Tax Modeling & Tax Reform:

Why It's Important

A look at how the Penn Wharton Budget Model, Tax Foundation, and Tax Policy Center analyze the budgetary and economic effects of tax legislation

Tax reform has been at the forefront of the federal policy discussion in 2017. As Congress and the Administration have put forward various iterations of tax bills, the budgetary and economic effects of proposed legislation have been a critical element of the debate.

Those budgetary and economic effects are central to tax policy, but the modeling assumptions underlying them are often not adequately understood. As Congress works to reconcile the current House and Senate versions of tax legislation through a conference committee, it is important for policymakers and the general public to have a full understanding of the various analyses and the underlying approaches to better interpret their meaning.

The Joint Committee on Taxation has an essential role as the official scorekeeper of tax legislation for Congress. However, a number of outside organizations also provide their own analysis of tax proposals, and those organizations may emphasize different factors, which contribute to variations in the results of their analyses.

To help illuminate the assumptions and methodologies used in modeling changes to tax policy, the Peterson Foundation asked three non-governmental organizations — the Penn Wharton Budget Model, the Tax Foundation, and the Tax Policy Center — to answer a set of nine questions that highlight important aspects of tax modeling. Each organization independently submitted its written responses, which are shown in this report in their original, unedited form.

Why are tax modeling assumptions important?

Changes to our tax code touch every corner of the economy, and therefore, have implications for every American family and business. Analyzing tax legislation provides information about the budgetary effects of changes to projected revenues and outlays, as well as the impact to our national debt and the interest paid on it. In addition, tax modeling also sheds light on how policy changes could affect important macroeconomic variables like gross domestic product, overall levels of income, and interest rates.

The three participating organizations have estimated the consequences of the House and Senate bills that have been proposed in recent months incorporating such macroeconomic effects on the budget. The groups' estimates of the 10-year cost after incorporating such feedback range from $0.5 trillion to $1.7 trillion.

Those estimates indicate an underlying consensus that the legislation will not pay for itself and that it will increase debt in the long run. They also reflect general agreement among economists about the effects of changes in tax rates faced by individuals on their decisions to work, save, and invest.

However, the range of estimates also indicates different viewpoints about the macroeconomic effects of tax legislation. For example, there is divergence in the estimated effect of changes in tax rates on businesses and their decisions to invest. There is also variation in the way that economists view the effect of future deficits on interest rates, with assumptions about the financing of those deficits playing a major role in modeling results.

Details on how each of the three organizations views important economic effects of tax policy are included in the appendices to this report.

As Congress moves towards a final version of tax legislation, this is an opportune time to examine the inputs, methods, and results of tax modeling. With trillions of dollars at stake, it's critical to have a full understanding of the effects of tax policy on our economy, our budget, and the national debt.

NOTE: _The Peterson Foundation asked nine identical questions to the Penn Wharton Budget Model, the Tax Foundation, and the Tax Policy Center. Each organization independently submitted its written responses, which are shown here in their original, unedited form._

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Questions

1. What are the most important elements to economic growth of tax policy?

Previous work, including the Penn Wharton Budget Model, indicates that maximum economic growth from tax reform comes from three basic elements: (a) full expensing of capital expenditures (tangible and intangible), along with a (b) destination-based (or economically equivalent cash flow) tax system for international coordination, which is (c) revenue neutral on a static basis and, hence, lowers debt on a dynamic basis. Revenue neutrality can usually be achieved over the time by reducing interest-deductibility and/or with other base broadeners. Tax "integration" is another efficient way to preserve revenue by largely avoiding reclassification of income between labor, small businesses and corporations.

