CBO
MEMORANDUM

AN ANALYSIS OF THE POTENTIAL
MACROECONOMIC EFFECTS OF THE
ECONOMIC GROWTH ACT OF 1998

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CONTENTS

The Economic Growth Act of 1998, a bill introduced by Speaker of the House Newt Gingrich, would reshape the tax treatment of long-term capital gains. The bill would reduce the tax rate on most gains from the sale of assets held for at least one year. The new tax rates on gains would be 15 percent (for taxpayers in the 28 percent bracket and above) and 7.5 percent (for taxpayers in the 15 percent bracket). The corresponding tax rates on gains are now 20 percent and 10 percent. However, they are scheduled by the Taxpayer Relief Act of 1997 to drop to 18 percent and 8 percent for gains on assets held for at least five years (about 60 percent of the gains on assets held for more one year). Therefore, the Speaker's proposal in effect would decrease the scheduled tax rate on most long-term capital gains from 18 percent to 15 percent for taxpayers in the 28 percent bracket or above. It would reduce the rate from 8 percent to 7.5 percent for taxpayers in the 15 percent bracket.

The bill would also apply the top rate on gains more uniformly. The maximum rate of 15 percent would apply to gains from the sale of assets that are now taxed at rates higher than the normal maximum of 20 percent. Those gains arise from the sale of collectibles, real estate whose tax depreciation in past years exceeded its economic depreciation, and the included portion of qualifying small business shares.

According to the Joint Committee on Taxation (JCT), the bill would decrease revenue in the 10 years following its enactment by a total of about $40 billion. That estimated loss in revenue results in part from a lower tax rate on those capital gains that would have been realized in the absence of the tax cut. The loss in revenue also reflects two behavioral responses to the tax cut by investors: they would realize more gains by selling their assets sooner and more often (a revenue-enhancing effect), and they would try to receive more of their income as capital gains rather than as more heavily taxed interest or dividends (a revenue-reducing effect). By JCT's estimate, increased realizations would initially outweigh a lower tax rate, leading to a revenue increase of almost $2 billion in the first two years following passage of the bill. But in eight succeeding years, a lower tax rate would outweigh the increased realizations, leading to average revenue losses of more than $5 billion a year.

However, the behavioral responses included in JCT's estimate are not the only effects that would follow from a lower tax on capital gains. As with any tax, the levy on capital gains affects people's decisions about how much to work and save, and the consequences of those decisions affect the nation's economic growth. Under House rules, JCT's cost estimate excluded such macroeconomic effects. At the request of Chairman Archer of the House Committee on Ways and Means, the Congressional Budget Office (CBO) has prepared an analysis of the bill's effects on economic growth.

The net effect of the proposal is likely to be small. That conclusion holds because the bill would make a relatively small change to a tax that applies to relatively little capital income. The top tax rate on capital gains is about half that on ordinary income, such as interest or dividends. And two factors make the effective tax rate on capital gains even lower: owners pay no tax on capital gains until they sell their assets, and about half of all capital gains escape tax when the owners die. Moreover, the tax on capital gains largely applies only to income from business capital that was financed by equity and that generates capital gains to taxable investors. As a rough estimate, such income represents one-quarter of income from business capital stock. (Two-thirds is financed by equity; half of all equity returns are received as capital gains; and three-quarters of equity is held in taxable forms, rather than in pension funds, individual retirement accounts, 401[k] plans, and so forth.) Thus, the proposal could have only a small effect on revenue and incentives, and a correspondingly small effect on gross domestic product (GDP).

Principal Channels of Influence

The proposed cut in the tax on capital gains would influence the economy mainly through three channels. Effects operating through the first two of those channels would stimulate growth; effects operating through the third would retard it. The tax cut would operate by:

- Increasing the after-tax rate of return on saving;

- Fostering innovation and risk-taking; and

- Reducing the federal surplus.

Increasing the After-Tax Rate of Return on Saving. A higher after-tax rate of return on saving should induce more private saving. Taken alone, that rise in private saving would increase national saving (the total of both government and private saving), which in turn would raise the capital stock and future output. If the proposed tax cut were revenue neutral, national saving would rise by the full amount of the increase in private saving.

But the proposal would generate little extra output from this channel. Even if revenue remained unchanged and private saving rose by an amount that is generally regarded as optimistic, CBO calculates that private saving would rise by only 0.3 percent, adding about 0.06 percent to the capital stock after 10 years. The resulting increase in GDP would amount to about $2 billion to $3 billion in the 10th year, or about $10 billion to $15 billion over the decade.

Fostering Innovation and Risk-Taking. By fostering innovation, a tax cut on capital gains surely raises productivity and hence output, but the extent of the increase is unknown. No study has measured the relationship between the capital gains tax and innovative enterprise. One might assume that the effect on GDP would be relatively modest, given that small enterprises that have been financed by venture capital firms make up only about 1 percent of the entire business sector. But the effect might also be relatively significant because such enterprises can be highly productive. Without empirical evidence, the response of innovative enterprise to a capital gains tax cut remains speculative.

Reducing the Federal Surplus. A lower surplus would offset at least some of the positive effects on GDP operating through the two channels discussed above. If, as JCT estimates, revenue fell by $40 billion cumulatively over the next 10 years, CBO calculates that the corresponding drop in the surplus would more than offset the additional private saving arising from a higher after-tax rate of return. Thus, the proposal's net effect on growth depends on whether the combined positive effects on growth stemming from higher private saving and more innovation could outweigh the negative effects that would follow from a decline in the surplus.

Evidence from Models of the Economy

To assess the bill's impact on growth, CBO surveyed the findings of simulations using four computer models of the economy that represent a variety of approaches and generate a range of results. Findings from two of the models directly support the conclusion that the proposed cut in the capital gains tax will have only modest effects on GDP. Results from the other two models seem to suggest more significant effects, but further examination reveals that those findings depend on inappropriate assumptions.

