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"Dynamic Scoring": Why and How to Include Macroeconomic Effects in Budget Estimates for Legislative Proposals

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When legislation is being developed in the U.S. Congress, the Congressional Budget Office (CBO) and the staff of the Joint Committee on Taxation (JCT) prepare estimates of the effects of that legislation on the federal budget. Those estimates often play a critical role in Congressional deliberations and public discussion.

The estimates produced by CBO and JCT generally incorporate the effects of anticipated behavioral responses to the proposed changes in federal tax or spending policies. For example, estimates for changes in benefit programs include shifts in take-up rates among eligible people, and estimates for changes in income tax rates include shifts in the use of tax deductions. However, by longstanding convention, the estimates have excluded behavioral responses that would have macroeconomic effects, in the sense of altering overall output, employment, or similar variables. For example, CBO and JCT's original estimate of the budgetary impact of the Affordable Care Act included the effects of employers altering the mix of taxable and nontaxable compensation provided to their employees but not the effects of employees altering their supply of labor.

The convention of excluding macroeconomic effects may seem odd from an economics perspective. Estimates for legislative proposals include behavioral responses in order to improve the accuracy of the predicted budgetary effects and to illuminate noteworthy non-budgetary effects, and that rationale appears to apply equally to behavioral responses that affect overall output and those that do not. Indeed, some analysts and policymakers have argued for years that the estimates produced by CBO and JCT should include macroeconomic effects—an approach that has become known as "dynamic scoring." However, other analysts and policymakers have argued in response that including macroeconomic effects would degrade the quality and usefulness of CBO's and JCT's estimates. That debate has achieved greater prominence this year because a rule adopted by the House of Representatives and the budget resolution approved by the House and the Senate both call for dynamic scoring in certain circumstances.

Based on my experience as the director of CBO from January 2009 through March 2015, the principal concerns expressed about estimated macroeconomic effects of proposals apply with equal force to other aspects of budget estimates or can be addressed by CBO and JCT. In my view, including macroeconomic effects in budget estimates for certain legislative proposals would improve the accuracy of those estimates and would provide important information about the economic effects of those proposals. Moreover, if certain key conditions were satisfied, those estimates would meet the general goals of the estimating process that estimates be understandable and resistant to misinterpretation, based on a consistent and credible methodology, produced quickly enough to serve the legislative process, and prepared using the resources available to CBO and JCT.

Therefore, I conclude that the macroeconomic effects of legislative proposals should be included in budget estimates—that is, dynamic scoring should be used—under the following conditions:

- Macroeconomic effects should be included in estimates only for *major* proposals, defined by having a large estimated budgetary impact excluding macroeconomic

effects or having the inclusion of such effects requested by the chair or ranking member of the House or Senate Budget Committee. CBO and JCT do not have sufficient staff or time to carefully analyze macroeconomic effects for every proposal under consideration, and using rules of thumb in place of careful analysis risks the credibility of the estimates.

- Macroeconomic effects should be included in estimates for major proposals affecting federal *spending* as well as revenues. Changes in either spending or revenues can have notable macroeconomic effects, and the estimating process should treat proposals affecting the two sides of the budget as comparably as possible subject to other constraints.

- Macroeconomic effects should *not* be included in estimates when CBO and JCT find that they do not have the tools or time needed to do a careful analysis of those effects. That situation will arise most often for proposals that are being developed and amended quickly and for proposals regarding certain types of regulatory policy in which the estimators do not have significant expertise.

Those conditions, and others discussed in this paper, can be readily satisfied. If they were, CBO's and JCT's estimates of macroeconomic effects and their budgetary feedback would have strengths and weaknesses similar to those of the agencies' current budget estimates.[1]

However, the current House rule and Congressional budget resolution do not fully satisfy the specified conditions. In particular, the current requirements for dynamic scoring explicitly exclude appropriations bills (which cover about one-third of federal noninterest spending) and give only the chairs but not the ranking members of the Budget Committees the right to request the incorporation of macroeconomic effects in certain estimates. In addition, the threshold budgetary impact for presumptively including macroeconomic effects in estimates is lower than ideal from my perspective.

There are advantages of an alternative approach in which CBO's and JCT's estimates of macroeconomic effects and their budgetary feedback would be provided in supplementary reports rather than being included in official budget estimates. In my judgment, though, the advantages of that alternative approach compared with the agencies' plans for including macroeconomic effects in budget estimates are limited and are outweighed by some significant disadvantages.

I. The Basics of Budget Estimates for Legislative Proposals

[1] The advantages and disadvantages of dynamic scoring have been considered by numerous authors, including Auerbach (1996, 2005), Burman (2006), Center on Budget and Policy Priorities (2006, 2014), Committee for a Responsible Federal Budget (2012), CBO (1995, 2002), Gale (2002), Hassett (2002), Holtz-Eakin and Mandel (2015), Ip (2015), and Orszag (2002).

CBO and JCT provide the official estimates used by the Congress of the effects of legislative proposals on the federal budget. The estimates are based on procedures that have been developed over time and on the professional judgment of the two agencies. The analysts at CBO and JCT stay in their jobs regardless of political shifts in the control of the Congress (although the director of CBO and the chief of staff for JCT are chosen by the Congressional leadership), and the organizations have strong reputations for providing objective, nonpartisan analysis.

I.A. The Mechanics of Estimates

CBO, which began work in 1975, produces public estimates for bills after they have been approved by Congressional committees or before they are voted on by the full House or Senate. For bills that would alter the tax code, CBO is required by its founding statute to use revenue estimates provided by JCT, which was created in 1926; for bills that would alter spending policies, CBO uses its own estimates; and for bills that would make changes in both tax and spending policies, the agencies prepare estimates together. The estimating process is sometimes referred to as "scoring," and the estimates are called "cost estimates." In addition to those public estimates, the agencies provide private estimates to Members of Congress and their staffers for proposals that are being developed and have not been released publicly. In a typical year, CBO publishes between 500 and 600 public estimates, and it and JCT give committees thousands of private estimates for legislation under development.

Each estimate shows effects relative to the "baseline," which is CBO's projection of what would occur in the absence of the proposal. The baseline generally reflects current law, although the Congress has specified certain exceptions.

The estimates present changes in nominal cash flows for the current fiscal year and each of the 10 subsequent years, a period that is often called the "budget window."[2] The use of cash flows and a limited time period means that estimates do not always measure a proposal's full budgetary effect. Indeed, some proposals deliberately delay cash costs beyond the budget window or accelerate cash receipts into the budget window in order to lower the apparent budgetary impact.[3] However, when the Congress is especially interested in a proposal's long-term budgetary effects, or when CBO expects that a proposal would have notably different budgetary effects beyond the coming decade than during the decade, the agency tries to provide information about the long-term effects.

The estimates are point estimates that are intended to show what is colloquially described as "the middle of the distribution of possible outcomes" but is specifically the mean

[2] The principal exception to this statement is estimates for federal credit programs, which are based on the accrual of financial commitments by the federal government (CBO, 2012a). All cost estimates exclude changes in federal interest payments that would result from changes in federal borrowing. However, CBO includes changes in interest payments when it provides estimates for overall budget packages, as in its annual analysis of the President's budget proposals.

[3] For example, in a policy change known as "pension smoothing," companies are allowed to defer required payments into pension funds, thereby increasing their reported profits and thus tax payments in the budget window while reducing them later.

outcome (CBO, 1999). Although CBO and JCT are acutely aware of the uncertainty of estimates, the agencies focus on point estimates because the budget process and the procedural rules of the House and Senate rely on point estimates and because measuring the uncertainty of estimates is often especially difficult.

I.B. Behavioral Responses

CBO's and JCT's estimates generally include the impact of behavioral responses to the proposed changes in law—that is, the estimates are not based on an assumption that the economy is "static." For example, estimates for changes in benefit programs include shifts in take-up rates for those benefits among eligible people, and estimates for changes in income tax rates include shifts in the use of tax deductions. More generally, CBO and JCT try to account for the behavior of households, businesses, federal regulators, and state, local, and foreign governments; however, the agencies do not attempt to predict future changes in federal law. CBO and JCT estimate the magnitude of behavioral responses using a broad range of evidence, including formal statistical analyses done by the agencies themselves and by other researchers as well as anecdotal information from consultations with government agencies and private businesses (CBO, 2011; JCT, 2011a).

The scope of the included behavioral responses varies greatly across estimates. Some potential responses are omitted because the available evidence does not indicate the order of magnitude or even the sign of a response. Other potential responses are omitted because CBO or JCT do not have the time or resources to collect the available evidence and build and apply an appropriate model. Still other potential responses are omitted from estimates because including the responses would greatly complicate the legislative process; for example, the effects of certain changes in spending on taxable incomes and thus revenues are omitted from estimates because including them would generate jurisdictional conflicts between committees.

In addition, some potential behavioral responses are excluded from estimates because the responses would affect overall output, and overall output has been held fixed in cost estimates by longstanding convention. Therefore, CBO's and JCT's estimates have not included the budgetary effects of changes in labor supply, saving, interest rates, productivity, and other aggregate variables. Under dynamic scoring, this convention of "fixed output" would be dropped. The principal exception to this convention before 2015 was estimates for comprehensive immigration legislation in 2006, 2007, and 2013. In CBO's view, "assuming that those bills would have had no effect on overall output would have ignored one of the primary effects of the bills and distorted those estimates too severely" (CBO, 2015j).

