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The Advisory Panel's Tax Reform Proposals

July 13, 2006

Congressional Research Service
https://crsreports.congress.gov
RL33545

CRS REPORT
Prepared for Members and
Committees of Congress

Summary

In November 2005, the President's Advisory Panel on Tax Reform presented two potential reform proposals: a simplified income tax (SIT) and a direct consumption tax proposal (the growth and investment tax, or GIT). Both proposals would eliminate itemized deductions while allowing, for all taxpayers, a credit for mortgage interest deductions and deductions for charitable contributions and health insurance. Both proposals substitute credits for personal exemptions and standard deductions. Both would allow greatly expanded tax-preferred savings plans. SIT would eliminate taxes on dividends and most capital gains from corporate stock, simplify depreciation and allow expensing (deducting costs immediately) for small business, and alter the international tax regime. GIT, as a consumption tax, would allow expensing of all investment. GIT also includes a tax on passive capital income (dividends, interest, and capital gains).

Both proposals are stated to be both revenue and distributionally neutral. Because the panel uses a baseline assuming the 2001 tax cuts are permanent, both would lose revenue compared to the Congressional Budget Office (CBO) official baseline, which has the tax cuts expire as provided by current law. An additional revenue loss is expected in the long run because of the proposals for tax-deferred savings plans. These measures also cause the income tax proposal to be slightly less progressive than current law. The consumption tax proposal is likely to be significantly less progressive than current law.

The plans would simplify tax filing for higher-income individuals and the self employed; lower-income taxpayers could, in some cases, have more complicated tax returns. Much simplification rests on the assumption that many minor provisions, not actually discussed, will be eliminated, an unlikely event in the case of certain provisions such as casualty losses and catastrophic medical expenses.

Both plans would likely increase efficiency in the allocation of capital, but these effects would be quite small for SIT and lessened for GIT due to the tax on financial income. The SIT may magnify distortions in the allocation of capital around the world. The effects on overall economic growth would be negligible for SIT because of the limited change in marginal tax rates. Although there would be a substantial reduction in effective tax rates on new investment under GIT, the growth effects for this plan are uncertain and may be quite modest. In any case, they are not large enough to materially affect the budget outlook. The effects on economic efficiency other than in the allocation of capital are mixed: a floor under charitable deductions along with expansion to non-itemizers would contribute to efficiency, but the effects on health markets are unclear.

Transition problems present difficulties; the main issue with the SIT would probably be in the loss of deductions for homeowners with large houses and mortgages. These transition problems in the SIT are minor, however, in comparison with the significant problems in the GIT arising from the loss of depreciation deductions, interest deductions, and deductions for the recovery of inventory. This report will not be updated.

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In early 2005, the President appointed a tax reform advisory panel to formulate tax reform proposals. The report of the President's Advisory Panel on Tax Reform, issued in November 2005, recommended two reform plans to consider: 1) a revised income tax, referred to as the simplified income tax (SIT); and 2) a consumption tax coupled with a tax on financial income, referred to as the growth and investment tax (GIT).[1]

The income tax proposal, or SIT, is an income tax reform proposal that broadens the base and lowers the rates. The consumption tax, or GIT, is imposed as a direct tax which includes a cash flow tax on businesses and a progressive tax on individual wage income. A consumption tax of this type is often referred to by the generic term "flat tax" when rates are flat, and as an "x-tax" when the tax on wages is progressive. The GIT is not a pure consumption tax plan because it also includes a 15% tax on financial income (interest, dividends, and capital gains); rather it is a consumption tax, with a wage credit and an add-on tax on passive capital income at the individual level. Few individuals are likely, however, to pay much of that capital income tax because of the generous opportunities for tax-favored savings accounts.

The advisory panel's report discussed and found some merit in considering partial replacement of the income tax with a value added tax (VAT), but did not propose such a tax. Finally, the report discussed but rejected a retail sales tax as a replacement for the income tax, and also rejected full replacement of the income tax with a VAT. Note, however, that there are several congressional proposals that include value added taxes and retail sales taxes, as well as income tax and flat tax proposals.[2]

Currently, the reform proposals are being considered further by the Treasury Department, which has recently released a dynamic analysis that discussed the two tax reform proposals as well as a third proposal, a progressive consumption tax (PCT) that modifies the GIT by eliminating the 15% financial income tax, and raising the top rate to 35%.[3]

This report describes the two formal proposals and analyzes them based on revenue neutrality, simplicity and administrative feasibility, equity (distributional effects), and a variety of economic effects. The section on economic effects considers the effects on the allocation of capital, overall effects on growth, potential consequences of the international tax rules, and effects of other tax incentives, including health care, charitable contributions, and spending by state and local governments. Some of these sections also include brief mention of the PCT, the VAT, and the retail sales tax. The report concludes with a discussion of transition issues.

Description of the Proposals

The tax reform plans have not been presented in legislative language, and therefore details of the plans are not always clear. Many tax issues, such as the treatment of casualty losses or alimony, or capital gains on owner-occupied housing, are not directly addressed, but would presumably be

[1] *Simple, Fair, and Pro-Growth: Proposals to Fix America's Tax System*, November 2005, which can be found at http://www.taxreformpanel.gov/.

[2] See CRS Report RL34343, *Tax Reform: An Overview of Proposals in the 110th Congress*, by James M. Bickley.