None of the models, however, can gauge the effect on GDP of a greater degree of innovation in response to a lower capital gains tax. Moreover, the models assumed that the loss in revenue from a lower capital gains tax was offset elsewhere in the budget, which would eliminate any negative feedback effect on GDP stemming from a smaller surplus. Thus, the overall impact on GDP of the proposed cut in the capital gains tax remains an open question.

INTRODUCTION

The capital gains tax has complicated economic effects because the tax treatment of capital gains differs from that of ordinary income. Investors and property owners can receive personal capital income in two ways: as current income or as capital gains. Current income from capital comprises dividends, interest, rent, and the profits of unincorporated enterprises. Investors ordinarily owe tax on such income when they receive it. By contrast, capital gains accrue to investors when their assets appreciate—that is, when they rise in value. Such gains do not by themselves boost investors' current cash income, but they do increase investors' wealth. That increase in wealth is "realized" when investors sell their appreciated assets. Only then do they owe tax on the capital gains.

An asset can accrue capital gains for a number of reasons. For example, inflation tends to raise the nominal value of most assets. Interest rates can also affect asset prices: other things being equal, a drop in interest rates will raise the prices of bonds and other competing assets such as stocks and real estate. In the long run, most real (inflation-adjusted) capital gains on a corporation's stock accrue when the corporation retains some of its earnings rather than paying them to its shareholders as dividends. The corporation invests those retained earnings by buying buildings and equipment, expecting that they will generate profits in the future. If outside investors agree with that assessment, they will pay more for stock in that corporation, raising the value of its shares. Some new firms—including many in high-tech fields—initially pay no dividends at all. Consequently, capital gains are the only returns their early shareholders will receive, making investment in such firms especially sensitive to the capital gains tax.

In several ways, the current tax system favors long-term capital gains over ordinary capital income received as interest or dividends. For one thing, the top tax rate on gains is only half as high as the top rate on ordinary income, which is 39.6 percent. Moreover, investors can defer taxes on their capital gains because they do not pay the taxes until they sell their appreciated assets. Deferral confers a number of advantages. It effectively constitutes an interest-free loan from the government. The amount of the hypothetical loan in each year is equal to the tax that would have been paid if the tax code imposed a levy on gains when they were accrued rather than when they were realized. The hypothetical interest-free loan reduces the bite of the eventual tax.

The tax bite on capital gains disappears altogether in the extreme case of investors who plan to leave assets as bequests. Those investors can essentially earn tax-free capital gains because the tax code allows what is known as a "step-up in basis" at death. By allowing the step-up, the government forgoes tax on the gains that the benefactors had accrued (that is, the government effectively forgives the hypothetical loan). Deferral also allows investors to choose to realize their capital

gains when their current incomes, and hence their tax brackets, are abnormally low. The ability to choose the time when income appears on their tax forms is not so readily available to investors who receive interest or dividends.

To capture the effects of the tax treatment of capital gains, economists use the standard concept of an "effective" tax rate on gains. The effective rate is lower than the statutory rate because the effective rate includes the value of the interest-free "loan" described above and allows for the fact that some gains escape tax altogether because they are stepped-up or are held in tax-exempt forms such as pension funds or individual retirement accounts (IRAs). About one-half of otherwise taxable gains escape tax by being stepped-up. And about one-quarter of business assets that would otherwise yield taxable gains reside in tax-exempt forms.

Thus, although the top statutory tax rate on capital gains at the start of 1997 was 28 percent, one commonly used calculation yielded an estimated effective rate of 9.4 percent.[1] The top statutory rate was cut to 20 percent during the year by the Taxpayer Relief Act, bringing the estimated effective rate to 7.2 percent. The Speaker's proposal, H.R. 4125, would further reduce the estimated effective rate to 6.0 percent.

Although those rates are quite low, they apply to nominal capital gains, which include the effect of inflation. Much higher effective rates apply to real gains. In the late 1980s when the top statutory rate on gains was 28 percent and the inflation rate was 5 percent, the estimated effective tax rate on real capital gains was 52 percent. Today, that rate is down to 27 percent, still much higher than the effective rate on nominal gains but much lower than the effective rate of 60 percent on real interest income. In any case, the Speaker's proposal has the same effect on the economy regardless of whether the analyst calculates the reduction in the lower effective rate on higher nominal gains or in the higher effective rate on lower real gains.

The reduction would affect the economy only slightly: the proposal makes a small cut in a tax that has a low effective rate and that applies only to roughly one-quarter of income from business assets. The effects of the tax cut would operate through channels of influence discussed in the next section, as well as through other channels that would affect the composition of output in the economy and the distribution of income but not the amount of revenue. To estimate the overall impact of the proposal, the Congressional Budget Office reviewed simulations from four economic models that represent a variety of modeling approaches. The review

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1. The Congressional Budget Office calculated the effective rate by using a modified version of a procedure suggested in Don Fullerton, Yolanda Henderson, and James Mackie, "Investment Allocation and Growth Under the Tax Reform Act of 1986," in Office of Tax Analysis, Department of the Treasury, *Compendium of Tax Research* (1987).

indicated that the proposal would have minor consequences, although the models excluded a potential effect whose magnitude is unknown.

THE CAPITAL GAINS TAX AND GROSS DOMESTIC PRODUCT: CHANNELS OF INFLUENCE

A reduction in the tax on capital gains could affect the economy through a number of channels. Some would operate to influence the growth of GDP and hence taxable income and revenue; that is, those channels would entail dynamic feedback effects on revenue. A cut in the capital gains tax might also operate through other channels that would change the structure of the economy but would involve little or no dynamic feedback effects on revenue.

