic output. Tax policy also influences overall demand for goods and services, which affects output in the short run. Finally, tax policy affects the composition and level of output by changing the relative returns to different economic activities. All those economic effects in turn influence the federal budget.

As part of its annual analysis of the President's budgetary proposals, the Congressional Budget Office (CBO) has for the past several years analyzed the potential economic effects of those proposals. The total estimated economic effects in those analyses include the effects of tax proposals, but they also include the effects of various spending proposals. Moreover, the tax proposals comprise policies with different economic effects—for example, some provisions may tend to increase output while others may tend to decrease it. Therefore, CBO's macroeconomic analysis of the overall budget provides limited information about the estimated effects of particular tax policies.

To illustrate more clearly how CBO estimates the economic effects of tax policies, this brief analyzes the economic and budgetary effects of a relatively simple tax proposal: a 10 percent reduction in personal income tax rates.[1] CBO finds that such a cut in taxes might increase output by amounts roughly in the range of zero to 1 percent on average over the first 10 years, among other economic effects. Under various assumptions, those macroeconomic effects are estimated to offset between 1 percent and 22 percent of the revenue loss from the tax

1. A more detailed discussion of this analysis can be found in Robert Dennis and others, *Macroeconomic Analysis of a 10 Percent Cut in Income Tax Rates*, CBO Technical Paper 2004-7 (May 2004).

cut over the first five years and add as much as 5 percent to that loss or offset as much as 32 percent of it over the second five years.

The Tax Proposal

This brief analyzes a stylized 10 percent reduction in all federal individual income tax rates—for example, an individual facing a 25 percent federal marginal tax rate would see that rate fall to 22.5 percent. The rates that are reduced include those on ordinary income, those on long-term capital gains and dividend income, and those for the alternative minimum tax (AMT). The analysis assumes that no offsetting changes to spending or other tax policies are made over the first 10 years following the tax cut, so that the reduction in revenues leads to a net increase in the deficit over that period. Eventually, the restoration of long-run budget stability following the tax cut requires offsetting changes in taxes or spending.[2] CBO assumes those changes would occur after 10 years, and it examined a range of alternative assumptions about what future policymakers might do.

Two key variables in CBO's analysis are the effective marginal tax rates on capital and labor income—the rates levied by both federal and state governments on an additional dollar of capital or labor income (capital income includes income from interest, dividends, capital gains, and rent, whereas labor income includes wages and salaries and the labor portion of the earnings of the self-employed). Those rates are important because they provide a summary measure of the effect of a tax policy on people's compensation for working or saving a little bit more and therefore earning a little bit more labor or capital income.

Although the policy being considered lowers federal income tax rates by a uniform 10 percent, it has differing effects on the effective marginal tax rates on labor and capital income. Because the policy does not change state income taxes or payroll taxes (such as Social Security and Medicare taxes) that fall on labor income, the effective tax on labor income falls by only 5 percent to 6 percent. Similarly, because corporate taxes and state taxes on capital income are unchanged, the effective tax rate on capital would fall by only about 3 percent.

Conventional Revenue Effects

CBO's analysis begins with an estimate, provided by the Joint Committee on Taxation, of conventional revenue effects. Those estimates assume that tax changes do not affect gross domestic product, but they incorporate changes in taxable income that can occur with a fixed level of gross domestic product (GDP). Such changes include shifts in the timing and form of income, as well as changes in compliance. For example, a reduction in tax rates may encourage people to receive more of their income as taxable wages and less in the form of nontaxed benefits, such as employer-provided health insurance or pension contributions. Lower tax rates on individual income may also lead more businesses to choose the noncorporate form of organization (which implies that they are taxed at individual rather than corporate rates) and reduce tax evasion and avoidance.

According to that conventional estimate, the tax reduction would lower revenues by $466 billion over the first five years and $775 billion over the second five years. Including additional debt service adds about 25 percent to the total budgetary impact over the first 10 years (see Table 1). The reductions in ordinary and AMT rates account for almost all of the revenue loss; very little comes from reductions in taxes on capital gains and dividends.

