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FEDERAL REVENUE AND EXPENDITURE ESTIMATING: A FLAWED PROCESS THAT LEADS TO BAD FISCAL POLICY

Summary

Although most private sector forecasting models recognize that changes in tax rates or other features of the tax code affect the aggregate economy in various ways, government revenue estimators at the Treasury and the Joint Committee on Taxation (JCT) deliberately ignore tax-driven effects on the aggregate economy when attempting to measure the revenue consequences of proposed tax changes.

Government revenue estimators claim their models are dynamic because they sometimes allow for modest changes in which products are produced, where income is earned, and how income is spent as a result of tax changes. But because the models assume that tax changes never affect total production, total employment, total earnings, total saving and investment, economic growth, or any other features of the aggregate economy, government revenue estimation models are essentially static.

When tax changes improve production incentives at the margin, output and incomes rise, which

expands the tax base and yields positive revenue feedbacks. When tax changes worsen marginal production incentives, they yield negative revenue feedbacks. By ignoring these effects, the Treasury and the JCT deliver highly misleading revenue estimates, and highly misleading advice to the Congress and the Administration.

Tax reforms with large positive work and saving incentives — such as an across-the-board cut in tax rates, a lower capital gains tax rate, faster capital cost recovery allowances, and elimination of the alternative minimum tax — would have much smaller revenue costs than government estimators claim. Spending increases that have no positive incentive effects, or transfer payments that discourage work or saving, would decrease GDP, not add to it, and would cost more than initially forecast by reducing government revenues.

Government revenue estimates could, and should, be more accurate:

- *Government revenue estimation models should include dynamic macroeconomic effects.*
- *The dynamic effects in the models should be based on behavioral changes motivated by price signals (i.e., the microeconomic price and incentive effects of tax and spending changes), not on theoretically unsound and empirically discredited Keynesian theories of demand management.*
- *The models should recognize that we live in a global economy. Taxing U.S.-sited capital less heavily can quickly attract large amounts of domestic and foreign saving to finance additional investment in the United States.*
- *The assumptions and equations that government estimators use in their models should be made public so that people outside the government may judge whether the models are reasonable.*
- *The JCT is moving too slowly toward new estimation methods, and the Treasury has not even begun. They must be urged, respectively, to move faster and to get started for the good of the country.*

Introduction

In June 2001, the House Rules Committee's Subcommittee on Legislative and Budget Process was scheduled to hold a hearing on federal revenue and expenditure estimating. The Chairman sought to learn how well the economic forecasting and revenue estimating models used by the Treasury, the Joint Committee on Taxation (JCT) and the Congressional Budget Office (CBO) perform in order to examine the accuracy of the information these agencies provide to the Congress in its work on budget and tax issues.

These issues involve questions and disputes about how government fiscal and monetary policy affect the economy. For a period in the late 1970s and 1980s, it seemed that the government and many policy analysts had made some progress toward a better understanding of these relationships. In recent years, however, many of the economic lessons of the 1960s, 1970s, and 1980s have been forgotten.

A re-airing of the issues involved would have shed some light on the effect of various types of tax and spending changes on the economy and on the federal budget. Such a discussion would have come too late to improve the Economic Growth and Tax Relief Act of 2001, but it might have led to a better "stimulus" plan at year's end, and might have given a boost to the idea of fundamental tax reform. It might also have kick-started the process of improving how we measure and design federal tax and spending changes, and inspire the JCT, the CBO, and the Treasury to do a better job for the country, which would make an enormous difference in people's welfare.

Unfortunately, a question of committee jurisdiction was raised, and the Rules Subcommittee was forced to cancel the hearing. No other committee picked up the ball. I had been asked to prepare testimony for the hearing. What follows are the questions submitted by the Subcommittee, and my replies.

1. How do private sector models differ from government models?

Most private sector economic forecasting models try to predict the future course of the economy. They try to gauge economic trends plus whatever changes in the economy might result from government policy actions and from other events. They are complete models that seek to capture, as accurately as they can, all of the economic consequences of outside shocks plus the normal evolution of the economy over time. They assume, for example, that changes in tax rates or other features of the tax code would affect the aggregate economy in various ways.