Channels with Significant Dynamic Feedback Effects on Revenues

Dynamic feedback effects stemming from a cut in the capital gains tax would operate through several channels, increasing the after-tax rate of return on saving, fostering innovation and risk-taking, and reducing the federal surplus. Those channels of influence would have partly offsetting effects on potential economic growth. A higher after-tax rate of return on saving and more innovation would raise GDP by stimulating saving and investment, which in turn would add to economic capacity. But other things being equal, a smaller surplus would work in the other direction by reducing national saving.

Increasing the After-Tax Rate of Return on Saving. A higher after-tax rate of return on saving has two separate and opposing effects. Other things being equal, the first effect makes people want to save more (consume less) because a dollar saved today will buy more consumption tomorrow than it would have before the tax cut (the substitution effect). Yet at the same time, a higher net rate of return increases people's income. Other things being equal, higher income makes people want to consume more and therefore save less (the income effect). The overall response depends on which of the two effects dominates, a question that can only be answered empirically. Some studies find that people save less when the net rate of return rises, but the balance of evidence suggests that they save slightly more.

If the tax cut is revenue neutral so that the surplus remains unchanged, overall income initially remains unchanged as well. By holding income unchanged, a revenue-neutral tax cut on capital gains offsets the negative income effect and allows only the positive substitution effect to operate. That effect unambiguously increases private saving.

A revenue-neutral cut in the tax on capital gains sets off a chain of events in the capital market. The cut first raises the after-tax rate of return on saving, inducing more private saving and driving down the market (before-tax) rate of return that savers require from their assets that produce capital gains. For corporations, a lower market rate of return reduces their user cost of capital—a measure that incorporates all of the costs of using capital (personal and corporate taxes, interest and depreciation expenses and their associated tax allowances, and the rates of return that firms must pay to their owners or stock- and bondholders). Taxes in effect drive a complicated "wedge" between the user cost of capital and the market rate of return. The user cost of capital represents the value of output that a unit of capital must produce to cover all of its costs and pay investors the normal market rate of return. A lower market rate of return, and hence a lower user cost of capital, induce firms to use more capital and to invest more.

Although the Speaker's proposal would set off that chain of events, the initial increase in the after-tax rate of return on saving would be quite small—for two reasons. First, the effective tax rate on gains is already low, and its change under the proposal is small. Second, capital gains account for only a fraction of all business income from capital—specifically, the fraction used in business that was financed through equity and that generates capital gains to taxable investors. As a rough estimate, such income represents roughly one-quarter of the yields from the business capital stock. (Two-thirds is financed by equity; half of all equity returns are received as capital gains; and three-quarters of equity is held in taxable forms, rather than in pension funds, individual retirement accounts, 401[k] plans, and so forth.) Thus, the overall after-tax rate of return on saving would rise by very little. By one conventional estimate, the net rate of return on the average form of saving is now about 3 percent. The proposal would raise that rate by about 0.03 percentage points, an increase of only 1 percent.

Other things being equal, any increase in the after-tax rate of return leads to more private saving, more capital formation, and ultimately higher GDP. But such a small increase in the net rate of return as that resulting from the proposed cut could add little to saving and still less to GDP, even in the long run. Moreover, the capital stock would build up slowly, so the effect would be even smaller in the 10-year budget window.

<u>Fostering Innovation and Risk-Taking</u>. A capital gains tax cut may spur innovation by making it more profitable for existing firms and by increasing the supply of funds available for forming new enterprises or for expanding promising ventures. The capital gains tax rate is especially important for innovative enterprises because they are more likely than run-of-the-mill firms to finance investment by retaining earnings (in the case of existing firms) or by attracting investors who expect to receive a large part of their returns as capital gains (in the case of start-up firms). Moreover, because

innovation can be risky, investors in start-up firms probably compensate for that risk by investing only in companies that are unusually likely to earn very high returns and to produce substantial capital gains. The tax on such high returns matters more to those investors than does the tax on equity investments that yield ordinary market rates of return.

A cut in the tax rate on capital gains might also induce more innovation in another way. Start-up firms often have poor access to working capital and thus have difficulty paying their employees. Although such firms lack cash, they can issue shares of stock. As a result, many start-up firms save money on payroll costs by giving equity stakes to their managers and sometimes even to their workers. A reduction in the capital gains tax increases the value of the stock that start-up firms can use in place of cash, thereby encouraging more new enterprise.[2]

Once a firm is past the start-up stage, the capital gains tax fades in importance. To raise funds for expansion, growing young firms usually turn to investors who are not subject to the personal tax on capital gains. For instance, nearly 90 percent of venture capital comes from existing corporations or nontaxable institutions, such as pension funds.[3] Cutting the personal tax on capital gains does not make investments in growing firms more attractive to those institutions.

Moreover, although start-up firms can be quite productive, they make up only a small part of the overall economy. The tangible assets of growing young firms that are past the start-up stage and that have been financed with venture capital account for less than 1 percent of the nation's plant and equipment.[4] And the amount of capital in start-up firms is probably even smaller. Thus, for such firms to have much of an effect on GDP, their size and number would have to expand substantially in response to a lower tax rate on capital gains.

No research, however, has estimated the amount by which start-up investment responds to a change in the capital gains tax. Without such an estimate, CBO can do little more than recognize the possibility that a tax cut on gains might stimulate more

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2. Many firms offer their employees stock options—that is, the opportunity to buy stock in the firm at a set price. Firms may offer qualified options, on a nondiscriminatory basis, or nonqualified options, which are usually offered only to key employees. Offering a qualified option provides an incentive similar to that provided by offering stock—employees who exercise their options by buying stock pay capital gains taxes on the difference between the stock price and the option price. If, however, employees exercise nonqualified options, the difference between the stock price and the option price is taxed as ordinary income, just like their salaries.