I.C. Current Status of Dynamic Scoring

In early 2003 the House adopted a rule (rule XIII(3)(h)(2)) that required JCT to provide an analysis of the macroeconomic impact of all tax legislation approved by the Ways and Means Committee. That rule was adopted again by subsequent Congresses and remained

in effect in the House through 2014. JCT (2015) summarized its response to this rule: "For most tax bills, the expected effects were so small that a brief statement to that effect was all that was required. Short qualitative analyses were provided for legislation that JCT macro models were not configured to model. For major tax legislation, JCT staff has provided detailed quantitative analysis of a possible range of effects on GDP [gross domestic product], employment, investment, and revenues, based on the results of multiple models using multiple parameter assumptions."

In early 2015 the House modified that rule to require dynamic scoring by CBO and JCT for "major" legislation, defined as legislation that would have significant estimated budgetary effects or was designated as such by the chair of the Budget Committee or the Ways and Means Committee. The rule excludes appropriations bills, requires a qualitative assessment of budgetary impact including macroeconomic effects for 20 years beyond the 10-year budget window, and includes the caveat that the requirements be met "to the extent practicable."

In the spring of 2015 the House and Senate approved a budget resolution that included requirements for dynamic scoring similar to those in the House rule. Under the budget resolution, CBO and JCT will, to the greatest extent practicable, incorporate the budgetary effects of changes in macroeconomic variables resulting from legislation that has a "gross" budgetary effect of a quarter of a percent of output in any year over the next 10 years or is selected by the chair of the House or Senate Budget Committee. That threshold equals about $45 billion in 2015 and about $70 billion in 2025 (CBO, 2015a); I address the interpretation of "gross" budgetary effects later in the paper. The resolution excludes appropriations bills and requires a qualitative assessment regarding the two decades following the budget window.

CBO (2015i) summarized the agency's plans for meeting the requirements of the budget resolution. In June, in response to a request from the Senate Budget Committee, CBO and JCT applied dynamic scoring to a proposal to repeal the Affordable Care Act, or ACA (CBO, 2015h). And in August, pursuant to the resolution, JCT applied dynamic scoring to a bill approved by the Senate Finance Committee that would extend for two years a number of tax credits, deductions, and exclusions that primarily affect businesses (JCT, 2015b; CBO, 2015k).

II. CBO's and JCT's Past Estimates of Macroeconomic Effects and Their Budgetary Feedback

The arguments for and against dynamic scoring can be understood best after briefly examining CBO's and JCT's past analysis of proposals' macroeconomic effects and their budgetary feedback. Most of that analysis has appeared not in cost estimates—given the conventional exclusion of macroeconomic effects from such estimates—but rather in supplemental reports.

II.A. Analytic Approach

CBO provided an overview of its methodology for estimating the macroeconomic effects of legislative proposals in a November 2014 report, *How CBO Analyzes the Effects of Changes in Federal Fiscal Policies on the Economy*; that report referred to a set of other reports describing specific aspects of the agency's methods (CBO, 2001, 2012d, 2012f, 2012g, 2012h, 2013d, and 2014b). JCT (2003b, 2005, 2006, 2011, and 2015a) has summarized its methodology as well. In addition, in each report that presents such a macroeconomic analysis, CBO and JCT explain the key factors affecting the estimates.[4]

The approaches used by the two agencies differ in various specifics but are quite similar in their overall structure. For estimating the *short-term* effects of changes in fiscal policies, the agencies focus on effects on the demand for goods and services (and also include effects from changes in labor supply). Reductions in taxes and increases in federal spending boost demand directly, while the opposite changes diminish it; those direct effects propagate through the economy to an extent that depends on the response of monetary policy and other factors.[5] Changes in demand are estimated to lead to changes in output relative to potential output.

For estimating *longer-term* effects of changes in fiscal policies, the agencies examine effects on potential output. Both agencies use a Solow-type growth model and a life-cycle (overlapping generations) growth model.[6] In its Solow-type model, CBO focuses on the effects of changes in federal borrowing, marginal and average tax rates (through income and substitution effects), transfer payments (through income effects and, in some cases, substitution effects), and federal investment in physical infrastructure, education and training, and research and development. For example, an increase in the marginal tax rate on labor income is estimated to reduce the supply of labor, which in turn reduces capital accumulation. Similarly, JCT's Solow-type model captures responses to changes in federal borrowing, marginal and average tax rates, and other factors. In their life-cycle models, CBO and JCT include many of the same channels, although expectations also matter explicitly—which presents a challenge for dynamic scoring that I return to below.

CBO generally reports both a central estimate and a range of estimates for the macroeconomic effects of proposals. The range of estimates is based on ranges of values

[4] There are recurring calls for CBO and JCT to be more transparent regarding many aspects of their analyses. However, achieving greater transparency would require the agencies to allocate more of their resources to explaining existing estimates rather than producing new ones, and the Congress has been reluctant to accept that tradeoff.

[5] CBO projects actions by the Federal Reserve as part of its baseline economic projections, and the agency has explained its method for estimating the Federal Reserve's reaction to changes in fiscal policies. For example, CBO expects that the negative short-term effects of deficit reduction on output (stemming from a decrease in demand) will be "stronger when short-term interest rates are near zero … because under those conditions the Federal Reserve is unlikely to adjust short-term interest rates to try to offset the effects of changes in federal spending and taxes" (CBO, 2015g, page 88).

[6] JCT also sometimes uses a growth model with infinitely lived agents; see JCT (2011). CBO (2014d, page 12) discusses the possibility that changes in demand in the short term could affect potential output in the long term and concludes that the significance of the channels through which that might occur are "unclear" and thus "CBO does not currently incorporate such channels in its analyses, although the agency continues to investigate the issue."

for the key parameters that are based on the research literature; the range for each variable is intended to cover roughly the middle two-thirds of the likely values for the variable (CBO, 2015g, page 73). The central estimate is intended to represent the middle of the distribution of possible outcomes (and can give weight to estimates from both the Solow-type model and the life-cycle model).

To estimate the feedback from economic changes to the federal budget, CBO accounts for the impact of changes in income on tax revenues and benefits (with the latter much less affected than the former), as well as some other factors. A one-dollar increase in overall output reduces the budget deficit by roughly 20 cents to 25 cents, holding all else equal.[7] The estimated budgetary effects in a given year influence estimated economic developments in subsequent years.

A key challenge for CBO and JCT is assessing the changes that proposals would generate to effective marginal tax rates on labor and capital, the income of people with different propensities to consume, differences in tax rates across types of capital, changes in federal investment, and other inputs to the agencies' models. CBO and JCT also modify their models as needed to capture features of specific proposals. That process—as undertaken, for example, in the analyses of immigration reform and tax reform discussed below—sometimes requires a great deal of time and effort. In addition, the agencies adjust parameter values over time in response to new evidence; for example, see CBO's *A Review of Recent Research on Labor Supply Elasticities* (2012g).

CBO's and JCT's analyses of the macroeconomic effects of proposals are generally produced on much longer timetables than their budget estimates. That difference arises both because estimating the macroeconomic effects of a proposal can take considerable time and because the estimated budgetary impact of a proposal excluding macroeconomic effects is one of the inputs into estimating the proposal's macroeconomic effects.

II.B. Comprehensive Immigration Legislation

In 2013 the Senate passed a bill to substantially increase the number of people who could enter the country legally and to create a process through which many people who are currently present in the country on an illegal basis could gain legal status. CBO and JCT's estimates for the legislation were provided in two separate documents released simultaneously—a cost estimate that included some but not all of the expected macroeconomic effects of the bill, and a supplemental analysis of the bill's total macroeconomic effects and the incremental budgetary impact of the economic changes not included in the cost estimate.

CBO (2013c, page 2) explained: "[Since the legislation] would significantly increase the size of the U.S. labor force, assuming that total employment was unchanged would imply that any employment of the additional immigrants would be offset one-for-one by lower

[7] CBO (2015a, page 133) provides a rule of thumb for the budgetary impact of lower output growth. According to that rule of thumb, a reduction in output produces changes in revenues and noninterest spending that increase the budget deficit by 21 percent of the reduction in output.

employment elsewhere in the population. Because that outcome would be highly implausible, CBO and JCT relaxed the assumption of fixed GDP and employment and incorporated into the cost estimate their projections of the legislation's direct effects on the U.S. population, employment, and taxable compensation. Nevertheless, to remain as consistent as possible with the estimating rules CBO and JCT follow for almost all other legislation, the cost estimate … does not incorporate the budgetary impact of every economic consequence of the bill. The [supplemental] analysis … includes some additional budgetary effects stemming from changes in the productivity of labor and capital, the income earned by capital, the rate of return on capital (and therefore the interest rates on government debt), and the differences in wages for workers with different skills." That is, the cost estimate excluded macroeconomic changes that could be excluded without making the estimate nonsensical, and the supplemental analysis included all of the macroeconomic changes that CBO was able to estimate.