When private models try to predict the effect on the federal budget of a tax change, they include a calculation of how the economy would adjust following the tax change, and how that would alter the incomes of workers, savers, and businesses; that is, how the tax base would be affected (according to the views of the modeler). These tax base changes are in addition to the statutory tax adjustment that had been enacted, and have an added effect on federal revenue beyond that of the tax change applied to the old levels of economic activity and incomes.

Responsibilities of federal revenue estimators. The Treasury and JCT revenue estimators have two main chores. One is to prepare revenue forecasts for the federal budget in January and the midyear review. These are based on the economic forecasts they receive from the Administration economics team and the CBO, respectively. (The Administration forecast is prepared by economists from Treasury, the Council of Economic Advisors (CEA), and the Office of Management and Budget (OMB), and is approved by the Secretary of the Treasury, the Chairman of the CEA, and the Director of OMB — the "troika".) Second, the Treasury and JCT revenue estimators also attempt to measure the revenue consequences of various tax bills introduced during the year.

Economic forecasts for the budget. The economic forecast in the Administration budget is prepared with an eye on the forecasts of the private sector and any improvements from anticipated policy changes that the Administration cares to consider as part of the outlook. The CBO also studies private sector forecasts in making its budget projections.

The level of detail in the economic assumptions required for federal budget calculations is not great. The Administration does not rely on an in-house model to forecast the economy. The "troika" agencies, Treasury, OMB, and the CEA, settle on an economic projection to guide the budget work. They take their cue from private forecasters, with some modest adjustments factored in to reflect what the Administration believes its proposed policy changes might do. These are not generally determined by running any specific model, but reflect a reasonable guess, based on the economics literature and the private models, about what the policy changes might accomplish. Similarly, the CBO settles on its annual and revised mid-year economic projections after consultations with private sector and academic advisors, and after looking at what the private modeling community is forecasting.

As I understand it, the CBO has no independent model of its own. It has developed a framework for, in effect, blending the estimates of a number of private sector models to achieve a "consensus" projection for the economy based on the CBO's projections of government spending trends, tax policy, and Federal Reserve policy, etc., including anticipated changes. These models are of different degrees of sophistication and quality. They have different ways of dealing with various policy changes and different frameworks of analysis, and they place different weights on how much various policy changes affect the economy. While any given private sector model may be internally consistent (for better or for worse, depending on the quality of the theory behind the model), blending results from several models cannot yield an internally consistent outcome.

In addition, the CBO may change the weights it assigns to the different models to try to match the outcome with recent historical experience in the hope that this will improve future estimates. Since all models are, at best, approximations of how the world works, and operate on different theories, this effort is unlikely to be successful. One model may predict the effect of an energy shock well. Another may do a better job with tax changes of a specific type. The "shock" that occurred last year may be different from the "shock" that occurs this year, and re-weighting models based on past performance without distinguishing the source of the "shock" will not improve the forecast.

Revenue estimates of tax bills. When Treasury and JCT revenue estimators forecast the change in government revenue from a change in tax policy, they do not try to model the effects of the tax policy proposal on the total economy and the resulting revenue feedbacks. Similarly, they do not routinely predict the impact of spending proposals, bill by bill, on the economy. Instead, they take as fixed the macroeconomic forecast previously arrived at for budget work, and calculate the revenue effects of subsequent policy proposals using that fixed forecast. There is no "dynamic" scoring as such. Treasury and JCT revenue estimators do not compute a "pre-policy" baseline economic forecast and resulting revenue prediction and then compare it to a "policy-inclusive" economic forecast and revenue prediction. Instead, they calculate the "cost" or "gain" from any tax cut or increase by taking the single previously-arrived-at macroeconomic forecast, holding it constant, and applying the old and the new tax rates and regulations to it. The resulting revenue difference is given out as the cost or gain from the tax change.