3. James M. Poterba, "Venture Capital and Capital Gains Taxation," in Lawrence H. Summers, ed., *Tax Policy and the Economy,* vol. 3 (Cambridge, Mass.: MIT Press, 1989), pp. 47-67.

4. Ibid.

enterprise and innovation. If innovation increased, growth would increase as well, but no empirical evidence indicates by how much.

Reducing the Surplus. According to the estimate of the Joint Committee on Taxation, H.R. 4125 would decrease revenue cumulatively by about $40 billion over the 10 years following enactment. That cost estimate reflects the net result of the lower tax rate on capital gains, combined with two economic effects that would follow from the lower rate. First, people would realize more gains by selling their assets sooner and more often. Other things being equal, more realizations would increase revenue by raising the tax base. Second, investors would intensify their efforts to receive income as capital gains rather than as more heavily taxed ordinary income (for example, interest or dividends). Those efforts would in turn reduce revenue by shifting its base from more heavily taxed ordinary income to more lightly taxed capital gains. By JCT's calculation for the coming decade, the lower tax rate and the shift in the revenue base would outweigh the increase in realizations, leading to less revenue and a smaller surplus.

Other things being equal, a lower surplus directly reduces national saving—that is, total private and government saving. At $40 billion, JCT's estimate of a lower surplus more than offsets CBO's calculation of a cumulative gain of $18 billion in private saving in response to a higher net rate of return.

Channels with Insignificant Dynamic Feedback Effects on Revenues

Although cutting the tax on capital gains would also influence the economy through other channels, the effects operating through those channels would have little or no further influence on revenue. Such channels would affect the economy by:

- Shifting the allocation of capital and the mix of financial portfolios;

- Redirecting international flows of funds;

- Encouraging people to invest in assets that generate income as capital gains (so as to take advantage of the widened disparity between the effective tax rate on capital gains and that on other forms of capital income); and

- Reducing the lock-in effect.

Shifting the Allocation of Capital and the Mix of Portfolios. A cut in the tax on capital gains would shift the flow of capital investment and the mix of household

portfolios, with dynamic effects on revenue that would largely offset each other.[5] A lower tax on capital gains would reduce the user cost of capital in the business sector by more than it would in the housing sector (where, for the most part, capital gains and other income escape tax anyway). A lower user cost of business capital would attract some investment from housing to business. That shift would reduce the net output of low-taxed housing and correspondingly raise the net output of high-taxed business, thereby raising net revenue.

At the same time, however, investors would change the mix of assets they held in their portfolios, and corporations would retain a larger share of their earnings, enabling stockholders to receive a greater share of their income as capital gains. The proposed cuts in tax rates on capital gains would raise the after-tax income of people in high tax brackets by proportionately more than that of people in low tax brackets. Investors in high tax brackets would sell some of their taxable bonds and buy stocks, which are more likely than bonds to produce capital gains. Conversely, investors in low tax brackets would shift from stocks to bonds. Those switches in ownership would decrease revenue by about as much as the shift in investment from housing to business would increase it, leading to little or no net dynamic effect on revenue.

Redirecting International Flows of Funds. Although a cut in the capital gains tax would induce U.S. residents to save more, only part of that extra saving would remain in the United States. Instead, savers are likely to place some of it abroad. The tax cut would make both foreign and domestic stocks more attractive to U.S. investors. Overall, they would both save more and shift their portfolios from bonds to stocks, driving down the market rate of return on stocks.

The proposed tax cut would affect foreign savers only indirectly. They would face the same tax rates as before and would see a narrowing of the difference between the market rates of return on stocks and bonds. Thus, they would complement the overall actions of Americans by shifting their portfolios from stocks to bonds, tempering the initial changes in the respective market rates of return.

Any resulting changes in international flows of capital would have virtually no effect on domestic income or federal revenue. Domestic output produced by capital financed from abroad would raise foreign income but would not change U.S. income or federal revenue. Conversely, additional interest or equity income earned by Americans would add just as much to revenue, whether it was earned at home or abroad.

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5.   Patric Hendershott, Eric Toder, and Yunhi Won, "Effects of Capital Gains Taxes on Revenue and Economic Efficiency," *National Tax Journal*, vol. 64, no. 1 (1991), pp. 21-40.

<u>Widening the Disparity Between Tax Rates on Capital Gains and on Ordinary Income</u>. The sizable difference between the effective tax rate on capital gains and the ordinary tax rate on interest and dividend income creates an incentive to reduce tax payments by converting ordinary income into capital gains. The Speaker's proposal would increase the disparity between the rates and further encourage such tax-avoiding activity. For example, under the proposed law, an established firm might retain a greater share of its earnings, thus reducing the current dividend income of its shareholders and raising the capital gains they could expect in the future. But plowing earnings back into established firms in declining industries might channel investment into inefficient uses and divert it from more productive start-up firms. Other effects of the tax cut, however, might improve economic efficiency. For instance, a lower tax rate on capital gains would reduce the tax disparity between the highly taxed business sector and the tax-preferred housing sector. But overall, such effects would individually and collectively have little feedback impact on revenues beyond those that JCT has included in its cost estimate.[6]

<u>Reducing the Lock-In Effect</u>. Investors who have accrued very large capital gains on their assets may hesitate to sell them because they will have to pay tax on those gains. That reluctance of investors to turn over assets as often as they might in the absence of the tax is called lock-in.

Lock-in reduces efficiency because investors make decisions for tax reasons rather than for fundamental economic reasons. For example, when the price of a stock rises rapidly, the stock can quickly grow to become a large part of an investor's portfolio. Keeping a large share of one's wealth in a single stock is unsafe, whereas selling some of it and investing it elsewhere reduces the overall riskiness of the portfolio. By discouraging such asset swaps, the capital gains tax makes investors manage their portfolios less efficiently than they otherwise would.