2. How does the model deal with future debt levels and interest rates?

As explained in our related white paper, the PWBM dynamic model contains two types of assets held in household portfolios: (a) real capital (equity) and (b) federal debt. The difference between these rates is the equity premium. The real return on capital — and, hence, the equity premium — is determined by the marginal product of capital in general equilibrium. The interest rate on federal debt is currently taken from CBO projections, although we are currently developing an independent forecast. Debt is held by domestic households and foreign investors. The marginal take-up rate of new debt by foreign investors is determined by the user, although we believe that a 40% foreign take-up rate is the most reasonable setting, which we take as our baseline value. Unless the foreign take-up rate is 100% (treating the U.S. as a small open economy), additional debt reduces real capital in the economy, thereby reducing the economy's productive capacity. Because both current policy and many potential tax reforms lead to an exploding debt-to-GDP ratio over time, we force a closure rule in 2040 to stabilize the debt-to-GDP, by reducing discretionary government spending. In the current version of our model, only mandatory government transfer income is valued by households, and so reducing discretionary spending is equivalent to reducing "wasteful" spending. Taken together, our assumptions are, if anything, pro-growth. If we instead allowed the interest rate paid on government debt to increase with more debt, or if enforced the closure rule by increasing taxes instead of cutting spending, then less growth would emerge from a deficit-financed tax cut.

3. What assumptions does the model make about foreign investment (openness of U.S. economy)?

As noted above, the user can run the PWBM dynamic simulator under a range of assumptions about the openness of the economy. With 100% open economy (small open economy), after-tax returns to capital are pinned to a "world price," and capital then flows immediately in or out of the U.S. economy to maintain this price in all periods of the simulation. At the other extreme assumption of 0% openness, U.S. household portfolio allocation matches the proportions of debt and capital in the economy. More realistically, at an openness value in-between these two values, a combination of both effects play out.

4. How does the model deal with short-run and long-run effects of tax policy?

Households in the PWBM dynamic model are rational and forward-looking. Households immediately reallocate their labor and savings choices to optimize for both the short and long runs. It is our view that any labor frictions (e.g., search costs) or capital frictions (borrowing constraints) should be explicitly modeled, and so the PWBM model is always in equilibrium. (Put more bluntly, we believe that the distinction between so-called "actual" and "potential" GDP is a fairly dated IS-LM reduced-form model type of concept that largely originated before the economics profession started thinking harder about explicitly modeling frictions within an equilibrium model.) In the short run, a tax change can have "Keynesian"-like effects in our model if the policy impacts taxes or transfers on younger and lower-income households who are more likely to be borrowing constrained.

5. How might tax policy affect labor income/wages and capital investments?

At the micro-level, households respond to higher/lower wage taxes by reducing/increasing their supply of labor. Similarly, changes in taxes on capital returns affect household savings. At the macro-level, aggregate changes in labor supply and/or capital investment generate changes in the economy's wage rate and return to capital. These prices then further impact household choices of labor supply and saving.

6. What cross-border effects are incorporated in the model (corporate taxes)?

Inputs into the dynamic model from our microsimulation model include effective tax rates that address income shifts, as described in our related paper. The inputs of effective tax rates take into account elasticities of corporate tax-shifting which come from measurements in the empirical literature. For instance, if U.S. corporate taxes decrease we expect to see corporate income for firms with higher foreign tax liability shift to U.S.

7. How does the model deal with pass-through entities?

The dynamic model includes income from a corporate distribution and from pass-through entities, subject to different tax rates. Inputs into the dynamic model incorporate decisions by firms to change corporate form. The inputs of effective tax rates take into account elasticities of business income tax-shifting which come from measurements in the empirical literature, as described in our related paper and in recent analysis.

8. Is there a danger of mixing and matching static scores and feedback estimates from different models?

As described in our tax simulator brief, integration between PWBM's dynamic model and microsimulation static model is achieved by first running the OLG model in "static" mode and then running the model in "dynamic" mode. The differences between the two are then layered on top of the static microsimulation results. This approach captures the richness of detail in the microsimulation model along with the behavioral changes observed in the OLG model.

9. How do you view the politicization of modeling efforts and what role do you think that plays in the development of policy? Is this year similar to previous tax debates?

As a purely analytical (non-normative) group, PWBM does not address these types of questions.