This method, of course, is wrong whenever the tax or spending change would have an effect on the level of economic activity. The error is especially severe with major tax changes that have powerful incentive effects, such as broad-based tax rate changes. Although revenue estimators have computer programs that act as revenue calculators,

these are not complete econometric forecasting models. They are more like spread-sheets. To repeat, the official government revenue estimation models are essentially static; that is, they assume that aggregate economic performance and the tax base do not change as a result of a change in the tax rates or regulations.

To a very limited extent, the government's revenue estimating methods allow for some modest changes in behavior in the case of selective tax changes, such as changes in excise taxes. They may assume, for example, that an increase in the tobacco excise tax will reduce the quantity of cigarettes sold, and will factor that change in the tax base into their calculation of the revenue effect of a change in the cigarette tax rate. They assume, however, that the resources driven out of the tobacco industry will immediately find alternative employment in other uses producing goods of equal value and earning income of equal value. Consequently, the estimates do not include any macroeconomic consequences or resulting revenue changes from the excise tax increase. This simplifying assumption is incorrect even for selective excise taxes. Resources driven out of an industry where they had been put to their highest value added use will earn somewhat less in alternative employment. However, the macroeconomic consequences of selective excise taxes, while not zero, are at least not enormous.

The situation is very different, however, if the tax change has important incentive effects, such as changes in the individual or corporate income tax rates or the payroll tax rate, or an across-the-board revision of capital consumption allowances. (The latter affects the calculation of taxable income resulting from, and thereby changes the effective tax rate on, all depreciable investment projects.) These changes affect all labor services and/or all capital services or saving. If these tax rates are increased, there are no alternative uses into which these resources can migrate to escape the tax hike except to leave the marketplace altogether. Labor flees to leisure. Saving and investment shrink in favor of consumption. The reactions are in the opposite

direction in the event of a tax rate reduction. These tax changes have substantial macroeconomic effects that cause significant changes in the tax base, which feed back on the change in revenue that can be expected from the tax change. Changes in income and employment also affect federal outlays on income maintenance and retirement outlays. The Treasury and JCT revenue estimators *rigorously and deliberately* ignore such effects on the aggregate economy, the total tax base, and outlays.

The estimators do try to calculate what a tax change such as depreciation reform might do to the timing of investment write-offs. Faster depreciation might accelerate the write-offs for a given level of capital goods spending, resulting in lower taxable income near-term and higher taxable income later on. However, the estimators will not attempt to calculate what the faster write-off will do to the cost of capital and the level of investment and the capital stock. They will not factor in a permanently higher level of investment and capital that would boost economic capacity and future output, productivity, employment, and wages. They will not factor in the higher tax base from the economic expansion.

The revenue estimators often refer to their calculations of modest behavior responses with respect to the timing of a write-off or the change in size of one industry within an unchanged aggregate economy as "dynamic" scoring. This is not what economists mean by the term. The term "dynamic" scoring is meant to reflect the macroeconomic as well as microeconomic consequences of policy changes. Leaving out the macroeconomic consequences, especially where they are large and important, results in highly inaccurate revenue estimates, and highly misleading guidance to the Congress and the Administration.

Other behavior changes assumed by the JCT have less to do with economics and the economy, and more to do with tax compliance. They, too, are not properly called "dynamic," and are often neither accurate nor remotely plausible. For example, in its estimate of the revenue effect of repealing the estate

tax during consideration of the 2001 tax act, the JCT did not look at the reduction in the tax on saving, the consequent increase in the incentive to save, the resulting added growth in the economy, or the added revenues gained from the higher incomes. The JCT did estimate a cost from an assumed increase in tax avoidance practices, without, apparently, taking into account preventive measures that are available to the tax authorities. In short, the JCT assumed unlikely behavior changes unrelated to economics that raised the apparent cost of the provision, and ignored far more certain changes in economic behavior that would have reduced the cost of the provision.

2. Do private sector revenue and spending models differ, and how so? To what extent do they factor in behavioral feedback?