Supply-Side Effects of the Tax Cut

The macroeconomic effects of a tax cut can be broadly divided into long-lasting supply-side effects and short-run demand-side effects. Supply-side effects are changes in the economy's underlying potential to produce goods and services on a sustainable basis. That potential depends on the size and quality of both the labor force and the stock of productive capital, as well as on the level of technological know-how. Because they influence potential output, supply-side changes can have a lasting effect on the economy.

2. Estimates that assume people make choices about their economic activities based in part on their expectations of future conditions—in other words, that they act with foresight—require long-run assumptions about the state of the budget. CBO's estimates assuming foresight begin from a baseline with a constant debt-to-gross domestic product (GDP) ratio. Once revenue is lost through the tax cut, there must be offsetting policies at some point, or debt and interest payments will grow without bound relative to GDP (because the models assume that the interest rate on government debt is higher than the rate of economic growth).

Table 1.

Conventional Estimate of the Budgetary Costs of Cutting Federal Individual Income Tax Rates by 10 Percent

(Billions of dollars)

	First Five Years	Second Five Years
Total Revenue Loss (Conventional estimate)	-466	-775
Debt Service	-56	-261
Total Effect on the Budget Surplus	-522	-1,035

Sources: Congressional Budget Office and Joint Committee on Taxation.

Note: Estimates are based on CBO's January 2003 baseline adjusted for the effects of the Jobs and Growth Tax Relief Reconciliation Act and assume the tax cut is effective January 1, 2004.

Supply-Side Effects on Workers

One way that lower marginal tax rates influence the economy's potential output is by affecting the quantity and quality of labor supplied by workers. This analysis addresses the effect of the tax cut on the quantity of hours of labor supplied (weighted by the productivity of those working). Tax policies may also affect the quality of labor by, for example, influencing the effort expended while working or the level of education and training that workers choose. However, there is insufficient theoretical and empirical basis for those effects to allow CBO to incorporate them in this analysis.

The reduced marginal rates mean that people receive more after-tax compensation for each additional hour of labor, which encourages people to work more hours. However, people also receive more total after-tax income for any given number of hours worked, which tends to decrease hours worked. Empirical studies tend to estimate that, on balance, reductions in marginal tax rates increase the hours of labor supplied, primarily because the cuts draw secondary earners (for example, the spouse of a household's primary earner) into the labor force.

Another way in which the tax cut could affect hours worked is by changing people's expectations about future policies. The tax cut would increase the cumulative 10-year deficit, resulting in a higher level of government debt. That rise could lead people to expect that, at some time after that 10-year period, taxes or spending would have to change to finance the increase in interest payments on the additional debt.[3] If people expected to have to pay more in taxes or receive less in government services or direct payments (such as Social Security benefits), they might choose to work and save more now so as to have more resources to compensate for the larger burden in the future. In addition, if people expected to face higher tax rates on their income from labor in the future, they might want to work more before the rates went up and work less when the rates rose.

It is difficult to gauge, however, the extent to which that type of foresight influences people's decisions, the time horizon that people consider in making plans, and the future changes in policy they actually expect. To illustrate the importance of those factors, CBO used various assumptions in its analysis about the extent of people's foresight and the expectations they might have about future policies.

Supply-Side Effects on the Capital Stock

The reduction in tax rates affects the amount and composition of the stock of productive capital—the tools, machinery, and infrastructure used to produce goods and services. The tax cuts affect the amount of capital primarily by influencing the levels of consumption and saving. All other things being equal, higher current consumption means that less of the resources produced by the economy are available to invest in productive capital. The lower marginal tax rates increase after-tax income, which tends to boost consumption. However, the reduction in marginal rates also increases the after-tax return to saving, which tends to increase saving and reduce current consumption. The net effect on consumption depends on, among other things, the degree of foresight that people use in making their saving decisions.