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Dynamic scoring is an important tool to better help policymakers and the public understand the impact of changes to the tax code. Not all tax proposals are created equal — some raise revenue in a more efficient manner and have less of an impact on the economy.

The Tax Foundation's Taxes and Growth (TAG) model seeks to predict how much larger or smaller the economy would be under an alternative tax system. The prediction is relative to whatever else the economy might be doing over the period. The change in the ultimate level of output can be determined by noting how much the proposed tax change alters the profitability of investment or the reward to labor, compared to what they now are.

To do this, the TAG model, similar to many other models, considers the effects of tax rates on labor (labor supply and savings) and capital (business investment). If the tax code allows workers to keep more of their wages or add to their savings, the more likely they are to work more and save more money. Businesses, meanwhile, decide whether to reinvest their profits or distribute their gains to shareholders. While taxes influence both labor supply and capital, capital is more sensitive to taxation, as businesses can choose to invest either domestically or abroad. The TAG model measures how labor and capital would react to a tax proposal and measures those fiscal and economic changes through jobs, wages, revenue, and GDP.

A key way that our model differs from some others, such as those used by the Joint Committee on Taxation and Penn Wharton, is that it we believe the U.S. behaves as a small, open economy, meaning that government deficits do not constrain capital. Both governments and businesses need to find people to lend to them, so a number of economists assume that government deficits soak up some of the saving that would otherwise be used to lend to private-sector ventures. This is often known as "crowding out." Under this assumption, a tax cut that would increase economic growth but also add to government deficits would see some of that growth nullified due to increased government borrowing.

The TAG model does not model the impact of crowding out. Based on a growing amount of evidence and research, we believe the large supply of global saving and foreign investors willing to invest in the United States means that the impact of crowing out would be relatively small.

Questions

1. What are the most important elements to economic growth of tax policy?

The size of the economy depends on the quantities of labor and capital at work in the country. The TAG model incorporates all major taxes on capital and labor. Taxation of capital has more influence on the size of the economy than taxes on labor or consumption.

Capital includes land, equipment, factories, power plants, transportation vehicles, commercial and residential properties, other structures, and inventories. Taxation affects how much capital can be profitably employed by raising or lowering the pre-tax earnings needed to cover taxes, the cost of the investment, and a minimum return to savers. (The sum is the "service price" of capital, which drives the predicted change in the capital stock.). Taxes on capital include marginal corporate and small business tax rates; depreciation allowances; tax credits tied to investment; taxes on capital gains, dividends, and interest; and property and estate taxes. The higher these taxes are, the less capital that is created and used. The biggest effects come from depreciation rules and marginal income tax rates. Capital is very sensitive to taxation; it can be located here or abroad, and people may choose to consume instead of invest.

Labor force participation and hours worked are influenced by marginal income and payroll tax rates. Labor is less responsive to taxation than capital, but is the larger of the inputs to production, so taxes on labor matter. The TAG model assigns sales taxes, excise taxes and tariffs to labor and capital in proportion to their income.

2. How does the model deal with future debt levels and interest rates?

The TAG model displays the implications of the tax and economic changes for annual deficits and the changes in the debt, including interest on the debt. Unlike some other models, it does not impose the assumption that the debt is held constant. The intent is to show policymakers the full implications of the policy change. If the changes suggest an unacceptable increase in debt or interest costs, Congress may alter the size of the tax change, or enact tax or spending offsets to reduce the change in the deficit. If the deficit is falling or debt is less imposing, Congress might offer more tax reductions or raise spending. We do not presume what choices Congress will make.

We assume that moderate changes in the government debt or deficit have no measurable effect on interest rates or investment. This is consistent with the historical record for economies open to global capital markets, assuming the debt does not reach extreme levels. Interest rates on government debt play little role in business investment decisions. Interest rates for the economy at large are driven

mainly by inflation in the long run; we assume the Federal Reserve will keep inflation reasonably low and steady, per its announced targets. Our assumptions about inflation and interest rates follow the Congressional Budget Office baseline economic forecast. In addition, we assume that incremental business investment is mainly supported by equity finance, due to the rising cost of borrowing as individual businesses become more highly leveraged.