Lowering the capital gains tax would reduce lock-in. A cut in the tax would result in a short-term burst of realizations, as investors cashed in their accumulated past gains, and a much smaller long-term increase in realizations, as they cashed in their future gains sooner and more often. Both effects on realizations are reflected in JCT's estimate of the cost of the Speaker's proposal.

Although reducing lock-in enables investors to manage their portfolios more efficiently, it has little further economic impact. In particular, unlocking financial assets does not make the economy use tangible capital more efficiently or channel more funds to entrepreneurs. Investors who previously were locked in and who sell their stocks or bonds in response to a tax cut simply exchange those financial assets

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6.　　　Hendershott, Toder, and Won, "Effects of Capital Gains Taxes."

with other investors. The total amount of tangible capital in every firm and in the economy as a whole remains the same. Thus, unlocking financial assets adds no new tangible capital, adds nothing to output, and raises no revenue beyond that raised through higher realizations—an effect already included in JCT's estimate.

In rare cases, locked-in financial assets like stocks or bonds could indirectly lead to locked-in tangible capital. When many investors are locked into their current financial assets, they cannot buy stock in a new company, thereby depressing that stock's price. A low stock market price generally increases the user cost of capital to the firm. As a result, the company will buy less tangible capital and grow more slowly.

Although that reasoning is valid, such instances are not likely to be empirically important. The price of a widely traded stock in an efficient financial market will depend on what new investors are willing to pay for it—that is, investors with no lock-in problem. Eventually, that price must reflect all of the information available in the market, including what market participants believe to be the profit potential of the firm. The fact that *some* of the firm's potential investors may be locked in does not alter the firm's profit potential, and as long as there are enough investors who are not locked in, there should be no permanent effect on the firm's stock price.

Of course, market efficiency would suffer if many investors were locked in at the same time, but such a situation is unlikely. Speculators, for instance, often do not hold onto a stock long enough to become locked in. Many people hold their stock indirectly through mutual funds, whose managers do not hold back from selling a stock because it might mean that their subscribers would have to pay capital gains taxes—the fund managers are evaluated on the pretax performance of the fund. And a large share of equities are held in pension funds, 401(k) plans, individual retirement accounts, or other forms that are not subject to the capital gains tax. Lock-in, therefore, can never be an issue for them.

EVIDENCE FROM MODELS OF THE ECONOMY

To estimate the effects of the Speaker's proposal, CBO reviewed the results from simulations using four computer models of the U.S. economy. Such models specify equations that describe mathematically the ways in which economic variables interact and that enable analysts to estimate numerically how the proposal would affect the economy. Because each model bases its equations on different assumptions about the economy and how it operates, the results from a variety of models can suggest a plausible range of possible outcomes.

The models span a broad spectrum of modeling strategies. Three of the models represent "general-equilibrium" approaches; that is, they assume a frictionless economy in which resources are always fully employed. Such models incorporate feedbacks among all variables (for example, interest and wage rates and the supplies of capital and labor). Those feedbacks guarantee that supply and demand are consistently equated in all markets, an assumption that makes the models especially appropriate for long-run analysis.

The fourth model contains similar feedbacks but also allows for "Keynesian" disequilibrium in the short run, during which time the economy may have excess demand or excess supply. Thus, the model can generate either booms that may strain the economy's potential and thus raise the inflation rate, or busts that may create slack and so lead to underused capital and unemployed workers. In a Keynesian model, the proposed tax cut initially could induce a temporary boom, fueled by more consumption ensuing from a higher level of wealth and by more investment arising from higher overall demand and a lower user cost of capital. In such circumstances, total demand would grow faster than potential supply, thereby raising inflation and interest rates and seeding the demise of the boom.

But that kind of outcome could occur only if the Federal Reserve allowed the tax cut to spur demand by enough to raise inflation. If, instead, the central bank controlled the money supply to maintain its inflation target, the proposed tax cut would work only through the equilibrium channels discussed earlier without causing a temporary boom.

Many, but not all, of those equilibrium channels operate in the models CBO surveyed. All of the models incorporate the response of people to a higher after-tax rate of return on saving and the response of companies to a narrower tax wedge between the user cost of capital and the market rate of return to investors. But none of the models reflect an increase in innovation or entrepreneurship. As noted before, no data provide a basis on which to estimate by how much innovation responds to a cut in the capital gains tax.

Several studies have used the models that CBO surveyed to simulate the effects of a capital gains tax cut on the economy. However, those simulations dealt with tax cuts larger than the one proposed by the Speaker. Thus, CBO scaled down those results, dividing them, respectively, by appropriate factors. Although that method only approximates what each model would predict for the Speaker's proposal, the scaling is unlikely to seriously distort comparisons of the results among models.

The results from the simulations support the conclusion that the proposed cut in the tax on capital gains would have only modest effects on GDP. Two of the general-equilibrium models yield small increases in GDP—well below 0.1 percent

after 10 years. The other two models generate larger increases, but those results depend on extreme or unwarranted assumptions. Correcting those assumptions changes the results from large to trivial.

The AKSW Model

The general-equilibrium model designed by Alan Auerbach, Laurence Kotlikoff, Kent Smetters, and Jan Walliser (the AKSW model) subdivides the population by age and income class.[7] That subdivision allows the model to distinguish how people respond to a given policy change depending on their age and lifetime income. The overall response to a policy, therefore, depends in part on the relative proportions of young and old people in the population.

Assuming that a decline in government spending offsets the loss in revenue from the tax cut, the AKSW model predicts that the Speaker's proposal would decrease national output by 0.004 percent in the first year but increase it by 0.003 percent after nine years (see Table 1). After about 100 years, national output would increase by 0.008 percent.