In the cost estimate (CBO, 2013b), CBO and JCT estimated that the bill would reduce the deficit by about $200 billion during the first decade after enactment and about $700 billion during the following decade. In the supplemental report, CBO estimated that the bill would raise output by roughly 3 percent by the end of the first decade and that economic effects not included in the cost estimate would have no further net effect on the deficit in the first decade but would further reduce the deficit by about $300 billion in the second decade.

II.C. Affordable Care Act

When CBO and JCT estimated the budgetary effects of the ACA and its precursors in 2009 and 2010, the agencies incorporated the impact of many changes in the behavior of individuals, employers, health insurers, and health care providers. However, the agencies did not include the impact of certain other changes in behavior because of the longstanding convention for cost estimates that overall output would be unaffected.

By contrast, given the recent Congressional push for dynamic scoring, CBO and JCT's estimate earlier this year of the effects of *repealing* the ACA included macroeconomic changes. The estimate incorporated, among other factors: short-term effects on aggregate demand of changes on federal spending and taxes; effects on labor supply of changes in tax rates for certain higher-income people and of changes in subsidies for health insurance for certain lower-income people; and the effects on capital investment of the changes in tax rates, labor supply, and federal borrowing. The largest macroeconomic impact of repealing the ACA was estimated to stem from repealing the subsidies for health insurance.[8]

[8] The estimate of the effects on labor supply drew heavily on CBO's published analysis during the preceding several years. CBO (2009c) examined various channels through which changes to the health insurance system could affect labor markets; however, specific proposals were still in formative stages at the time, so the report did not provide quantitative estimates. In late 2009 and early 2010, Congressional interest in the evolving health care legislation focused on its effects on the federal budget, health insurance coverage, insurance premiums, and existing federal programs, so CBO and JCT's analysis focused on those issues. After the ACA was enacted, CBO needed to incorporate the law's economic effects into the baseline economic projections. As part of that process, CBO (2010b, pages 48-49) reported that it expected the ACA

The agencies concluded (CBO, 2015h): "[R]epealing the ACA would increase federal budget deficits by $137 billion over the 2016-2025 period …, [with that figure being the net effect] of two components: Excluding the effects of macroeconomic feedback … federal deficits would increase by $353 billion over the 2016-2025 period if the ACA was repealed. Repeal of the ACA would raise economic output, mainly by boosting the supply of labor; the resulting increase in GDP is projected to average about 0.7 percent over the 2021-2025 period. Alone, those effects would reduce federal deficits by $216 billion over the 2016-2025 period."

II.D. Congressman Camp's Tax Reform Proposal

In early 2014, Congressman Dave Camp, then the chair of the Ways and Means Committee, put forward a comprehensive proposal for broadening the bases of the individual and corporate income taxes, adjusting tax rates, and making other changes to those tax systems. JCT published a set of reports analyzing that proposal, including estimates of the proposal's distributional consequences, revenue effects (excluding any impact on the overall economy), and overall economic impact. Based on the convention of fixed output, JCT (2014a) estimated that the proposal would be effectively revenue-neutral, raising federal revenues by $3 billion over the next decade.

In its macroeconomic analysis, JCT (2014b) wrote: "Broadening of the individual and corporate income tax bases through elimination of many preferences in the form of deductions, exemptions, and tax credits allows for a reduction in average and effective marginal tax rates for most individual taxpayers, which provides both an incentive for increased labor effort, and an increase in demand for goods and services. These changes also reduce the after-tax return to investment under many modeling assumptions, providing an incentive for a reduction in the U.S. domestic capital stock." JCT estimated that the proposal would raise the level of output by between 0.1 percent and 1.6 percent, on average, during the 2014-2023 period. That additional output was estimated to reduce the deficit by between $50 billion and $700 billion during the 2014-2023 period.

II.E. Other Illustrative Analyses

In the past several years, CBO and JCT have provided estimates of the budgetary feedback from the macroeconomic effects of other proposals as well.

Each year, the agencies publish detailed estimates of the President's budget proposals based on the conventional assumption that the overall economy would be unaffected, and CBO separately (and somewhat later) publishes an analysis of the economic effects of the

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to reduce aggregate labor supply by an amount that would reduce labor compensation by roughly one-half percent after it was fully phased in. A few years later, during a careful review of its labor-market projections, CBO (2014a) updated that estimate to roughly one percent, with the revision arising because the agency "incorporated … additional channels through which the ACA will affect labor supply, reviewed new research about those effects, and revised upward its estimates of the responsiveness of labor supply to changes in tax rates" (page 118).

proposals and the feedback to the federal budget. As an example, CBO (2012b,c) estimated that, excluding macroeconomic effects, the deficit under the President's proposals would be $3.2 trillion during the 2013-2017 period and another $3.2 trillion during the 2018-2022 period—and that including macroeconomic effects, the deficit would be $3.0 trillion to $3.2 trillion during the first half-decade and $3.3 trillion to $3.6 trillion during the second half-decade.

In addition, CBO's annual analysis of the long-term budget outlook includes estimates of economic and budgetary outcomes under alternative policies, with the budgetary effects taking into account the economic effects and vice versa (CBO, 2015e). Moreover, in some years, CBO has published estimates of the economic effects and budgetary feedback of deficit paths specified by the chair of the House or Senate Budget Committee (for example, CBO, 2015e). Also, JCT has released macroeconomic analyses of the Jobs and Growth Reconciliation Tax Act of 2003 (JCT, 2003a), the American Recovery and Reinvestment Tax Act of 2009 as reported by the Ways and Means Committee (JCT, 2009), and other proposals.

III. The Case for Including Macroeconomic Effects in Budget Estimates

A natural starting point for evaluating dynamic scoring is to consider the underlying objectives of the budget estimating process. After providing that context, I explain why including macroeconomic effects in estimates for certain legislative proposals would both improve the accuracy of budget estimates for those proposals and provide important information about their economic effects. However, attempting to include macroeconomic effects in all budget estimates would not be appropriate because of limited staffing and time, and a set of other issues would need to be addressed as well.

III.A. What Should Be the Objectives of the Budget Estimating Process?

In my judgment, *CBO and JCT should provide estimates for legislative proposals that measure the full budgetary effects as accurately as possible and illuminate notable non-budgetary effects, subject to several significant constraints.*

To "measure the full budgetary effects as accurately as possible," estimates would ideally equal the expected present value of proposals' budgetary effects over a long time horizon. A long horizon is appropriate because the effects of proposals could last into the indefinite future, and CBO and JCT should analyze proposals as specified and not presume the enactment of any future legislation to modify or undo them; in particular, it is untenable for agencies working for the Congress to make specific predictions about the future decisions of current Members or of Members who will be elected over time.[9] Present value is appropriate because future events are discounted in other contexts. The

[9] However, some approaches to estimating the macroeconomic effects of legislation do require limited predictions about future policies; this issue is addressed in the last section of the paper.

expected outcome is appropriate because it minimizes the mean squared error of estimates.[10]

To "illuminate notable non-budgetary effects"—such as effects on the overall economy—estimates would ideally provide quantitative, or at least qualitative, information about such effects. That objective is appropriate because reliable and timely information about the non-budgetary effects of proposals is important for policymakers to receive and is not readily available from sources other than CBO and JCT. In particular, advocates and opponents of proposals often generate overly optimistic or pessimistic estimates of their effects, while independent analysts often are not familiar with the details of proposals and do not have the models needed to estimate their effects, so they have difficulty producing reliable estimates quickly.

However, those ideals cannot be fully achieved in practice because of four significant constraints:

- Estimates should be easily understandable by Members of Congress, their staffs, and outside observers, and they should be resistant to misinterpretation. Many Members, staff, and observers have little training in quantitative analysis or budgeting, and most have limited time for reviewing budget estimates. Also, advocates and opponents of proposals often try to cite estimates in ways that support their positions. Therefore, it is important that estimates be clear and difficult to use in misleading ways.

- Estimates should be based on methodologies that are applied consistently across related proposals and are credible to Members of Congress, their staffs, and outside analysts. Using consistent methodologies is crucial to ensuring that proposals can be compared meaningfully. Using methodologies that are credible is crucial to maintaining the confidence of the Congress in the estimates, ensuring that the estimates reflect the consensus of informed professional thinking, and protecting CBO and JCT from political pressure. By contrast, using methodologies that seem arbitrary or can be easily manipulated by constructing proposals in particular ways undermines confidence in the agencies' estimates for those proposals and for other proposals as well.

- Estimates should be produced quickly enough to serve the legislative process and structured in ways that fit the process. Thus, estimates should include the information sought by Congressional leaders or committees as they develop proposals and by Members of Congress as they vote on proposals. And when the legislative process moves swiftly, estimates should be prepared rapidly and updated rapidly as proposals are modified.

[10] For certain financial activities of the government where risk is apparent and can be readily assessed, I think the estimated budgetary effect should not equal the expected present value of the activities but instead should incorporate an estimate of the cost of that risk. That issue lies beyond the scope of this paper.

- Estimates need to be prepared using the resources available to CBO and JCT. Although the number of Congressional requests for estimates has increased considerably in recent years, the funding provided to the agencies has left their staffing little changed, on balance.