3. What assumptions does the model make about foreign investment (openness of U.S. economy)?

The TAG model treats the U.S. economy as fully integrated into the world economy for trade in goods and services, and with respect to international capital flows, both real direct investment by foreigners in U.S. physical capital, and foreign ownership of U.S. financial assets. This has two implications. One is that reasonable changes in government borrowing should not result in large changes in the interest rate on federal debt. The other is that the expansion of capital formation in the United States is not constrained by the amount of domestic saving.

Capital flows are a two-way street. The capital inflow is the difference between purchases of foreign assets by Americans and purchases of U.S. assets by foreigners. Much of the expansion of capital formation inside the U.S. can be achieved by increased domestic saving, and the investment of that saving here instead of abroad. In other words, we pay for the expansion by keeping more of our own money at home. Additional foreign investment can be attracted by higher returns on U.S capital. In the past, it has taken only small increases in the return on U.S assets to attract large net swings in capital flows to the United States.

4. How does the model deal with short-run and long-run effects of tax policy?

The TAG model does not assume different channels for tax policy in the short run and the long run. It has no short-run Keynesian "multipliers" to boost short-run consumption. The TAG model uses "comparative statics" analysis. It predicts how much larger or smaller the economy would be under an alternative tax system in the long term, after all adjustments. The change in the ultimate level of output is determined by how much the proposed tax change alters the profitability of investment or the reward to labor, compared to what they now are. Historically, major tax changes have been followed by a return to normal levels of compensation for investment within a decade, sometimes sooner. Consequently, we show a gradual move from current levels of economic activity to the higher or lower level suggested by the model over 10 years (using a geometric adjustment path). A large reform might take the full decade, or longer, a small change less time. Labor might respond faster than equipment, and equipment faster than structures. We hope to research the historical experience for these differences over time. For now, we focus on the ultimate change in the level of activity, not the transition.

The TAG model prediction is relative to whatever else the economy might be doing over the period. We do not create our own "baseline" to set the year-to-year level of output going forward. We use the CBO baseline forecast for illustration because Congress finds that convenient for its work.

5. How might tax policy affect labor income/wages and capital investments?

Tax policy affects labor income and wages in two ways, and capital investment in one. Taxation of wages and salaries directly affects the after-tax wage and the willingness to work (the supply of labor). Taxation of capital affects investment and the amount of capital by altering the cost of capital (the required pre-tax return needed to make investment profitable—that is, the service price). If a tax change makes additional capital formation attractive, the capital stock rises. With more capital, worker productivity increases. Increased labor productivity leads to higher wages, because additional labor adds more to output and sales, and more labor is hired (the demand for labor). The productivity gain, which raises pretax wages, is the second way in which tax policy affects after-tax wages. The TAG model production equations take all three channels into account.

6. What cross-border effects are incorporated in the model (corporate taxes)?

The TAG model explicitly models certain international aspects of the U.S. economy, but also assume access to international markets, which relaxes many constraints on economic growth. Both the explicitly modeled and assumed aspects of the TAG models help to mirror the U.S. economy.

The TAG model explicitly models two cross border effects: income shifting and income of multinationals earned abroad, also known as the territorial model. The income shifting module in the TAG model determines how much income multinationals shifted in or out of the country based on the difference between the U.S. effective corporate tax rate and the effective rates of other countries. The TAG model uses a country by country, semi-elasticity approach originally developed by Kimberly Clausing. The model has additional parameters, such as the elasticity of income shifting and whether or not foreign domiciled parents shift income into the United States.

The income shifting model is part of the static score. The Tax Foundation assumes that income shifting does not affect economic growth. However, when corporate income is shifted into the United States, aggregate capital income expands and becomes part of GDP. Although this would increase nominal GDP, real output does not change, since the capital employed and labor participation has not increased. As such, the TAG model likely underestimates nominal economic growth when corporate tax rates are decreased.