In addition, as described above, the higher cumulative 10-year deficit caused by the tax cut might lead some people to anticipate offsetting changes in policy in the future. To the extent that people expected higher taxes,

3. For some time, the shortfall could be made up by running larger deficits. However, the government could not follow such an approach indefinitely, because the interest costs compound relative to output over time (assuming, as CBO does, that the rate of interest on government debt is higher than the rate of economic growth).

Table 2.

Impact on Real GNP of a Deficit-Financed 10 Percent Cut in Federal Income Tax Rates

(Average percentage difference from baseline)

Assumptions	First Five Years	Second Five Years
Supply-Side Effects		
No Foresight	0.2	-0.1
Lifetime Foresight—Capital Immobile Across Borders		
Budget stabilized by cuts in government spending after 10 years	0.6	0.3
Budget stabilized by increases in tax rates after 10 years	0.6	0.5
Lifetime Foresight—Capital Flows Freely Across Borders		
Budget stabilized by cuts in government spending after 10 years	0.5	0.2
Budget stabilized by increases in tax rates after 10 years	0.6	0.3
Unlimited Foresight		
Budget stabilized by cuts in government spending after 10 years	0.7	0.7
Budget stabilized by increases in tax rates after 10 years	0.8	1.1
Supply-Side and Demand-Side Effects		
Global Insight's Model	0.4	n.a.
Macroeconomic Advisers' Model	0.5	n.a.

Source: Congressional Budget Office.

Notes: n.a. = not applicable.

Global Insight and Macroeconomic Advisers are commercial providers of economic forecasts.

In this analysis, CBO uses as its measure of output gross national product (GNP) rather than the more commonly cited gross domestic product (GDP) because in those circumstances in which capital can flow across borders, GDP can be a misleading guide to domestic incomes. If there are capital flows, foreigners can invest and earn returns from domestic production, meaning that a part of GDP is not available for domestic use. GNP—the amount produced by U.S. residents and the capital they own anywhere in the world—provides a better measure of the resources available in an open-economy context.

lower direct payments, or fewer government services in the years to come, they might reduce their spending and build up their savings to compensate for those anticipated policies. As with the analysis of labor supply, CBO used various assumptions about the extent of people's foresight and their expectations about future policy to analyze how their saving responds to tax cuts.

Effects on Technological Progress

In principle, the tax cut could also affect the economy by increasing the level of technological know-how. However, there is not enough evidence on how tax policy affects innovation for CBO to incorporate such effects in this analysis.[4]

CBO's Estimates of the Supply-Side Effects of the Tax Cut

CBO's analysis depends upon assumptions about how people and firms respond to changes in tax policy. Those assumptions are embodied in systems of equations referred to as "economic models." The estimated effects of the tax cut vary depending on which particular set of assumptions is used. Because there is insufficient evidence to conclusively identify which set of assumptions provides the most accurate estimates, CBO employed a number of such sets, which generated a range of results. However, that range does not span the possible effects of the tax cuts because people's behavior may differ from CBO's assumptions.

One important assumption concerns the degree of foresight and planning that households employ in making their economic decisions. Empirical evidence on that issue is mixed, so CBO employed three different assumptions regarding foresight. In the first ("no foresight"), households do not plan ahead and therefore respond only to current tax policy. Lower tax rates on labor encourage more labor supply, which tends to increase output. However, the tax cut also leads to higher consumption, which tends to reduce investment and the stock of productive capital and therefore decrease output.[5] On net, this approach indicates that the tax cut, if implemented, would

4. Reductions in tax rates on dividends and capital gains would tend to increase output by making the allocation of capital between the corporate and other sectors of the economy (such as housing) more efficient. However, the reduction in those taxes in the policy CBO analyzed is so small that it would probably have little effect on the estimates.

5. The model assumes that each dollar of the tax cut reduces capital investment by 36 cents.

raise the level of output by 0.2 percent over the first five years on average and reduce it by 0.1 percent over the second five years (see Table 2).[6]

Under the second assumption about foresight ("lifetime foresight"), households look forward and plan for what they expect to happen during their lifetimes. The final assumption ("unlimited foresight") assumes that households plan for the welfare of their descendants as well as their own. That means all future events, no matter how distant, can affect current behavior.