Many aspects of the budget estimating process represent compromises between those constraints and the idealized estimates described above. As one important example, official budget estimates generally apply to the coming decade rather than a longer time period because the estimating methodology needed for a longer period would require additional resources to develop, would usually be less credible, and would lead to estimates that were more prone to misinterpretation. Yet, certain proposals would have longer-term effects that are quite different from their effects in the coming decade, and CBO and JCT try to provide some information on the longer-term effects in those cases. The precision of that information and the time period for which it is provided vary across proposals depending on Congressional interest and on the agencies' assessment of the resources required to generate the information, the credibility of the methodology used, and the risk of misinterpretation of the results. Thus, CBO analyzes certain proposals to change Social Security over 75 years (CBO, 2010a) but generally does not analyze proposals to change federal health care programs beyond 25 years because of the especially large uncertainty involved in predicting the evolution of the health care delivery and financing systems.

As another example, official budget estimates generally show nominal cash flows rather than inflation-adjusted cash flows or the present values of cash flows because nominal flows are more straightforward than the alternatives and because the distortion relative to showing present values is fairly small over a decade. The principal exception is estimates for federal credit programs, for which nominal cash flows over a decade are often a gross misrepresentation of the full budgetary effects over a long horizon, and for which accrued costs are therefore used instead.

As a final example, official budget estimates sometimes exclude factors that might affect the budgetary impact of proposals but whose sign or magnitude are especially uncertain. That exclusion may seem inconsistent with the objective of measuring budgetary impact as accurately as possible: The mean squared error of a budget estimate reflects the underlying uncertainty of all relevant factors even if estimates of some of the factors are set to zero; therefore, if CBO or JCT can generate informed estimates of those factors, including them in the overall budget estimate would probably increase the accuracy of the estimate. However, that point cannot be proven as a general rule: Although in-sample prediction errors from linear regression models are minimized by including all relevant factors, including additional factors does not necessarily minimize out-of-sample prediction errors from nonlinear models (which is what CBO and JCT often use).[11] Moreover, including factors that are especially uncertain can diminish the credibility of the estimating process, because when the likelihood function for a factor is particularly flat, the agencies' choice of a specific value often seems arbitrary. Therefore, for factors whose budgetary impacts are probably small and are especially uncertain, the probable

[11] See CBO (2015f, pages 21-22) for a related discussion.

improvement in accuracy from including them in budget estimates may be outweighed by the risks of inadvertently diminishing accuracy and diminishing the agencies' credibility. That condition is particularly likely to be satisfied when the net budgetary impact of a set of excluded factors might be either positive or negative.[12]

III.B. Similarity between "Macroeconomic" and "Non-Macroeconomic" Effects

Changes in federal tax and spending policies can affect people's behavior in many ways, and those behavioral responses can affect the federal budget. Some of those responses affect the composition of output or distribution of income but not total output and income, while other responses affect total output and income as well as their composition and distribution. A natural presumption is that measuring the full budgetary effects of legislative proposals as accurately as possible requires including the impact of all of those behavioral responses.

For example, if marginal income tax rates were increased, a number of responses would ensue: The share of people's income devoted to activities whose costs can be deducted from income (such as mortgage interest payments and charitable contributions) would increase; the share of compensation received in nontaxable forms (such as employers' contributions to pensions and health insurance) would increase; the amount of labor supplied would decrease (if the substitution effect outweighed the income effect); and the amount of saving would decrease (again, if the substitution effect outweighed the income effect). The first two responses are typically included in conventional estimates, and the latter two are not. However, when the responses are described in this manner, there is no clear conceptual reason to treat the latter two responses differently from the first two.

Of course, one difference between those two sets of responses is that the reductions in labor supply and saving would affect total output, while the shifts in the uses of income and types of compensation would not. Thus, the reductions in labor supply and saving can be labeled "macroeconomic" effects, while the other shifts are purely microeconomic. Still, because all of the responses stem from actions by people and firms, there is no clear rationale for including some in budget estimates and excluding others.

The reductions in labor supply and saving that are spurred directly by the increase in marginal tax rates could generate further economic changes, such as shifts in pre-tax wages and the pre-tax return to capital—which would have further effects on labor supply and saving. One might argue that those additional effects should be excluded from budget estimates because of their indirectness. However, indirect effects can be quantitatively important. Consider an example from a legislative proposal that did not change tax rates: The immigration legislation approved by the Senate in 2013 would have significantly increased the supply of labor, which would have induced additional capital

[12] For example, CBO (2014a, page 123) discussed some ways in which the ACA might affect productivity and concluded: "Whether any of those changes would have a noticeable influence on overall economic productivity, however, is not clear. Moreover, those changes are difficult to quantify and they influence labor productivity in opposing directions. As a result, their effects are not incorporated into CBO's estimates of the effects of the ACA on the labor market."

investment. Ignoring the increase in labor supply would have substantially understated the impact of the legislation on output; including that increase in labor supply without including the induced growth of the capital stock would still have understated the impact of the legislation on output and would also have overstated its impact on wages.

Changes in federal policies can affect total output and income in many other ways as well. Changes in tax rules can affect investment in human capital and the allocation of physical capital, changes in federal benefits can affect labor supply and saving, and changes in federal spending for infrastructure, education and training, and research and development can affect labor supply, saving, and productivity. As with the effects of changes in marginal tax rates, there is no clear conceptual basis for including in budget estimates the effects of such policy changes on specific parts of the economy but not the effects on aggregate economic variables.

III.C. Advantages of Including Macroeconomic Effects in Certain Budget Estimates

Based on CBO's and JCT's past analysis of the macroeconomic effects of legislative proposals and their budgetary feedback, *I conclude that using dynamic scoring in budget estimates for certain proposals would improve the accuracy of those estimates, provide important information about the economic effects of those proposals, and (under certain conditions) satisfy the significant practical constraints for budget estimates listed earlier*.

CBO's and JCT's past analysis shows that some proposals' estimated macroeconomic effects would have significant budgetary consequences. For example, the estimated macroeconomic effects of the Senate's 2013 immigration bill, the ACA, and Congressman Camp's tax plan (based on the midpoint of the reported estimates) all have budgetary effects equal to hundreds of billions of dollars over a decade. Moreover, if dynamic scoring had been applied to the economic stimulus legislation of 2009 (the American Recovery and Reinvestment Act), its estimated budgetary effect would have been reduced by hundreds of billions of dollars: CBO (2009b) estimated that the legislation would raise output by more than $800 billion over the following decade, and that additional income would have been estimated to reduce budget deficits by more than $200 billion (or roughly one-quarter of the estimated budgetary cost of the bill reported in CBO, 2009a).[13]

To be sure, accounting for the estimated macroeconomic effects of those proposals would have improved the accuracy of the official budget estimates only if the estimates of the macroeconomic effects were somewhat accurate.[14] Unfortunately, assessing the accuracy of CBO's and JCT's estimates is quite difficult. Many proposals that the agencies have examined were not enacted, and the proposals that were enacted were just a few of many factors affecting economic and budgetary outcomes, so isolating their impact is hard even

[13] The central estimate in JCT (2009a) was that the tax provisions in the bill (as approved by the Ways and Means Committee) would increase output by about one-half percent in the short run, leading to a reduction in the cost of those provisions of about one-seventh of the conventional estimate.

[14] The further step of estimating the budgetary feedback from estimated macroeconomic effects is fairly straightforward and can be done reasonably accurately.

in retrospect (CBO, 2013a, 2015b). In my judgment, however, CBO's and JCT's methodology for conducting macroeconomic analysis reflects the consensus of informed professional thinking, and that consensus provides a useful, albeit imperfect, basis for predicting the macroeconomic effects of legislative proposals. Moreover, there is no reason to believe that CBO's and JCT's estimates of macroeconomic effects are generally less accurate than their estimates of other effects of complex proposals, although certainly the agencies should continue to strive to improve their analysis.

The effects of some legislative proposals on the overall economy are very important for policymakers to understand. For example, the macroeconomic effects of immigration reform and tax reform are among the most touted reasons for pursuing those policy changes.[15] Yet, different approaches to immigration reform—such as increasing the numbers of high-skilled and low-skilled immigrants by different amounts—could lead to very different macroeconomic effects. Similarly, different approaches to tax reform—such as using revenues raised by broadening tax bases to reduce marginal tax rates or to make targeted inframarginal tax reductions—could lead to very different macroeconomic effects. As another example, major changes to benefits for lower-income people could have notable effects on the economy by altering labor supply, and those effects could be an important criterion in evaluating such changes. To use Arthur Okun's famous metaphor, we should understand the leakiness of different buckets for transferring resources to lower-income people. And as a further example, policy changes that reduced federal deficits to different degrees and at different speeds would generally have different macroeconomic effects in the next few years and in the longer run.

Estimates of macroeconomic effects can be valuable even when those effects appear small to some observers. For example, CBO (2015e) found that this year's budget resolution—which calls for a reduction in cumulative deficits over the next decade of about $5 trillion excluding interest savings and macroeconomic effects—would raise the level of real output in 2025 by 1½ percent, which amounts to an increase in the average annual growth rate over the coming decade of 0.15 percentage point. If that effect is surprisingly small to some people, the value of the estimate is increased, not diminished.