Most private sector models seek to forecast the economy, not federal budget numbers. However, some academic or policy institute researchers attempt to model the economic consequences of major changes in federal taxation and spending, including behavioral feedbacks. Others prepare special studies of various federal programs. These usually try to factor in behavioral changes within the specific program area, but are unlikely to attempt to incorporate aggregate economic changes.

Some private models of the impact of government policy changes on the economy use a neo-classical framework, in which tax and spending changes are assumed to affect behavior by changing the price signals in the economy. The macroeconomic theory behind such models is built up from basic microeconomics. In such models, certain types of tax cuts lower the after-tax cost of incremental saving (at the margin) relative to consumption, or lower the incremental tax-inclusive cost of capital that governs investment decisions (at the margin), or they affect the time cost of working a bit longer to obtain additional market goods and services by giving up a marginal bit of leisure. Government purchases of goods and services alter the availability and cost of the resources remaining

for private sector use. Such marginal price changes induce individuals and firms to alter their behavior. The extent of the response can be estimated by applying certain "elasticities" derived from studies of past price and behavior changes.

Others models use a Keynesian approach in which changes in business after-tax cash flows or individuals' after-tax or "disposable" income due to shifts in tax or spending policy are assumed to trigger subsequent changes in private spending, saving, or investment totals. The quantity of the private spending changes is related by certain rules of thumb (based on so-called "propensities" to consume, save, or invest) to the dollar amounts of the policy shifts, that is, to the degree that the policy shifts alter the spendable cash flow or "income" of the recipients (or payees, in the event of a tax hike or spending cut).

Other models paint a complex picture of the results of fiscal policy changes assuming various reactions by the Federal Reserve and based on various theories (some of them suspect) as to how shifts in monetary policy affect the credit markets, price expectations, and the economy. These efforts result in scenarios that are so speculative that they obscure rather than illuminate the consequences of the fiscal policy changes per se. In particular, the estimators should not assume, as they sometimes do, that the Federal Reserve will intervene to thwart any fiscal policy change. That tells us nothing about what the policy change would achieve if it were allowed to become effective, and (one hopes) it is not an accurate picture of how the Federal Reserve behaves.

The several approaches to modeling the economy can yield very different predictions about the consequences of a change in federal taxes and spending. The JCT and the Treasury often point to these differences and uncertainties as an excuse for not trying to factor any responses into their revenue estimates, as if the staffs of the Committee and the Treasury cannot exercise any independent judgment

as to the relative merits of the differing theories and methods. (For which approaches are sound and unsound, see the reply to question 4, below.)

3. To what extent does the private sector use government estimates to make decisions?

The private sector makes little use of the semi-annual government economic forecasts. The private sector makes much greater use of federal government statistics on the economy, which it then plugs into its own private models to make private economic forecasts. Private forecasters do pay a good deal of attention, however, to the pronouncements of Federal Reserve officials who comment on the strength or weakness the Fed has observed in the economy by means of its extensive data gathering efforts. However, observing data and forming an opinion of the current state of the economy is not modeling and is not forecasting. It is like reporting current weather conditions without predicting the weather for tomorrow. In general, the government relies much more on private sector economic opinions than the private sector relies on government forecasters' opinions for looking ahead to the performance of the economy in the coming months or quarters.

Private modelers may use the static revenue estimates or spending projections of the government budgeteers as indicators of the magnitudes of proposed policy changes, but this information would only be an input into their models, not a prediction of the total impact.

Some accounting firms try to replicate the limited, mostly static revenue forecasting work done by the Treasury and the JCT so they can advise clients about how the government revenue forecasters might react to a proposed policy change. Except for this limited purpose, such static models are not useful in the private sector.

4. Are government models as accurate as possible? What are some of the reasons for their inaccuracies?

The government models are not as accurate as possible. To a great extent, they do not even try to model some of the most important consequences of federal fiscal and monetary policy changes. You cannot predict accurately what you deliberately ignore. Where they do try to make such estimates (for experimental purposes, not for budget scoring), their efforts are generally based on the wrong theory, and are right only by accident.