Those results reflect the model's specification of how work and saving respond to higher after-tax income and a higher net rate of return on saving. The short-run decline in output occurs because people foresee that their future after-tax income will be higher under the new law than under the old. Feeling richer, they choose to work less—now and later—thereby initially reducing output. Higher after-tax income also makes people want to consume more, but on balance, the higher after-tax rate of return induces them to save more from their higher income, which allows them to consume even more in the future. Whereas the decline in work initially reduces output, the rise in saving eventually increases it by accumulating enough capital to more than offset the decline in labor. Being permanent, the decline in labor diminishes the long-run increase in output in the AKSW model when compared with other models that impose different specifications on the decision to work.

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7.   See Alan J. Auerbach and Laurence J. Kotlikoff, *Dynamic Fiscal Policy* (New York: Cambridge University Press, 1987); and David Altig and others, *Simulating U.S. Tax Reform*, Technical Paper 1997-6 (September 1997), available from CBO's Macroeconomic Analysis and Tax Analysis Divisions.

TABLE 1. CHANGE IN GDP FROM CUTTING THE TOP TAX RATE ON CAPITAL GAINS FROM 20 PERCENT TO 15 PERCENT: RESULTS FROM FOUR MODELS, FISCAL YEARS 1999 TO 2007 (In percent)

Model	1999	2000	2001	2002	2003	2004	2005	2006	2007	Long Run[a]
AKSW	-0.004	-0.003	-0.002	-0.002	0	0.001	0.001	0.002	0.003	0.008
Gravelle[b]	0	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.19
Robbins[b]	0.09	0.25	0.41	0.56	0.72	0.84	n.a.	n.a.	n.a.	n.a.
DRI-1[c]	0.05	0.13	0.20	0.21	0.18	0.12	0.08	0.05	0.05	n.a.
DRI-2[d]	0	-0.01	0	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02	n.a.
DRI-3[e]	0	-0.01	-0.01	0	0	0	0	-0.01	-0.01	n.a.

SOURCES: Congressional Budget Office, for the AKSW and DRI simulations; results for the Gravelle and Robbins models were drawn, respectively, from the appendix to the statement of Jane G. Gravelle, Senior Specialist in Economic Policy, Congressional Research Service, before the Senate Committee on Finance, February 15, 1995, and Gary Robbins and Aldona Robbins, *Eating Out Our Substance (II): How Taxation Affects Investment*, Policy Report 134 (Dallas: TaxAction Analysis, November 1995).

NOTES: All of the simulations assumed that the policy took effect on October 1, 1998. In addition, all of the simulations except DRI-1 and DRI-2 assumed that the capital gains tax cut would not affect the budget surplus. CBO performed all of the DRI simulations using the current version of the model.

GDP = gross domestic product; AKSW = Auerbach-Kotlikoff-Smetters-Walliser model; n.a. = not available.

a. The long- run time frame is about 100 years.

b. The author estimated the effects of a proposal similar to but not the same as one cutting the rate of the capital gains tax from 20 percent to 15 percent. CBO scaled the results to make them comparable with those of the other models.

c. The simulation assumed that the capital gains tax cut was not revenue neutral. Moreover, the simulation allowed for Keynesian effects from monetary accommodation by holding real interest rates at their baseline levels.

d. The simulation assumed that the capital gains tax cut was not revenue neutral and closed off the channel for Keynesian effects from monetary accommodation by holding the inflation rate at its baseline levels.

e. The simulation assumed that the capital gains tax cut was revenue neutral and that it held the inflation rate at its baseline levels.

<u>The Gravelle Model</u>

The model developed by Jane Gravelle also uses a general-equilibrium approach, but it treats the population and the economy as a whole rather than in detail.[8] Instead of subdividing the economy into sectors or the population into classes, the model assumes that all firms, workers, and consumers respond in the same ways to a given policy change. Those responses to changes in policy are specified in the model by choosing numerical values from surveys of estimates of the ways that output, labor, and consumption have responded in the past to changes in capital and labor inputs, wage rates, interest rates, and income.

According to the Gravelle model, the Speaker's proposal would slowly increase output each year, raising it by 0.03 percent after nine years and by 0.19 percent in the long run.[9] Output would rise slowly because net saving is only about 2 percent of the existing capital stock. Therefore, an increase in net saving would add only a small fraction to the capital stock each year, which means that it would take a long time for the stock to build to its ultimate higher level.

As Gravelle notes, her results depend on two optimistic assumptions:

f.   The government offsets the loss in revenue from the lower tax on capital gains by imposing a lump-sum tax (a hypothetical tax that by itself has no effect on work or saving); and

g.   People and firms save 0.4 percent more of their combined net income for every 1 percent that the after-tax rate of return on saving rises—a saving response that is widely regarded as being at the high end of plausible estimates.[10]

Those assumptions guarantee that the capital gains tax cut leads to the greatest increase in national saving consistent with plausible empirical evidence. The assumed lump-sum tax implies that the tax cut entails no negative effect on saving—either through disincentives arising from the lump-sum tax (because it imposes no disincentives) or through a lower surplus (because the lump-sum tax offsets the loss in revenue resulting from the lower tax rate on capital gains). Thus,

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8.   Appendix to the statement of Jane G. Gravelle, Senior Specialist in Economic Policy, Congressional Research Service, before the Senate Committee on Finance, February 15, 1995.

9.   Statement of Jane Gravelle, Senior Specialist in Economic Policy, Congressional Research Service, before the House Committee on Ways and Means, March 19, 1997.

10.   Michael J. Boskin, "Taxation, Saving, and the Rate of Interest," *Journal of Political Economy*, vol. 86, no. 2, part 2 (April 1978), pp. S3-S27.

national saving unambiguously rises with the increase in the after-tax rate of return, leading to more capital and hence to higher output.