In addition, objective and timely information about the macroeconomic effects of legislative proposals is not readily available from sources other than CBO and JCT. Advocates and opponents of particular policies usually find ways to have their perspectives well represented in the Congressional and public debate. However, independent, reliable analysts generally have more difficulty completing their analyses on a timely basis (because doing careful analysis is hard and because those analysts often are not close to the policy development process) and having their analyses heard. Including macroeconomic effects in budget estimates would ensure that CBO and JCT devote resources to analyzing those effects in a timely way. Also, because of the attention paid to official budget estimates in the legislative process, including macroeconomic effects in those estimates would ensure that the effects receive attention.

[15] Changes in overall output do not necessarily correspond to changes in economic wellbeing and should not be interpreted as such. For example, CBO (2013c) distinguished carefully between the effects of the Senate's 2013 immigration legislation on output and on output per resident.

The usefulness of such attention depends in part on the clarity of CBO's and JCT's descriptions of estimated macroeconomic effects. Describing such effects can be challenging, but the agencies now have considerable practice doing so for supplementary analyses and are quite able to do so in official budget estimates. For example, in the agencies' report on repealing the ACA, the logic and magnitude of the macroeconomic effects are laid out clearly and in a manner that is nicely parallel to the discussion of the non-macroeconomic effects.

Lastly, CBO's and JCT's estimates of the macroeconomic effects of legislative proposals can satisfy, under certain conditions, the key constraints described earlier of being understandable and resistant to misinterpretation, based on a consistent and credible methodology, produced quickly enough to serve the legislative process, and prepared using the resources available to the agencies. Those issues are addressed in the remainder of the paper.

III.D. Limiting Macroeconomic Effects to Budget Estimates for Major Proposals

Despite the advantages of including macroeconomic effects in budget estimates for legislative proposals, I conclude that such effects should be incorporated *only in estimates for major proposals*. Specifically, I think that dynamic scoring should be applied only to proposals with estimated non-macroeconomic effects on revenues, spending, or deficits, relative to the baseline, that exceed a given threshold—as well as proposals for which dynamic scoring is requested by the chair or ranking member of the House or Senate Budget Committee.

That recommendation is based on three considerations (although there are legitimate counterarguments that are discussed below). First, CBO and JCT have the resources to conduct careful macroeconomic analyses for a limited number of legislative proposals each year. All of the estimates of macroeconomic effects described above involved significant conceptual and practical challenges and required a great deal of analysts' time to complete. The agencies can devote that much time to only a very small share of the thousands of proposals they examine each year.

Second, applying rules of thumb to produce estimates of the macroeconomic effects of other proposals would generally violate the important constraint that estimates be based on methodologies that are credible and cannot be easily manipulated. The macroeconomic effects of proposals can be complex and can vary considerably with the specifics of the proposed policy changes, the state of the economy, and the time horizon being examined. For example, when CBO (2015c) examined three ways of reducing spending for the Supplemental Nutrition Assistance Program (commonly known as food stamps), the agency found that even the sign of some policies' net effect on labor supply was not clear without detailed analysis. Similarly, JCT (2005) examined three approaches to reducing taxes by $500 billion and found that their effects on the economy differed greatly. In addition, the agencies' estimates of short-term macroeconomic effects depend importantly on the posture of monetary policy. Rules of thumb would not capture those

kinds of crucial nuances. Moreover, developers of proposals might exploit rules of thumb by structuring their proposals or labeling aspects of their proposals in ways that would generate more favorable estimated macroeconomic effects and thus lower estimated budgetary costs. CBO and JCT currently minimize such gaming by basing their non-macroeconomic estimates on a careful understanding of the substance of proposals rather than the application of arbitrary rules. Even if using rules of thumb to estimate macroeconomic effects could improve the accuracy of budget estimates on average, doing so would endanger the credibility of the estimating process.

Third, the proposals for which CBO's and JCT's estimates of macroeconomic effects would generally be most valuable are the ones with the largest estimated budgetary impacts apart from such effects—because those proposals are likely to produce significant macroeconomic effects. To be sure, *some* proposals that would not cause large changes in revenues or spending would also produce significant macroeconomic effects, but identifying them with a mechanical algorithm would be difficult. For example, Congressman Camp's comprehensive tax plan had a very small estimated effect on revenues—because the large estimated effects of some individual provisions of the plan were largely offsetting—but a significant estimated macroeconomic effect. A threshold for dynamic scoring based on the *gross* budgetary effects of a proposal's individual provisions would have identified his plan. However, a criterion based on so-called gross effects would not be very robust because the method of constructing an estimate and the level of detail shown in a table describing the estimate can alter the magnitude of the reported increases and decreases.[16]

Thus, the best way to choose which proposals with small estimated budgetary impacts relative to the baseline should be scored dynamically is to allow for requests from key Congressional leaders. In principle, at least, the Budget Committees are responsible for the budget process, and the official budget estimates are designed to support that process, so it makes sense to allow for requests from the Budget Committees. One might also allow for requests from the House Ways and Means Committee, the Senate Finance Committee, and the House and Senate Appropriations Committees, which are the other principal consumers of CBO's and JCT's estimates. However, if all of those committees could request dynamic estimates, the number of requests might become unmanageably large, so I slightly prefer to vest the authority only in the Budget Committees. It is more important to ensure that such requests are not skewed in the direction of one party's political interests. Therefore, the ranking members as well as the chairs of the committees should be allowed to make requests. By contrast, the new House rule and this year's budget resolution grant that power only to the chairs (of the Budget Committees).

In my view, a sensible threshold for automatically including macroeconomic effects in budget estimates would be estimated changes in revenues, spending, or deficits

[16] For example, the ACA included significant changes to the drug benefit in Medicare, some of which increased federal spending and others of which reduced it. One might view the estimated net effect on spending of those changes to be the combination of a gross estimated increase and a gross estimated decrease. However, the changes interacted with each other in significant ways, so CBO estimated their effects as a package and never identified elements of the estimate separately.

(excluding any macroeconomic impact) relative to the baseline exceeding one-quarter of one percent of projected output over the 10-year budget window. That threshold equals about $575 billion currently (based on CBO, 2015a) and would lead to dynamic scoring for only a few proposals each year, which would be a manageable increase in CBO's and JCT's workload. Neither the Senate's 2013 immigration proposal nor Congressman Camp's tax plan would have met that threshold, but clearly at least one leader of a budget committee would have requested dynamic scoring for each.

The new House rule and this year's budget resolution use a quarter-point threshold but apply it to any year in the budget window rather than the 10-year period as a whole. That approach generates thresholds of about $45 billion in 2015 and about $70 billion in 2025, and naturally it will cause more bills to be scored dynamically than my preferred approach would. In particular, short-term extensions of expiring tax or spending provisions are more likely to receive dynamic scores, as in JCT (2015b). However, the estimated macroeconomic effects of such extensions are not always illuminating: Many people expect such provisions to be extended, even retroactively, but the baseline reflects the expiration of the provisions and therefore the assumption that people will gradually recognize that extensions are not occurring; as a result, the macroeconomic effects of extending the provisions are primarily the effects of people not being surprised. Such effects can be complicated to estimate and difficult to explain. In addition, extensions of that sort are often negotiated and voted on under tight timetables, which further complicates doing macroeconomic analysis.

There are two noteworthy counterarguments to limiting dynamic scoring to major proposals. One is that even if the macroeconomic effects of a proposal with limited budgetary impact are small relative to the overall economy, their feedback on the federal budget could still be large relative to the non-macroeconomic budgetary impact of the proposal. In those circumstances, careful dynamic scoring would significantly improve the accuracy of the budget estimate. However, CBO and JCT cannot do careful analyses of the macroeconomic effects of all proposals, and using rules of thumb in place of careful analyses could reduce the accuracy of those estimates and diminish the credibility of CBO's and JCT's estimates more generally. In my judgment, those costs outweigh the benefits.

The other counterargument is that focusing dynamic scoring on major proposals would create an incentive for certain proposals to be bundled together or separated into pieces in order to lower their estimated budgetary cost. However, few enough proposals have budgetary impacts close to a quarter of a percent of output that this distortion would probably not be significant in practice. Moreover, allowing key Congressional leaders to request dynamic scoring for less-significant proposals should ameliorate this problem.

Given the inability of CBO and JCT to apply dynamic scoring to all proposals, one might wonder whether avoiding dynamic scoring altogether is the best feasible approach to budget estimates because it would make the estimating methodology more consistent across proposals. However, policymakers do not usually compare major proposals to less-significant proposals; major proposals are usually compared to other major proposals

that address similar issues or compared to the status quo, and both of those types of comparisons would be improved by dynamic scoring. In addition, as just noted, key Congressional leaders could request dynamic scoring for less-significant proposals for which the comparison to major proposals was especially valuable.

III.E. Other Important Issues Regarding the Inclusion of Macroeconomic Effects in Budget Estimates

Five other issues deserve comment.