For example, tax cuts or government spending increases do not work by giving people money to spend to boost "aggregate demand". That is, they do not affect the economy by initially raising people's after-tax income and thereby triggering additional spending. These "income effects" are canceled out by the need to finance government spending. This is called the government budget constraint.

Suppose the government raises its spending by a billion dollars. To pay for it, it must either raise taxes by a billion dollars, or borrow an additional billion dollars from the public (if the government is running a deficit) or pay down the national debt by a billion dollars less than otherwise (if the government is running a surplus). Similarly, a billion dollar tax cut must be paid for by cutting government spending by a billion dollars or by borrowing more or paying down less debt.

Any of these financing techniques takes back from the public an amount of money equal to the presumed "stimulus" from the spending hike or tax cut, resulting in no initial change in the spending power of the public. (If the Federal Reserve steps in and buys the added government debt, it will expand the money supply, which constitutes a change in monetary policy, not fiscal policy. Faster money creation can increase nominal spending, but it will also raise the price level and impose an inflation tax on money and bond holders.)

Consequently, fiscal policy changes do not work by initially altering disposable income. If they work at all, they do so by altering the prices received by

labor and providers of capital services, that is, by changing the after-tax incentives for incremental effort, saving, or investing in plant and equipment or structures. Put another way, tax reductions at the margin reduce the cost of hiring labor or utilizing capital in the production process. The added inputs offered to and employed by the market as a result of the lower tax rate on marginal activity produce additional goods and services, and the owners of the added inputs receive payments equal to the value of their output. The added factor income can then be used to buy the added national production. Supply and demand rise together, induced by the price effects of the tax reduction on marginal inputs and product. Only those types of tax changes that have these cost-cutting, incentive-boosting consequences raise GDP. Tax changes not at the margin have no impact on real output; the government simply gives money away with one hand and borrows it back with the other.

Insofar as government modelers are experimenting with models that are driven by income effects, the models are based on an inaccurate theory that assumes that government spending and any sort of tax cut are likely to expand output and employment, when in fact that is not the case. Such models may, by accident, predict the expansion that will result from a tax cut "at the margin", but they will also predict an expansion that will not occur from a non-marginal tax cut or rebate.

5. What kinds of modeling changes would the government need to make in order to improve its estimates?

The economy is subject to many influences every day, some of which are policy-related, most of which are not. Consequently, no model of the economy will ever make perfect predictions of economic performance or the levels of revenues or outlays in the federal budget, or track exactly what a policy change will do to the economy and the tax base. The many forces that drive the economy have also masked the consequences of past policy changes, and have made it harder to discover the

precise relationship between economic policy and economic performance.

Nonetheless, by examining historical relationships, and doing as much as possible to allow for other factors, it is possible to test various theories of how policies work. Such efforts are producing a better understanding of how various policy changes would alter the economy *compared to whatever path it would have taken without the policy changes*. These *relative* shifts in economic performance are all that policy can achieve, and are what should be factored into revenue estimates. That is all that policy makers need to know in order to make better informed decisions about taxes and spending. Several steps should be taken to ensure that federal modeling gives as accurate a picture of these differences in economic performance, revenue, and outlays as is possible.

Include dynamic effects. To achieve accurate, real-world estimates of the changes in economic activity to be expected from policy proposals, the government would need to add dynamic effects of tax and spending policy changes on private sector economic behavior. It would have to incorporate the impact on federal revenues and outlays of the resulting changes in the tax base. Tax reforms with large positive work and saving incentives — such as an across-the-board cut in tax rates, a lower capital gains tax rate, faster capital cost recovery allowances, and elimination of the alternative minimum tax — would have much smaller revenue costs than government estimators claim. Spending increases which have no positive incentive effects, or transfer payments that discourage work or saving, would decrease GDP, not add to it, and would cost more than initially forecast by reducing government revenues.