The territorial model determines the amount of corporate taxes collected on corporate income earned in other countries. Under a worldwide corporate tax system, parent corporations headquartered in the United States are required to pay the U.S. tax rate on income earned abroad, even if the tax rate in the other country is lower than the U.S. rate. A territorial system does not require income earned abroad

to be taxed at the U.S. rate. Switching from one system to the other changes the taxes collected by the U.S. As such, the TAG model has a module which tracks the revenue switch between a worldwide and a territorial system.

Even when moving to a territorial system, some of the income earned abroad falls into a special category called Subpart F income. Subpart F income is taxed at the U.S. rate regardless of where the income is earned. The territorial model determines the portion of income earned abroad that falls into this category and the revenue collected by the United States.

7. How does the model deal with pass-through entities?

The pass-through income in our model includes business income or loss for sole proprietorships from schedule C; non-corporate business income on schedule E from rental real estate, royalties, partnerships, S corporations, estates, trusts, and REMICs (real estate mortgage investment conduits); and farm income from Schedule F. We treat income from pass-through entities the same as ordinary income such as salary and wages. The baseline data for pass-through income is from the IRS Public Use File (PUF). The PUF consists of over 140,000 individual sample tax returns, which can statistically represent the total population of tax filers.

The TAG model assumes that tax policy will impact labor income and capital investment. In our tax simulator, by weighting the portion each return represents, the aggregate average marginal rate for pass-through business income is calculated under current law vs. under an alternative tax proposal, assuming the proposal is only related to pass-through businesses. The changed marginal rate for business income would then impact the service price of noncorporate capital in our economic model. The change in the noncorporate service price changes the desired capital in the noncorporate sector and accordingly changes the capital stock, labor supply, and then the level of income in the noncorporate sector. The growth factor of noncorporate income, calculated as new noncorporate business income divided by old noncorporate business income, is passed to the tax simulator and the marginal rate for pass-through business income is recalculated. The economic system and tax-return simulator will cycle until a new equilibrium is reached. The revenue and economic effects of the tax proposal are reported based on the new equilibrium.

8. Is there a danger of mixing and matching static scores and feedback estimates from different models?

If the intention of a model is to rank tax policy given a set of assumptions, summing or averaging scores from different models could obfuscate the rank of a policy within each model. The problem is that a tax policy could score well below baseline for a particular model due to its assumptions, while in other models the same policy could generally score slightly above baseline. If the scores are mixed to produce an overall score, the model with the score far below the baseline could wash out the small but positive scores in other models. Mixing the scores could hide the fact that most models rank a particular tax policy change as an improvement to the current baseline.

If mixing models could hide the rank of the policy, why do some organizations mix scores from different models? Some organizations believe that mixing the models gives a more complete view of the economic and budgetary impact of tax policy. The hope is that by using one model that captures an individual's incentives to work or invest over their lifetime and another model to capture the effect of credit markets and international financial flows on investment, the overall score is a better reflection of the whole economy. But some models analyze particular relationships better than others.

Mixing models to avoid outside criticism does a disservice to the economic modeling community. Academic debate helps economists refine and test models. Although some criticisms lack collegiality, constructive criticism is important feedback to the academic process. When models are mixed, it is difficult to determine in what model an issue may exist. Mixing models may help you avoid some criticism, but it does not improve the academic debate.

9.   How do you view the politicization of modeling efforts and what role do you think that plays in the development of policy? Is this year similar to previous tax debates?

In general, the economic modeling of tax legislation should be carried out in an apolitical manner, and the public should interpret the results of economic models as apolitical analysis. After all, the economic effects of a tax bill do not depend on the party that is attempting to pass it, and modeling efforts are generally non-partisan, good-faith attempts at predicting the economic consequences of major pieces of legislation.

Lawmakers should be cautious when criticizing the results of modeling efforts that don't conform to their preconceived notions about how a piece of legislation would affect the economy. On the one hand, it is entirely appropriate for lawmakers to learn about and question the assumptions behind the economic models used to predict the effects of their legislation. On the other hand, the reason for independent economic models is to serve as an objective, unbiased arbitrators of the effects of various plans; lawmakers should resist the temptation to immediately lash out at unfavorable results.