First, estimates of macroeconomic effects of proposals should include both short-term effects stemming from shifts in aggregate demand and longer-term effects stemming from shifts in potential output. Longer-term economic effects may be better guides to proposals' effects beyond the 10-year budget window, and since that window is a compromise between on the ideal of an even longer horizon and the practical advantages of a shorter horizon, a focus on longer-term effects may seem preferable. However, the severe recession and slow recovery of the past several years are a stark reminder that shortfalls in the demand for goods and services can have large and persistent effects on the economy and the federal budget, so the effects of policy changes on aggregate demand can be quite important. Indeed, increasing aggregate demand was the principal objective of some proposals considered by the Congress in the past several years, such as the economic stimulus legislation of 2009. Moreover, different policy changes that the Congress sometimes compares—such as different time paths for reducing budget deficits by a given amount—would have different effects on aggregate demand, and illuminating those differences would be an important benefit of dynamic scoring.

Second, when CBO and JCT conclude that they do not have the tools or time needed to do a careful analysis of a proposal's macroeconomic effects, they should state as much and not include such effects in the official budget estimate. Estimating macroeconomic effects carefully often requires a great deal of analysis, and legislation is sometimes developed and amended quickly. Doing dynamic scoring without sufficient tools and time would endanger the credibility of the estimating process, as discussed above. That situation is especially likely to arise for changes in regulatory policy that have small effects on the federal budget apart from any macroeconomic effects. For example, substantial changes in federal regulation of the financial system or the environment could have significant macroeconomic effects that would be important for policymakers to understand and that could feed back to the federal budget in notable ways. However, CBO does not have much expertise in estimating the macroeconomic effects of such regulatory changes, and acquiring enough expertise to do so quickly during the legislative process would require a significant increase in CBO's resources and would distract the agency from its core responsibility of informing budget policy.

Third, CBO and JCT should share responsibility for estimating the macroeconomic effects of proposals along the lines of their sharing responsibility for estimating the budgetary impact of proposals excluding macroeconomic effects. Specifically, JCT should produce estimates of the macroeconomic effects of major proposals to change the

federal tax code, CBO should do the same for major proposals to change federal spending, and the agencies should collaborate in estimating the macroeconomic effects of major proposals that would change both tax and spending policies (as with the estimate for repealing the ACA released in June 2015). One challenge is ensuring that proposals that are similar in their substance receive similar estimates of their macroeconomic effects regardless of whether they are structured as changes in tax policy or spending policy. For example, similar subsidies for similar activities should be estimated to have similar macroeconomic effects whether those subsidies take the form of tax credits or explicit federal spending. But that same challenge arises currently in estimating the budgetary impact of policies excluding their macroeconomic effects, and the challenge is met by ongoing interaction and coordination between CBO and JCT.

Fourth, some Congressional procedures may need to be modified to accommodate dynamic scoring. For example, dynamic scoring may generate jurisdictional conflicts between some Congressional committees: Because changes in spending that affected total output and income would affect revenues, the House and the Senate would need to develop procedures for assigning budget targets to committees that allowed for such interactions. That problem would be somewhat ameliorated by the limited number of bills that would be scoring dynamically. Other Congressional procedures would adapt naturally to dynamic scoring. For example, official budget estimates are used to assess the applicability of certain parliamentary "points of order"; if a proposal was scored dynamically, then the estimated budgetary feedback from the macroeconomic effects of the proposal would be incorporated in that assessment.

Fifth, there are advantages of an alternative approach in which CBO's and JCT's estimates of macroeconomic effects and their budgetary feedback would be provided in supplementary reports rather than being included in official budget estimates, but I think those advantages are outweighed by the disadvantages. The advantages of that alternative approach include the following: It would avoid delaying the publication of budget estimates until macroeconomic analyses could be completed, which might be a considerable period of time in some cases. It would maintain a consistent basis of fixed output for all official budget estimates, which might make it easier for CBO and JCT to exclude macroeconomic effects when they did not have a solid analytic basis for assessing those effects. And it would avoid the jurisdictional problems between committees just discussed.

One might view as a further advantage of the alternative approach that estimated macroeconomic effects and their budgetary feedback could be reported as ranges of possible outcomes—thereby demonstrating the uncertainty of such analyses—rather than as the point estimates that are needed for the Congressional budget process. Indeed, CBO and JCT should quantify the uncertainty of macroeconomic effects by reporting ranges of estimates whenever feasible, as I discuss in greater detail later. However, CBO (2014e) explains that "providing ranges sometimes muddies, rather than enhances, general understanding of analysis because people tend to cite the part of a range they prefer," so CBO already tries to clarify the agency's findings by reporting point estimates as well as

ranges in the agency's macroeconomic analyses. Using those point estimates in official budget estimates would not distort the analyses or their presentation.

One might view as a different advantage of the alternative approach that providing the estimated budgetary impact of macroeconomic effects separately would enable the House and Senate to differ in their use of that information and would enable Members of Congress, their staffs, and outside observers to evaluate the estimated macroeconomic effects separately from the other estimated effects. However, CBO (2015d, page 23) explained that "cost estimates [with dynamic scoring] will include all of the information that typically would be included if macroeconomic effects were not incorporated in the analysis, as well as additional information related to the macroeconomic effects." Accordingly, the recent estimates for repealing the ACA and extending certain expiring tax provisions reported the estimated budgetary impacts excluding macroeconomic effects, the estimated budgetary impacts of macroeconomic effects, and the estimated budgetary impacts including macroeconomic effects. Including estimated macroeconomic effects in official budget estimates in this manner does not preclude the Congress and others from evaluating and using that information as they see fit.

Yet another seeming advantage of the alternative approach might be to facilitate a procedural transition between the historical exclusion of macroeconomic effects and their possible future inclusion: Such a transition would give CBO and JCT an opportunity to experiment with different methods of analysis and presentation, and it would give the Congress and others an opportunity to learn about the agencies' macroeconomic analysis and develop procedures for using that information. However, that transition has effectively been underway for some time. As discussed above, both CBO and JCT have published many analyses of the macroeconomic effects of legislative proposals as well as reports on their methodology for such analyses. Moreover, the recently published estimates for repealing the ACA and extending expiring tax provisions did not reveal any problems that suggest that dynamic scoring is "not ready for prime time."

In addition, the alternative approach of providing estimates of macroeconomic effects and their budgetary feedback in supplementary reports rather than official budget estimates would have some significant disadvantages. Leaving macroeconomic effects out of budget estimates would reduce the attention that those effects receive, even though the effects can be important for policymakers to understand. Also, separating the two types of budgetary effects of legislative proposals would make CBO's and JCT's estimates more difficult to understand for Members of Congress, their staffs, and outside observers. In my judgment, those disadvantages of the alternative approach outweigh the limited advantages described above.

IV. Concerns About Including Macroeconomic Effects in Budget Estimates

A number of observers have expressed concerns that including the macroeconomic effects of legislative proposals in official budget estimates would worsen rather than improve the information provided in those estimates. This section examines six important

concerns that were not addressed, or were addressed only briefly, in the preceding section. In my view, the first two of these concerns apply with roughly equal force to macroeconomic and non-macroeconomic effects of proposals and thus are not compelling reasons for treating the former differently, the next three concerns represent true challenges in estimating macroeconomic effects but can be addressed adequately by CBO and JCT, and the final concern is premised on a view of the agencies' role in the budget process that I think is inappropriate.

IV.A. Potential Political Pressure on CBO and JCT

One concern is that including macroeconomic effects of proposals in official budget estimates would increase political pressure on CBO and JCT to adopt modeling approaches or elasticities of behavioral responses that would overstate the positive effects of certain types of policies. I welcome vigilance about the risk that the agencies will be subjected to political pressure to modify their analysis in any regard. However, political pressure has not altered CBO's or JCT's estimates for legislation in the past decades, and I doubt that dynamic scoring would substantially increase such pressure.

In my six years as CBO director, Members of Congress, their staffs, and other observers were not hesitant to speak up when they disagreed with an estimate from CBO. That is not surprising—nor is it objectionable, because CBO's and JCT's estimates are not above reproach. The appropriate response by the agencies to such criticism is to collect any information that can be provided by those who disagree with the estimate, to reconsider whether the agencies' analysis was correct, and to revise the estimate if and only if the reconsideration shows that a different figure would be more accurate. That process occurred a number of times while I was at CBO. However, at no point in those six years did anyone in a position of authority in the Congress attempt to dictate a change in a CBO estimate or in a CBO modeling assumption. Congressional leaders appear to understand the long-term value of maintaining CBO's and JCT's analytic independence.

Similar disagreements with CBO's and JCT's macroeconomic analyses have occurred in the past and would occur in the future if dynamic scoring was adopted. However, the risk of political pressure does not seem greater for estimates of macroeconomic effects than for estimates of non-macroeconomic effects. On the one hand, there may be more observers who have strongly held views about key parameters underlying macroeconomic estimates—such as the elasticity of labor supply—than have strongly held views about the less well-known parameters underlying non-macroeconomic estimates. On the other hand, because macroeconomic estimates depend heavily on a small number of parameters and other modeling choices, CBO and JCT have documented those choices more thoroughly than they have documented the analytic underpinnings of some non-macroeconomic estimates. It is important, then, that CBO and JCT report publicly on any changes in their macroeconomic modeling (as CBO did during the past few years as it updated a number of aspects of that modeling).