When people plan ahead in making their decisions, they must implicitly evaluate how the budget will be stabilized in the long run despite the lower tax receipts. Many different types of spending cuts and tax increases are possible. CBO used two simple assumptions to give some sense of the outcomes: in some simulations, the tax cut was ultimately followed by decreases in government spending on goods and services; in others, the tax cut was ultimately reversed through an increase in marginal tax rates.[7] In each case, the balancing policies were phased in beginning 10 years after the initial tax cut.

In general, the analysis suggests that people would tend to work and save more during the first 10 years if they expected that tax rates would ultimately rise. The expectation of an eventual tax increase encourages people to work and save more in the meantime to prepare. In addition, people may shift some of their hours of work into the period with lower tax rates to take advantage of the higher after-tax wages. By contrast, under the assumptions used in this analysis, lower government spending on goods and services leaves more resources available for private consumption, so those who expect spending to fall in the future feel less need to work and save in the meantime.[8]

Once the financing policy is implemented, however, the economic implications are reversed: an increase in tax rates will discourage work and saving once it occurs, implying relatively less output in the long run, whereas a cut in government spending on goods and services frees resources for both consumption and investment, implying relatively more output in the long run.

CBO also tested how the estimates are affected by the degree to which the U.S. economy is assumed to be open to flows of goods and finance from other countries: some simulations assumed capital could flow freely into and out of the country, whereas others assumed capital was immobile.

Under the different assumptions about foresight and the openness of the country to capital flows, the tax cuts are projected to increase output from 0.5 percent to 0.8 percent on average over the first five years and from 0.2 percent to 1.1 percent over the second five years (see Table 2). The estimates are most positive when the tax cut is expected to lead to future increases in tax rates and when people form their plans with maximum foresight. Those assumptions imply that people fully anticipate a permanent future rise in taxes and thus increase saving and work effort accordingly.

Estimates Incorporating Both Supply- and Demand-Side Effects

In addition to its supply-side effects on the economy's potential output, the tax cut would raise the level of output temporarily through "demand-side," or cyclical, effects. Those effects occur when people spend some of the tax cut and firms ramp up production to satisfy the increased demand. Firms must gear up to provide the additional goods demanded, perhaps by paying overtime to existing

6. In this analysis, CBO uses gross national product (GNP) as its measure of output rather than the more commonly cited GDP because in those circumstances in which capital can flow across borders, GDP can be a misleading guide to domestic incomes. If there are capital flows, foreigners can invest and earn returns from domestic production, meaning that part of GDP is not available for domestic use. GNP—the amount produced by U.S. residents and the capital they own anywhere in the world—provides a better measure of the resources available in an open-economy context.

7. The future tax increase must eventually be larger than the initial tax cut to pay interest on the additional debt.

8. CBO's estimates assume that government spending on goods and services does not substitute for private consumption. Under that assumption, people do not have to prepare for cuts in government spending by working and saving more, as they do for tax increases. By contrast, another possible assumption is that people expect eventual cuts in direct government payments (such as Social Security) rather than in purchases of goods and services. Under that assumption, the macroeconomic estimates would be more similar to those that assume an eventual increase in taxes.

Table 3.

The Cumulative Impact on the Budget Surplus of a 10 Percent Cut in Federal Income Tax Rates

(Billions of dollars)