Output also rises because the supply of labor expands slightly, inching up by 0.02 percent in the long run. That increase occurs because more capital makes labor more productive and raises the wage rate, inducing workers to supply more labor. Labor supply in the Gravelle model rises by 0.15 percent for every 1 percent that the wage rate rises, a value that is well within the range of estimates that CBO recently surveyed.[11] Those assumptions rule out the drop in labor supply that occurred in the AKSW model in response to higher income. Thus, even with optimistic assumptions and a mainstream specification for the supply of labor, the Gravelle model calculates that the proposed cut in the tax on capital gains would have little effect on output.

The Robbins Model

The general-equilibrium model designed by Gary and Aldona Robbins also treats the population and the economy as a whole rather than in detail. Assuming that the proposed tax cut pays for itself, the Robbins model predicts that GDP would rise by 0.84 percent after six years, a result far greater than those of the other models.[12] The large effect is exaggerated, assuming that the after-tax rate of return on saving remains virtually constant.

The Robbinses refer to historical evidence that the after-tax rate of return on saving fluctuates for short periods around an average value that has no apparent trend. From that evidence, they conclude that the net rate of return remains constant in the long run and that it reverts quickly to its long-run value after being disturbed by a change in capital market conditions.

Those conclusions require the assumption that firms and savers react swiftly and massively to a tax cut on capital income. Rather than taking decades for a higher rate of saving to build completely into a bigger capital stock, the process in the Robbins model takes only a few years. For the process to occur so rapidly, firms must effortlessly adjust their techniques to work with more capital. And savers must supply capital almost perfectly elastically—that is, they must supply so much more capital and so quickly that the after-tax rate of return on saving rises only briefly. Mathematically, if the after-tax rate of return on saving rose by 1 percent, the supply of saving would rise by an infinite amount.

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11. Congressional Budget Office, *Labor Supply and Taxes*, CBO Memorandum (January 1996).

12. See Gary Robbins and Aldona Robbins, *Eating Out Our Substance (II): How Taxation Affects Investment*, Policy Report 134 (Dallas: TaxAction Analysis, November 1995).

The notion that firms can adjust so readily to using more capital has little basis in evidence. The ups and downs of the after-tax rate of return around its average value correspond largely to the ups and downs of the business cycle. Thus, the speed of reversion to the historical average probably reflects the timing of the business cycle, not the speed of adjustment of the capital stock to equilibrium changes in its supply and demand.

Moreover, the idea that saving responds almost perfectly elastically requires, in addition to a specification of domestic saving, a strong assumption about international capital flows. The model assumes that domestic saving increases by 1 percent for every 1 percent that the after-tax rate of return on saving rises. Even though that assumed response is large, it is far below the infinite response needed to keep the net rate of return essentially constant. Instead, the model implicitly assumes that net inflows of saving from abroad respond almost perfectly elastically, an assumption that implies that the United States is such a small part of the global capital market that its actions have virtually no effect on world supply and demand.

Argument For the Assumed Constancy of the Net Rate of Return on Saving. The assumption that the net rate of return on saving remains virtually fixed needs to be justified by an argument such as the following. A cut in the tax on capital gains favors equity returns, so when one occurs, Americans on the whole try to shift their portfolios from bonds to equities—a result that is widely accepted. But, the argument supposes, domestic firms continue to supply about the same mix of bonds and equities as before. Thus, in trying to sell bonds to buy equities, domestic investors simply bid up the market rate of interest on U.S. bonds and bid down the market rate of return on U.S. equities.

Furthermore, the argument proceeds, investors in any country are quick to buy foreign bonds if the foreign interest rate rises even slightly above the domestic rate, but they are slow to buy foreign equities, even if the foreign equity rate rises well above the domestic rate. Thus, the argument continues, U.S. savers buy few foreign equities in search of what would now be higher-than-domestic rates of return (they respond inelastically), but foreign savers buy large amounts of U.S. bonds in search of what would now be higher-than-foreign rates of interest (they respond elastically).[13]

According to the argument, that elastic response by foreigners keeps the U.S. market rate of interest essentially fixed. With no change in either the market rate of interest or the U.S. tax on interest income, the after-tax rate of interest paid to Americans also remains constant. Finally, the argument concludes, if U.S. investors

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13.   In calculating the user cost of capital, however, the Robbins model assumes that firms finance all additional investment arising from the tax cut by selling bonds (not equity) to taxable residents (not untaxed foreigners).

freely substitute between U.S. bonds and U.S. equities in search of the highest after-tax rate of return, the U.S. market rate of return on equities falls commensurately with the cut in the tax on capital gains, holding the after-tax rate of return on equities constant as well.

Argument Against the Assumed Constancy of the Net Rate of Return on Saving. The previous argument leads to a counterintuitive result that fails in any case to establish that national income would rise by the amount that the Robbins model reports. The chain of reasoning described above flouts intuition because the tax cut applies only to domestic savers, who increase their saving. An increased supply of domestic saving would ordinarily suggest that U.S. savers would supply more, not less, net saving to the rest of the world.

Moreover, U.S. firms could satisfy the fall in the domestic demand for bonds and the rise in the domestic demand for equities simply by rolling over fewer bonds and retaining more earnings or issuing more shares. The resulting drop in the supply of U.S. bonds would keep their rate of interest from rising as much, and the corresponding jump in the supply of U.S. equities would keep their rate of return from falling as much.

Finally, and most important, even if foreigners did supply more capital to the United States by buying U.S. bonds, that increased capital would raise neither U.S. income nor U.S. revenue. The bonds that foreigners bought would finance additions to the U.S. capital stock, raising U.S. GDP. But the income from that extra output would accrue to foreign savers, not U.S. workers and investors. And the government would collect no tax on that income because under common treaty arrangements, the United States does not tax interest income paid to foreigners.