IV.B. Uncertainty of Macroeconomic Effects

Another concern is that macroeconomic effects of proposals are so uncertain that including them in official budget estimates would degrade the quality of the estimates. However, as noted above, the accuracy of the budget estimates would probably be improved by including all of the factors for which CBO or JCT can generate informed estimates, and macroeconomic effects meet that criterion when the agencies have the time and tools to do a careful analysis. Moreover, many *non*-macroeconomic effects of proposals are very uncertain as well, and in many cases there is less evidence to bring to bear to quantify those effects than to quantify the macroeconomic effects of proposals.

As one important example, the extent of uncertainty regarding the macroeconomic effects of changes in tax rates can be gleaned from CBO's recent review of evidence on the elasticity of labor supply. In a table summarizing estimates of the substitution elasticity for men and single women, CBO (2012g) showed values ranging from 0.04 to 0.84; in a corresponding table for married women, CBO showed values ranging from 0.03 to 0.7. Similar uncertainty exists about other behavioral responses and other aspects of CBO's and JCT's models of the macroeconomic effects of fiscal policies. However, uncertainty about those parameters is so apparent in part because they have been the subject of substantial research, which at least provides evidence for CBO and JCT to draw on.

For many of the behavioral responses underlying the *non*-macroeconomic effects of fiscal policies, there is much less evidence for CBO and JCT to use, but that does not imply that uncertainty about the responses is smaller. For example, the agencies' estimates of the non-macroeconomic effects of the Senate's 2013 immigration legislation, the ACA, and Congressman Camp's tax reform plan all relied heavily on assessments of behavioral responses about which there is little evidence and experts are highly uncertain. In addition, as noted above, the agencies' public documentation of their methodologies for estimating non-macroeconomic effects is less expansive in some cases than their public documentation of their methodology for estimating macroeconomic effects. Thus, there is no good reason to view the agencies' estimates of macroeconomic effects as less credible than their estimates of non-macroeconomic effects.

Note also that *excluding* macroeconomic effects from budget estimates for proposals that might have significant macroeconomic effects—and excluding those effects because of a historical convention that appears arbitrary to many observers—itself diminishes the credibility of budget estimates. In sum, I think that including macroeconomic effects (under the conditions described in this paper) would enhance the credibility of the official budget estimates.

Although the budget process focuses on point estimates, quantifying the uncertainty of estimated macroeconomic effects may be useful to Members of Congress, their staffs, and outside analysts, and I think that CBO and JCT should do that whenever feasible.[17] For example, the range of estimates that JCT published for Congressman Camp's tax plan provided a measure of uncertainty, and, as noted above, CBO typically presents its estimates of macroeconomic effects with a range as well as a central estimate.

[17] Regarding uncertainty in CBO's estimates and the appropriate response by policymakers, see Manski (2011) and CBO (2014e, 2015g [pages 108-109]).

IV.C. Potential Bias Toward Tax Cuts Relative to Spending Increases

A further concern is that applying dynamic scoring to proposals affecting federal taxes but not proposals affecting federal spending would distort policymakers' decisions in favor of tax cuts relative to spending increases. For example, if lower tax rates raise output by increasing labor supply, and greater infrastructure spending raises output by increasing the capital stock, then including the former effect in official budget estimates but excluding the latter effect would inappropriately encourage tax rate cuts relative to infrastructure spending increases. That concern is, in some ways, the opposite of a concern about the conventional approach to cost estimates that excluding effects on labor supply tends to overstate the budgetary cost of tax cuts and understate the budgetary cost of benefit increases, thereby encouraging policymakers to increase taxes and benefits. In any event, the concern can be addressed by applying dynamic scoring to proposals that change spending as well as those that change revenues.

Indeed, as described earlier, CBO's analyses of macroeconomic effects include the effects of federal spending on the demand for goods and services, the effects of federal benefits on labor supply, and the effects on the economy of federal investments in infrastructure, education and training, and research and development.[18] For example, CBO's annual economic analysis of the President's budget incorporates the effects of proposed changes in both spending and taxes. In addition, the estimated effects of the ACA on labor supply stem partly from changes in the tax code and partly from changes in spending for Medicaid (as well as some other aspects of the law), and those effects are treated in a completely parallel manner in the estimates.

Nonetheless, there are two obstacles to the goal of applying dynamic scoring equally to federal spending changes and tax changes. One obstacle is that the Congressional budget process treats certain types of spending differently from other types of spending and revenues. Roughly a third of noninterest federal spending arises from annual appropriations by the Congress (sometimes called "discretionary spending"), with the remaining roughly two-thirds reflecting payments for ongoing benefit programs (sometimes called "mandatory spending"). Appropriations are currently split about equally between defense and nondefense purposes, and about half of nondefense appropriations go to investments in infrastructure, education and training, and research and development. The Congressional Budget Act of 1974—which established CBO, the House and Senate Budget Committees, and many of the ground rules that govern the budget process—specified that CBO should not produce estimates for appropriations bills that are comparable to those it produces for other legislation but instead should tally the amounts specified in those bills and provide those tallies to the Appropriations

[18] As CBO has noted, its analysis of those effects would benefit from further methodological advances. CBO (2014d, page 9) explained that the agency is "developing the capability to apply substitution elasticities as well [as income elasticities], but it does not currently have that capability for all transfer payments (although the agency has incorporated substitution elasticities in some specific analyses)." Similarly, the agency should enhance its capability to estimate the effects of federal investments in disaggregated categories and to estimate the long-term effects of federal benefits—although its analysis in those areas is limited mostly by a paucity of available research.

Committees. Potential implications of appropriations for future tax revenues or benefit payments are not considered in that tallying process or in the subsequent legislative process. Perhaps because of that different procedural treatment, appropriations bills are excluded from the requirements for dynamic scoring in the new House rule and Congressional budget resolution.

Moreover, if dynamic scoring were applied only to proposals with a significant budgetary impact (excluding macroeconomic effects) relative to the baseline, as recommended above, few appropriations bills would meet that criterion. The baseline for appropriations equals the previous year's appropriations adjusted for inflation, or the statutory cap if one exists. Actual appropriations in a single year rarely differ from the baseline by an amount that exceeds a quarter of a percent of output over the coming decade, with the most recent exception being the one-time burst of appropriations under the 2009 stimulus bill.

However, if the chairs and ranking members of the Budget Committees were allowed to request dynamic scoring for some bills with small estimated budgetary effects, also as recommended above, then they should be allowed to make those requests for appropriations bills. It would be appropriate, in my view, for CBO to provide estimates of the macroeconomic effects and resulting budgetary feedback of consequential changes in appropriations.[19] In addition, I think the agency should publish a report with estimates of the macroeconomic effects of alternative multi-year paths for federal investment and the budgetary feedback from those macroeconomic effects.

A second obstacle to applying dynamic scoring equally to spending changes and tax changes is that the macroeconomic effects of certain sorts of federal spending are not fully felt within the 10-year budget window. Of course, that same issue arises for certain sorts of federal tax changes—for example, reductions in the marginal tax rate on capital income encourage additional investment, and the resulting increase in the capital stock (and thus output) occurs gradually. However, the problem may be more acute for spending changes that involve investments. For example, most of the increment to output from a new bridge or improved highway (allowing for construction time and subsequent depreciation) occurs beyond the budget window. And most of the increment to output and income that may arise from improved health care, preschool education, or housing for low-income children probably occurs after those children have entered the labor force.

This problem can be addressed at least to some extent by CBO and JCT providing information about the effects of proposals beyond the budget window. As described above, when the agencies expect that a proposal would have very different budgetary effects beyond the coming decade than during the decade, they try to provide information about the long-term effects. For example, CBO and JCT provided estimates for the second decade after enactment for the Senate's 2013 immigration legislation and for repeal of the ACA, and in some cases CBO has estimated the effects of policy changes over even longer horizons (see CBO, 2010a, 2012e). In addition, the new House rule and Congressional budget resolution explicitly require that qualitative information be

[19] For a recent estimate of the macroeconomic effects (but not budgetary feedback) of a change in appropriations, see CBO (2015l).

provided about budgetary effects (including macroeconomic effects) beyond the 10-year budget window. Unfortunately, providing information about the macroeconomic (and non-macroeconomic) effects of proposals beyond the coming decade is challenging because, as noted earlier, the estimating methodology needed for a longer period would require additional resources to develop, would usually be less credible, and would lead to estimates that were more prone to misinterpretation in certain ways. In particular, the evidence base that could be used to construct estimates of the long-term effects of benefit changes for low-income children remains limited.

Given the limitations on applying dynamic scoring to changes in federal spending, one might wonder whether avoiding dynamic scoring for changes in federal taxes is the best feasible approach to official budget estimates because it increases the comparability of certain policies in a second-best way. However, the limitations discussed here create no distortions to comparisons between different types of tax changes, between tax changes and the continuation of current tax law, between tax changes and spending changes apart from investments, and between spending changes apart from investments and the continuation of current law. Even for comparisons between tax changes and changes in federal investments, estimates for the decade-long budget window or estimates that extend into a second decade may still be more comparable if they include macroeconomic effects. At the least, including such effects in budget estimates, even when imperfectly measured, brings additional attention to those effects.