Price signals should drive the model. The model would have to base its predictions of behavioral changes on the microeconomic price and incentive effects of policy shifts, not on first order income effects. This is the only way to take full account of the government budget constraint, which is the fact

that all federal outlays must be funded through tax revenues or borrowing or money creation on the day they are made.

To predict the economic and budgetary repercussions of tax changes in a manner that reflects the real workings of the economy, the model should treat tax changes as affecting the after-tax returns at the margin to suppliers of labor and capital (or gross-of-tax costs at the margin to the employers of labor and capital), triggering a change in the cost, supply, and employment of these inputs. It should also treat government spending changes as affecting output by altering the cost and availability of real resources to the private sector. The more resources the government absorbs, the higher their cost will be and the lower private output will be. Changes in government transfer programs should be treated according to how they reduce or increase marginal incentives to work or save, not as income shifts. In short, unless a government spending program reduces some barrier to production, it should be modeled as displacing private output, not as adding to GDP.

So-called "life cycle" models that assume that individuals have "target" levels of retirement saving, and reduce their saving if lower taxes enable them to reach their targets more easily, should be scrapped in favor of models that reflect the greater lifetime income opportunities that lower taxes on saving can generate. The former approach relies on questionable income effects, the latter on the more solid influence of price incentives.

Assume an integrated global economy. The model would have to acknowledge that the United States has an "open" economy. We are part of the global economic system. U.S. interest rates and prices are set in global, not purely domestic, markets. Capital and goods are free to move across borders.

If investment opportunities open up in the United States, they can be funded with domestic or foreign saving, and can be translated into additional capital

formation far more quickly than if we were dependant only on our own saving or on our own capital goods industries. Estimates of the response of capital investment to a tax change should be based strongly and directly on the impact of the tax change on the desired capital stock, and not on calculations about the flow of funds through the financial markets and the availability of domestic saving; once additional investment is made profitable by a tax change, the global financial market will take care of the funding.

Recent efforts by the JCT to model the effects of fundamental tax reform involved submissions from many private modelers, some of whom assumed a closed economy, some an open economy. The results were quite different. The JCT and the CBO should draw two lessons. First, fundamental tax reform can yield large benefits, as predicted by the open models. Second, the predictions of the closed models that there is little benefit to be had from tax reform derive quite clearly from their unrealistic assumption of an economy isolated from the rest of the world. Any model developed by the JCT or the CBO for their own use in the future should be open and neo-classical in form.

Reform requires speed, flexibility, and accountability. The JCT is moving slowly toward new estimation methods and an in-house economic model. The Treasury has not even begun. They must be urged, respectively, to move faster and to get started for the good of the country.

At the prompting of many economists and policy officials, the JCT is looking at the possibility of moving away from the static revenue estimation convention toward a more accurate dynamic estimation procedure. However, it seems reluctant to trust the predictions of pure neo-classical open-economy models that the economy responds strongly to well-crafted policy changes. As it moves away from the old Keynesian disposable income approach to modeling popular in the 1950s and 1960s, it

seems inclined to adopt theories that suggest that dynamic economic changes are small and not worthy of consideration in scoring tax proposals.

There are several steps that can be taken to encourage the JCT to keep an open mind. As it tests each theory and each new version of its model, it can make "backcasts" that try to "predict" the known effects of historical policy changes. It can also make predictions about the impact of new policy initiatives as they are implemented. The JCT should be required to keep track of how well each theory and each version of the model performs in such experiments and in practice, and to report periodically to the Congress and the public on the performance of each effort. This will enable the JCT

to learn from failures to predict, and motivate it to change its techniques and preferred theories when the old techniques and theories fail to perform. Very importantly, the JCT should make available to the public the equations of the model and a discussion of the data sources and assumptions that underlie it, so that the models may be peer reviewed for technical and theoretical merit. The process will be a lot of work, and will require flexibility in thinking and willingness to test alternative views, but the Committee staff is certainly capable of meeting the challenge. The rewards for the country will be enormous if the job is done well.

Stephen J. Entin
President & Executive Director