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Macroeconomic analysis of the effects of tax proposals begins with conventional estimates of the effect of the proposal on revenues. Those conventional estimates are not "static." They incorporate a variety of microeconomic behavioral responses to tax changes, such as the amount of taxable income that people declare, the consumption of taxed goods, and capital gains realizations. They do, however, hold major macroeconomic variables, such as real GDP, the price level, and overall labor supply and saving fixed.

In addition to the microeconomic behavioral changes mentioned above, the effects of tax policy on aggregate economic variables such as overall economic output, interest rates, and inflation, can affect revenues. Conventional analysis generates the basic building blocks that macroeconomic models require, beginning with the conventionally estimated effect on revenues and the distribution of that estimated effect across households. The distribution of gains or losses from tax policies is important to macroeconomic estimates because different households respond differently to changes in tax liabilities. For example, research indicates that low income households spend more out of each dollar of tax savings than do high-income households.

Furthermore, conventional analysis can be used to produce estimates of marginal tax rates on different types of income — for example on labor income, such as wages and salaries, or capital income such as profits, interest, and capital gains. The translation of conventional estimates into estimated marginal tax rates is not always straightforward, because different provisions of a tax policy can affect those rates in different ways. Conventional estimates also provide a basis for estimating the magnitude of incentives for new investment. Different approaches to estimating these variables is part of the explanation for differing estimates of macroeconomic effects.

Once model inputs such as revenues, distribution, and marginal tax rates have been calculated, macroeconomic models can be used to estimate dynamic effects on the economy and the consequent feedback effects on revenues.

One important modeling decision is how and whether effects on aggregate demand are incorporated into the analysis. Most economic forecasters agree that aggregate demand — the total amount of goods and services that households, firms, and governments want to buy — plays an important role in

determining economic output in the short run. TPC models output as largely determined by demand in the first years after a policy change.

When demand effects are incorporated in macroeconomic analysis, key assumptions are the amount different types of households spend out of additional income (the "marginal propensity to consume"), the impact of investment incentives such as expensing or investment tax credits on businesses' investment spending, and the impact of initial changes in demand on output (the "multiplier"). The size of the multiplier in turn depends importantly on how the Federal Reserve is predicted to change interest rates in response to changes in demand, which may differ significantly over the business cycle. A related issue is how long the effects of changes in aggregate demand are expected to persist. TPC assumes that those short run effects dissipate by the fifth year after the policy change.

In the longer run the effects of marginal tax rates and federal budget deficits are more important in determining macroeconomic effects. Economic research indicates that lower marginal tax rates on labor income increase labor supply (although the overall effect is small and concentrated among secondary earners) and therefore boost output, other things equal. The size of that effect is an important variable in macroeconomic analysis, but most analysts incorporate broadly similar assumptions.

Macroeconomic models differ most starkly in their estimates of the impact of changes in marginal tax rates on capital and in investment incentives such as expensing, in combination with changes in government budget deficits, on investment and the size of the capital stock. The most important factors leading to those differences — aside from the calculation of the tax rates themselves, mentioned above — are the projected responses of private saving and foreign capital inflows.

When tax rates on capital income (such as profits, interest, dividends, and capital gains) fall, the after-tax returns to households' saving rises. From the point of view of savers, this means they earn more for each dollar saved and therefore have an incentive to save more. (Technically there is an opposing effect, because a higher return also makes savers richer, encouraging current spending rather than saving. Economic models strongly indicate that the incentive effect is stronger, although empirical evidence is more ambiguous). From the point of view of businesses, they can now raise funds at a lower cost (because savers require a lower pre-tax return) and therefore can invest in additional projects that have a lower projected rate of return. Therefore when marginal tax rates on capital income fall, saving and investment tend to rise, boosting the size of the stock of capital (such as factories and computers) and increasing economic output.