IV.D. Difficulty in Capturing Expectations of Future Fiscal Policy

Yet another concern is that accurately projecting the macroeconomic effects of proposals might require modeling expectations of future fiscal policy, which would raise significant conceptual and practical difficulties. In particular, a reduction in current tax rates has different effects on labor supply and saving if people's expectations of future tax rates increase, decrease, or remain the same—and modeling those expectations is challenging, especially if the proposal at hand represents an unsustainable change in policy. However, expectations of future fiscal policy are frequently left aside in other economic analyses, and CBO and JCT have developed methods for handling this issue in their macroeconomic analyses.

Consider proposals that reduce marginal tax rates on labor income. When CBO or JCT analyze such a proposal using their Solow-type growth models, they apply labor supply elasticities drawn from the large empirical literature to the change in tax rates between the baseline and the proposal. Most papers in that literature do not explicitly measure expected tax rates but simply examine changes in labor supply that have resulted from given changes in contemporaneous tax rates. Therefore, the estimated elasticities can be interpreted as the effect of a given change in current tax rates with expected future tax rates adjusting in whatever way people expected them to adjust, on average, in the past—which may appropriately reflect the fuzziness of people's expectations about future tax rates. The Solow model does not explicitly include expectations, so this sort of estimated elasticity fits logically, although it will generate a less accurate estimate in circumstances when anticipatory effects are important.

In contrast, people's behavior in life-cycle growth models depends explicitly on their expectations. If forward-looking people expected that debt would rise relative to output without limit, they would not hold government bonds, so the models can be used only to analyze sustainable changes in policies. Therefore, when CBO or JCT use their life-cycle models to analyze a proposal that would increase deficits indefinitely, the agencies incorporate future policy changes not specified in the proposal to offset the deficit increases. That situation is awkward because a key principle of budget estimates is that the agencies take proposals as written and do not predict future legislation.

To minimize the influence of the assumed future policy changes on their estimates, CBO and JCT generally report results for multiple alternative changes—for example, one estimate under the assumption that future revenues are increased and one under the assumption that future spending is reduced. In fact, the results often do not differ very much under alternative assumptions (CBO, 2015i). The agencies also defer the assumed changes as long as possible while still being able to solve the models (although Congressional interest in receiving information about the effects of proposals beyond the 10-year budget window increases the difficulty of deferring the assumed changes long enough that they would not affect the reported estimates). Even so, if a proposal would increase deficits indefinitely, which would have harmful economic effects, the inclusion in a budget estimate of additional policy changes not specified in the proposal might make the proposal look better than it really is.

Given those issues, I think that CBO and JCT should give less weight to estimates based on their life-cycle models than their Solow-type models, except in circumstances where the anticipatory effects of proposals might be especially important.[20] Indeed, the agencies have used their life-cycle models less often than their Solow-type models in their macroeconomic analyses, perhaps because of the issue described here or because the life-cycle models can be more cumbersome in other respects.

It bears emphasis that the same issue arises with estimates of certain *non*-macroeconomic effects of proposals, although it is rarely discussed in that context. For example, a reduction in current tax rates may have different effects on mortgage interest deductions or employers' payments for health insurance depending on expectations of future tax rates. However, the research literature regarding such behavior does not explicitly measure expected tax rates, so CBO's and JCT's estimates can be interpreted as the effect of a given change in current tax rates with expected future tax rates adjusting in whatever way people expected them to adjust, on average, in the past. That approach is somewhat unsatisfying, especially if the policy change at hand is not sustainable and therefore future changes will be needed, but there is no feasible alternative.

IV.E. Potential Distortion to Estimates of Unsustainable Policy Changes Stemming From the 10-Year Budget Window

[20] See CBO (2014c, pages 14-15) for an example of how the agency combines results from its two models.

A further concern is that estimates of the macroeconomic effects of unsustainable policy changes would be distorted by the 10-year budget window. For example, suppose that a reduction in tax rates was estimated to raise output over the next decade but to generate revenue losses that were unsustainable (because the increase in output was not large enough for the tax reduction to "pay for itself"). If those same rates were raised later to satisfy the government budget constraint, output would be estimated to be lower in the long run. In that scenario, dynamic scoring over the budget window would credit the proposal with raising output even though the ultimate effect on output would be negative.

That scenario might occur, but it is not likely. First, a reduction in tax rates without an offsetting broadening of the tax base or reduction in spending might well be estimated to *lower* output within the 10-year budget window, depending on the specifics of the tax reduction. For example, JCT (2003a) estimated that the tax cuts enacted in 2003 would increase output during the first five years after enactment but decrease output later in the decade, in part because the harmful effects of greater federal debt were estimated to outweigh the favorable effects of lower tax rates. Similarly, CBO (2010c) estimated that extending the broad tax cuts originally enacted in 2001 and 2003 would raise output in the following few years but lower output later in the decade.[21]

Second, the harmful effects of greater federal debt increase over time as debt compounds, while the favorable effects of lower tax rates generally do not, so any tax-rate reductions that were estimated to raise output throughout the first decade after enactment would be less likely to be estimated to do so in the second decade. Indeed, CBO (2010c) estimated that the negative effects on output of extending the tax cuts would be much larger after 30 years than after 10 years. Those long-term effects would be reported by CBO and JCT because, as noted above, the agencies try to provide information about long-term effects when the agencies expect those effects to be very different from effects within the budget window. In addition, the current rules regarding dynamic scoring require CBO and JCT to provide information about the long-term effects of proposals.

Despite those points, suppose that a reduction in tax rates was, in fact, estimated to raise output over the next few decades but to generate revenue losses that were unsustainable. The unsustainable nature of the rate reduction would be shown by the estimated effect of the proposal on federal debt, so the need to make further policy changes to offset the budgetary losses would be quite apparent. In addition, the increase in deficits might be offset later *not* by reversing the tax-rate reduction but by making some other policy change—and because that other change would have an effect on output that was not just the opposite of the effect of the tax-rate reduction, it is unclear whether the estimated effects of the rate reduction on output in the first few decades would truly be misleading. Moreover, the estimated macroeconomic effects of the rate reduction would not be the

[21] That result may seem surprising in light of CBO's (2005) estimate that a 10 percent reduction in federal tax rates on individual income would probably increase output in the second half of the decade after enactment. The difference between CBO's 2005 and 2010 estimates stems from several factors, including: the inclusion of inframarginal cuts in taxes under the 2001 and 2003 legislation; an increase in outstanding federal debt, which means that the rise in interest rates resulting from greater federal borrowing has a more significant effect on future deficits; and various improvements in CBO's modeling.

only aspect of the budget estimate that could be misleading: The estimated *non*-macroeconomic effects on the budget could be misleading as well, as would any distributional analysis and or other analysis based on the rate reduction. In any event, it is not tenable for CBO and JCT to ignore the policy changes included in a legislative proposal even if those changes are not, by themselves, sustainable.

IV.F. Potential Benefits of Estimates that Err on the Side of Exaggerating Budgetary Cost

One other concern about dynamic scoring arises from the view that policymakers tend to give insufficient weight to budgetary costs when developing and voting on legislative proposals, so CBO and JCT should provide budget estimates that tend to err in the direction of overstating those costs. As summarized (but not necessarily endorsed) by the Committee for a Responsible Federal Budget (2015, page 1), the story then goes that excluding the macroeconomic effects of proposals from official budget estimates would make "dynamic gains a 'bonus' to help further reduce the deficit."

However, dynamic scoring does not consistently reduce the estimated budgetary cost of proposals relative to non-dynamic scoring. As noted earlier, CBO (2010c) estimated that extending the broad tax cuts originally enacted in 2001 and 2003 would *reduce* output by the latter part of the decade after enactment, so dynamic scoring would have shown a more negative impact on the budget than non-dynamic scoring. Also, CBO (2014a) estimated that the expansion of federal subsidies for health insurance under the ACA was reducing labor supply and thereby federal revenues, so dynamic scoring of the ACA would have shown a more negative impact on the budget than non-dynamic scoring.

More fundamentally, I do not think it is appropriate for CBO and JCT to try to nudge policymakers toward smaller budget deficits by providing estimates that tend to overstate the budgetary costs of proposals. Instead, the agencies should provide estimates that are in the middle of the distribution of possible outcomes and leave policymakers to make decisions based on their own views of desirable outcomes and acceptable risks.

V. Conclusion

Including macroeconomic effects in budget estimates for major legislative proposals—except when CBO and JCT do not have the tools or time to do a careful macroeconomic analysis—would improve the accuracy of those estimates and provide important information about the economic effects of those proposals. Therefore, I conclude that dynamic scoring should be used under those circumstances.

To complement that greater commitment to analyzing the macroeconomic effects of proposals, I think that CBO and JCT should also make a greater commitment to analyzing the distributional effects of proposals. Because policy choices can involve significant tradeoffs between total income and the distribution of income, and because outcomes that are quantified often receive greater attention in policy discussions than

outcomes that are not, quantifying the effects of legislative proposals on both total income and its distribution would be very valuable.[22]

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[22] Ideally, the distributional analysis of proposals would incorporate the macroeconomic analysis—for example, to capture the partial shift in the burden of capital taxes from capital owners to workers that stems from changes in the amount of capital. However, CBO and JCT have not developed the capability to conduct such dynamic distributional analysis, and doing so would be very challenging.

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