	First Five Years	Second Five Years	First 10 Years
Conventional Estimate	-466	-775	-1,241
Additional Debt Service on Conventional Estimate	-56	-261	-317
Total	**-522**	**-1,035**	**-1,557**
Macroeconomic Feedbacks Under Various Assumptions			
No Foresight	6	-39	-33
Lifetime Foresight—Capital Immobile Across Borders			
Budget stabilized by cuts in government spending after 10 years	77	107	184
Budget stabilized by increases in tax rates after 10 years	82	132	214
Lifetime Foresight—Capital Flows Freely Across Borders			
Budget stabilized by cuts in government spending after 10 years	98	142	240
Budget stabilized by increases in tax rates after 10 years	104	154	258
Unlimited Foresight			
Budget stabilized by cuts in government spending after 10 years	82	158	240
Budget stabilized by increases in tax rates after 10 years	100	245	345
Global Insight's Model	62	n.a.	n.a.
Macroeconomic Advisers' Model	67	n.a.	n.a.
Macroeconomic Feedbacks as a Percentage of the Conventional Estimate[a]			
No Foresight	1	-5	-3
Lifetime Foresight—Capital Immobile Across Borders			
Budget stabilized by cuts in government spending after 10 years	17	14	15
Budget stabilized by increases in tax rates after 10 years	18	17	17
Lifetime Foresight—Capital Flows Freely Across Borders			
Budget stabilized by cuts in government spending after 10 years	21	18	19
Budget stabilized by increases in tax rates after 10 years	22	20	21
Unlimited Foresight			
Budget stabilized by cuts in government spending after 10 years	18	20	19
Budget stabilized by increases in tax rates after 10 years	21	32	28
Global Insight's Model	13	n.a.	n.a.
Macroeconomic Advisers' Model	14	n.a.	n.a.

Source: Congressional Budget Office.

Notes: Numbers may not add up to totals because of rounding.

Global Insight and Macroeconomic Advisers are commercial providers of economic forecasts.

n.a. = not applicable.

a. Excludes debt service on the conventional estimate.

workers and hiring new ones. However, demand-side effects do not persist because output cannot remain above its potential level indefinitely.[9]

To investigate the combined supply- and demand-side effects of the tax cut, CBO used slightly modified versions of commercial macroeconometric forecasting models created by two private forecasting firms, Global Insight (GI) and Macroeconomic Advisers (MA). Because estimating demand-side effects is increasingly difficult as the projection extends into the future, CBO used those models to produce estimates only for five years.

The GI and MA models do not incorporate any foresight about future policies. Therefore, in generating estimates using those models, it is not necessary to assume any particular policy change in the future to restore long-run budget balance.

The underlying supply-side assumptions used in the GI and MA models are similar to CBO's "no foresight" assumptions; recall that those assumptions implied an estimated supply-side effect on output of 0.2 percent on average over the first five years. The GI model estimates that, accounting for both supply-side and demand-side effects, implementation of the tax cut would increase output by 0.4 percent on average over the first five years. The MA model predicts that the tax cut would increase output by 0.5 percent on average.

Budgetary Effects

The various economic estimates imply changes in government revenues and interest payments. As noted above, the conventional estimate (without macroeconomic feedbacks) is that the tax policy, if implemented, would reduce revenues by a total of $466 billion over the first five years and an additional $775 billion over the second five years. Under various assumptions, the supply-side economic effects of the tax cut are estimated to offset between 1 percent and 22 percent of that revenue loss over the first five years and add as much as 5 percent to that loss or offset as much as 32 percent of it over the second five years (see Table 3). According to models that account for both supply-side and demand-side effects, those effects might offset somewhat less than 15 percent of the revenue loss over the first five years.

Related CBO Publications: *An Analysis of the President's Budgetary Proposals for Fiscal Year 2006* (March 2005); *An Analysis of the President's Budgetary Proposals for Fiscal Year 2005* (March 2004); *An Analysis of the President's Budgetary Proposals for Fiscal Year 2004* (March 2003); and *How CBO Analyzed the Macroeconomic Effects of the President's Budget* (July 2003).

This issue brief was prepared by Ben Page. It and other publications by CBO are available at the agency's Web site (www.cbo.gov).

9. Additional demand for goods also implies increased demand for money to make purchases, which tends to increase interest rates. In addition, raising the demand for labor above the potential level of supply creates upward pressure on wages. That ultimately leads to increases in the cost of production and, therefore, inflation. To tame the inflation, monetary authorities must further increase interest rates. The higher interest rates discourage investment demand and reduce output. Ultimately, the economy settles back down to its potential level.

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