The DRI Model

Data Resources, Inc. (DRI), uses a disequilibrium macro model, meaning that actual GDP can differ from its potential and workers can be unemployed.[14] That approach implies that a cut in the tax on capital gains might operate through short-run disequilibrium channels in addition to the equilibrium channels discussed earlier. Under such an approach, a policy change that has little long-run effect on GDP might have a significant short-run impact that later reversed itself.

In 1997, DRI estimated that cutting the top tax rate on capital gains by about twice as much as the Speaker proposes would increase GDP by 0.4 percent after 10

14.   See Roger E. Brinner and Mark J. Lasky, "Model Overview: Theory and Properties of the DRI Model of the U.S. Economy," *DRI/McGraw-Hill Review of the U.S. Economy* (August 1997), pp. 41-61.

years.[15] The analysis assumed that nominal interest rates remained fixed and that the tax cut roughly paid for itself. (DRI overlooked the fact that about half of all gains-producing assets are held in tax-exempt forms.) The DRI simulation produced a small Keynesian boom, driven by increased demand for consumption and investment arising from higher income and wealth and a lower user cost of capital.

But the capital gains tax cut was not the only force driving the boom; the results also depended on the Federal Reserve's reaction to the tax cut. By holding nominal interest rates fixed, DRI assumed that the central bank accommodated the greater demand for consumption and investment by creating more money and allowing the inflation rate to rise. In the short run, more money temporarily stimulates real growth by holding down interest rates, thereby boosting demand. But in the long run, the boom in real output dissipates, and more money leads only to more inflation. In DRI's simulation, the growth of GDP depended not only on the equilibrium supply-side effect of a lower tax on capital gains but also on the disequilibrium demand-side effect of faster money growth.

To assess DRI's results, CBO used the current version of the DRI model to simulate the Speaker's proposal under three alternative monetary assumptions. The first simulation (DRI-1) roughly followed the DRI method by assuming that the loss in revenue resulting from the tax cut was not offset and that real interest rates were fixed. (When nominal interest rates were fixed, the model produced unrealistic results.) In that simulation, GDP rose by 0.20 percent after three years and by 0.05 percent in the 10th year, with consumer price inflation rising above its baseline level by about 0.1 percentage point. Those results are roughly consistent with the earlier findings that DRI reported for a larger tax cut.

The second simulation (DRI-2) continued to assume that the loss in revenue was not offset but no longer assumed that higher inflation was allowed. The latter assumption enabled the supply-side effects of the tax cut to operate through equilibrium channels but eliminated the disequilibrium spur to output from faster money growth. Without faster money growth, interest rates rose higher than they did in DRI-1, thereby choking off the disequilibrium increase in demand and holding the inflation rate to its baseline levels. Rather than rising, real and nominal GDP in the DRI-2 simulation fell slightly—by 0.02 percent after nine years.

The third simulation (DRI-3) continued to assume that the Federal Reserve maintained its inflation target and added the further assumption that the government offset the loss in revenue following from the tax cut on capital gains. The offset affected the simulation in two ways: it eliminated the positive disequilibrium effects

15. DRI/McGraw-Hill, *The Capital Gains Tax, Its Investment Stimulus, and Revenue Feedbacks* (Lexington, Mass.: DRI, for the American Council for Capital Formation, April 1997).

on aggregate demand stemming from lower taxes, but it also eliminated the negative equilibrium effects on aggregate supply resulting from a lower level of national saving. Like the DRI-2 simulation, the DRI-3 simulation eliminated the disequilibrium spur to output from faster money growth. Given those assumptions, GDP again fell slightly—by 0.01 percent after nine years. Thus, CBO's three simulations of the DRI model show that all of the effects on GDP reported earlier by DRI arose not from cutting the tax on capital gains but from relaxing the Federal Reserve's inflation target.

CONCLUSIONS
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Cutting the top tax rate on capital gains from 20 percent to 15 percent is likely to have only a modest effect on GDP. If the proposed bill were revenue neutral, its passage would raise private, and hence national, saving by increasing the after-tax rate of return on saving. In that case, the available economic models indicate that GDP probably would increase by no more than about 0.2 percent after many years. In the 10-year budget window, the economic outcome would depend largely on the reaction of the Federal Reserve. If it relaxed its inflation target, actual GDP could expand in the short run by more than the policy would add to its sustainable potential level. But that action by the Federal Reserve seems unlikely. If, instead, it maintained its inflation target, GDP in the 10th year following enactment of the bill would have increased by only a few hundredths of a percent. In dollars, GDP might rise by between $2 billion and $3 billion in the 10th year or, cumulatively, by about $10 billion to $15 billion over a decade.

Yet the effects of the tax cut may be even smaller, making the estimates above too optimistic. In large part, that optimism rests on the assumption that the policy is revenue neutral. If, instead, the tax cut reduced revenue and the surplus, the long-run increase in GDP would be smaller, possibly even negative. Based on JCT's projections that the proposal would reduce revenue (and thus the surplus) by about $40 billion over 10 years, CBO estimates that private saving would not rise by enough to offset the effects of a lower surplus.

That calculation ignores the proposal's spur to innovation, but enhanced innovation would have to boost GDP substantially to offset the negative effects ensuing from a lower surplus. CBO estimates that GDP would have to rise by a total of about $120 billion over 10 years to generate enough revenue to close the estimated $40 billion gap left by the tax cut. That amount of output is about 10 times as great as the additional cumulative rise in GDP that is implied by a higher after-tax rate of return on saving. Could the proposed tax cut stimulate innovation and output by enough to offset the negative effect on GDP resulting from the estimated decline in

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the surplus?   In the absence of studies that have estimated how innovation responds to changes in taxes, that question remains an open issue.