The size of the increase in the capital stock depends in part on the responsiveness of private saving to the increase in the after-tax rate of return. In the case of a single, isolated (or "closed") economy, the pretax return will fall, but the ultimate after-tax return must be higher to induce more saving (unless saving is extremely responsive to tiny changes in the after-tax return, or "infinitely elastic"). That limits the increase in investment and the capital stock due to the policy.

However, firms can also raise funds from foreigners, or shift funds from overseas to the US. Those sources of funds are referred to as "net capital inflows". In the case of an economy too small to influence foreign capital markets, these flows can be analogous to the case of extremely responsive saving — they would result in the pre-tax rate of return falling by the full amount of the decline in the tax rate, leaving the after-tax rate unchanged. However, the US is large relative to the rest of the world, so the small open economy assumption is unlikely to apply in practice.

With the assumption of either infinitely elastic saving or a small open economy, a reduction in the tax rate on capital income will have a similarly large effect on the capital stock and domestic output. But there is an important difference between the two assumptions. If domestic investment is financed by foreign capital inflows, foreigners will be owed interest and profits in future years. Those payments subtract from the income available to US residents. Therefore, increases in output due to foreign capital inflows do not benefit US residents to the extent that effects on domestic output (or GDP) make it appear. Gross national product (GNP) subtracts payments to foreign investors from domestic product, and for that reason effects on GNP can provide important supplementary information, especially in cases where a policy has a significant impact on capital inflows.

Questions

1. What are the most important elements to economic growth of tax policy?

The most important elements of a tax policy for the economy depend in part on its intent. If a tax proposal is designed to boost output in the short run — for example to counter the effects of a recession — the most important feature is its effect on aggregate demand. That effect is in turn most influenced by the size and distribution of the tax cut, with the impact of a tax cut being greater the larger it is and the more it is targeted toward lower-income households.

In terms of the economic effects over the medium to long term (ten years or longer), in rough order of importance the key aspects are the effects on: budget deficits; investment incentives; the marginal tax rate on capital; the marginal tax rate on labor income; uniformity; and predictability.

The impact of budget deficits is important because new issues of government debt soak up saving that would otherwise finance investments in productive capital, thus "crowding out" investment. I rank this consideration first because its effects tend to cumulate over time, as deficits lead to higher debt and interest rates, increasing interest payments on the debt and further increasing deficits. In addition, it is a fundamental goal of tax policy to provide adequate funds to finance the spending that voters and policymakers demand. A tax policy that produces large deficits falls short of this goal.

Incentives for new investment (such as expensing, or allowing firms to write off the cost of investment against taxable business income) are important because they are more efficiently targeted, in terms of the economic effects per dollar of revenue loss, than tax cuts that benefit existing capital owners.

Other types of reductions in the marginal tax rate on capital income (such as reducing the corporate income tax rate) will also tend to increase investment, but most of the benefit flows to capital that is already in place — the result of past investment decisions that can't be changed by policy. Reductions in the tax rate on labor income increase labor supply and output, but research indicates the effects are modest.

Uniformity and predictability are two more important features of tax policy for the economy. A tax policy that treats income from different types of economic activity similarly will result in a more efficient allocation of resources, and therefore higher output. Different tax treatment of different income types can create incentives for tax considerations to interfere with the market-driven allocation of capital, leading to a sub-optimal investment pattern across the economy or resources wasted in tax minimization planning. And uncertainty in tax policy can disrupt long-term planning by businesses and households, which could result in lower output.

More generally, it is important to remember that effects on economic output do not necessarily translate into effects on well-being, and are only one goal among many for tax policy.

2. How does the model deal with future debt levels and interest rates?

In TPC's modeling, larger deficits in the short run tend to increase output because they stem from reductions in taxes or increases in transfers that boost after-tax incomes, or increases in government spending. Each of those effects adds to aggregate demand, boosting output in the short run.

In the long run larger deficits are assumed to crowd out investment by 33 cents for each dollar increase, following the assumptions of the Congressional Budget Office. Higher deficits increase interest rates as government borrowing competes with private investment for a limited supply of available savings, and crowding out reduces the size of the capital stock, increasing the marginal product of capital.

TPC's modeling does not incorporate an explicit effect of expected future debt levels on current economic outcomes. However, it does assume that people respond to deficits in a way similar to what they have done in the past. The model implicitly includes some "average" effect of future anticipated events to the extent that past behavior reflects such anticipation.

3. What assumptions does the model make about foreign investment (the openness of the US economy)?

TPC's modeling assumes that the US is a large open economy. That is, it assumes that net foreign investment responds to changes in policy, but not to the extent that it leaves the after-tax rate of return unchanged. In TPC's modeling, every dollar increase in the deficit results in an increase of 24 cents in foreign capital inflows.

4. How does the model deal with the short-run and long-run effects of tax policy?

TCP's modeling assumes that in the short run (over the first few years after a policy is implemented), output is determined primarily by aggregate demand. As demand increases, firms gear up production by increasing hiring, thereby reducing unemployment, and drawing additional workers into the labor force. At the same time, the Federal Reserve acts to raise interest rates in order to avoid increases in inflation. TPC's modeling assumes the Federal Reserve bases interest rates on a combination of the output gap (the difference between actual output and its potential level) and the rate of inflation, via a function known as a "Taylor rule". In TPC's short-run modeling this rule incorporates a factor of 0.5 on inflation and a factor of 1.0 on the output gap. In the longer run, output is governed by the size of the capital stock, the amount of labor, and technological progress. Projected economic outcomes phase from the short run analysis to the long run analysis via a simple weighted average over five years.

5.   How might tax policy affect labor income/wages and capital investments?

Tax policy can affect wages and investment in a variety of ways. In the short run reductions in revenues boost output, wages, and investment by increasing aggregate demand. In the longer run higher budget deficits crowd out investment and shrink the capital stock, resulting in lower wages. Allowing firms to write off ("expense") investment increases the capital stock and therefore wages, as does reducing the marginal tax rate on capital. Reducing the marginal tax rate on labor increases labor supply, reducing pre-tax wages.

6.   What cross-border effects are incorporated in the model (corporate taxes)?

As described in question 3, TPC's modeling incorporates the assumption that increases in deficits are partially offset by inflows of foreign capital. TPC's central estimates do not incorporate an explicit effect of corporate tax rates on net foreign investment.

7.   How does the model deal with pass-through entities?

TPC's macroeconomic modeling does not incorporate any differential effect of pass-through entities as opposed to corporations or other business forms. However, TPC's microsimulation individual tax model includes the taxation of pass-through income and can model detailed changes in the treatment of pass-through income. Results from the microsimulation model are incorporated into the calculation of METRs (marginal effective tax rates) on new investments, which are calculated separately for corporations and pass-through entities. Depending on the proposal, TPC can estimate the impact of tax changes on the reporting of income across different organizational forms. For example, a differential between the tax rate on individual income and the tax rate on pass-through business income could lead to shifting of income from individual to business forms.

8.   Is there a danger in mixing and matching static scores and feedback estimates from different models?

Conventional estimates incorporate assumptions that influence inputs (such as marginal tax rates) used by macroeconomic models. Indeed the conventional revenue estimate itself is an important factor in macroeconomic analysis. Therefore in principle adding feedback from one modeling effort to the conventional score from another introduces a fundamental inconsistency. In practice, however, conventional estimates tend to be fairly consistent across models, so mixing and matching is probably not a paramount concern.

9.   How do you view the politicization of modeling efforts and what role do you think that plays in the development of policy? Is this year similar to previous tax debates?

The crafting of tax policy is inevitably a political process and therefore it is no surprise that modeling efforts will be used by advocates for political purposes. From the point of view of the analyst, all we can do is try to tune out the noise and produce the best estimates possible. Ideally a diversity of estimates would give policymakers a sense of the large uncertainties involved in macroeconomic analysis and create some reluctance to make extravagant claims about economic effects.