[3] Robert Carroll, John Diamond, Craig Johnson, and James Makie III, *A Summary of the Dynamic Analysis of the Tax Reform Options Prepared for the President's Advisory Panel on Federal Tax Reform*, U.S. Department of the Treasury, Office of Tax Analysis, May 25, 2006, prepared for the American Enterprise Institute Conference on Tax Reform and Dynamic Analysis, May, 2006.

addressed once specific legislative changes are contemplated.[4] However, the major important features are clear.

Changes in Basic Individual Tax Provisions (Both Proposals)

The proposals generally have similar provisions that relate largely to the current individual income tax:

- Convert personal exemptions and standard deductions to credits.
- Replace the current rate structure (10%, 15%, 25%, 28%, 33%, and 35%) with four rates (15%, 25%, 30%, and 33%) in the SIT and three rates (15%, 25%, and 30%) in the GIT.
- Repeal the alternative minimum tax (AMT).
- Increase the maximum earned income credit (EIC).
- Eliminate itemized deductions. Allow a 15% mortgage interest credit for all taxpayers with the mortgage amount capped at the average price of housing in the region. Allow a deduction for charitable contributions in excess of 1% of income for all taxpayers. (**Note:** deductions for state and local taxes would be eliminated).
- Allow a deduction for the purchase of health insurance to taxpayers not covered by an employer plan, and cap employers' deductions for health insurance.
- Simplify the exclusion for social security benefits and index it.
- Eliminate the tuition tax credit and other education preferences.
- Significantly expand existing preferred savings accounts, such as individual retirement accounts, by allowing two savings accounts, each with a limit of $10,000. No income restrictions would apply. The "Save for Retirement" account would replace existing individual retirement accounts with a current limit of $5,000. The "Save for Family" account would replace education and health savings accounts; funds could be used for education, health, and first time home purchase. Simplify employer savings plans. All individual savings plans would be converted to Roth-type plans (not deductible up front) and, in the case of the GIT, 401(k) and similar plans would be converted to Roth-type plans as well.
- Simplify employer savings accounts, and encourage and remove barriers to automatic enrollment and growth of contributions.

Several provisions listed above would also have consequences for the taxation of investments in assets. For owner-occupied housing, the changes in mortgage interest and property taxes would affect the return on that investment. Tax burdens on capital income would also be affected by the preferred savings accounts.

[4] Technically, the proposal appears to disallow casualty loss deductions, even though these deductions were recently expanded for victims in the aftermath of Hurricane Katrina. Current law also allows alimony to be deductible by the payor and taxable by the recipient, and presumably many divorce settlements take into account this tax treatment. Many other small tax provisions are not explicitly addressed in the proposal.

Business and Capital Income Tax Treatment Under the Income Tax Proposal (SIT)

The simplified income tax plan would make major revisions in the current treatment of capital income in addition to those affecting savings in preferred accounts and investment in owner-occupied housing. As in the case of the individual structural provisions, the treatment of some items is not entirely clear. For example, although the research and experimentation credit would presumably be repealed, the expensing of intangible investment in R&D would presumably continue. The major changes are as follows:

- Eliminate taxes on dividends and reduce taxes on capital gains on corporate stock to a more or less negligible level.
- Allow a significant amount of expensing of investment in equipment as well as cash accounting for small businesses, and cash accounting for medium sized businesses. Small businesses would be required to have a separate business bank account.
- Repeal the corporate alterative minimum tax (AMT).
- Provide a new, simplified depreciation system.
- Eliminate most existing preferences.
- Eliminate the taxation of income from active business abroad, but tax earnings from intangibles currently.

Additional Modifications of Business and Capital Income Tax Treatment Under the Pro-Growth Proposal (GIT)

The GIT provides a cash flow tax at the business level so that the treatment of investments that are currently expensed, such as intangible expenditures on research and development, would continue.

- All investments and purchases are expensed (deducted when paid); old depreciation deductions phased out.
- Interest would not be deductible by business and interest income would not be taxable; deductions and payment of taxes on interest on existing debt would be phased out.
- Taxes paid would be rebated at the border (similar to the treatment of a value added tax).
- Financial capital income (dividends, capital gains, and interest) would be taxed at 15%.

The progressive consumption tax (PCT) plan studied by Treasury would eliminate the tax on financial capital (and obviate the need for savings accounts), and would raise the top rate to 35%. The VAT would be similar to the PCT but would not allow a deduction at the firm level for wages and would not tax wages to individuals, and therefore would eliminate all of the features of the individual tax including the mortgage credit and the deduction for charitable contributions for that part of the tax. The VAT was discussed, however, as a partial replacement for the income tax.

Revenue Neutrality

One of the objectives of the proposal was revenue neutrality. How revenue neutrality is measured depends on the baseline used, and the panel chose to use the Administration baseline, which included the permanent extension of the 2001-2003 tax cuts. This baseline differs from the baseline used by the Congressional Budget Office (CBO), which simply relies on the current tax law, and thus assumes that temporary provisions, including the 2001-2003 tax cuts, will expire. Thus, revenues raised under the administration baseline are smaller than those raised under the CBO baseline.

As a result, the revenues raised by the tax reform proposal are associated with a substantial deficit—and one even more substantial given that there is a currently a surplus in the Social Security account that will eventually disappear and become a deficit. Over the period 2007-2016, in addition to the projected deficit of $0.8 trillion, the cost of making temporary tax provisions (except the AMT) permanent, including debt service, is about $2.3 trillion.[5] And these projections do not include the possibility that discretionary spending will rise to keep pace with national income, which would increase the deficit by $1.6 trillion.

Because the panel used the Administration baseline, any comparisons made in the analysis are with current law incorporating the 2001-2003 tax reductions. Nevertheless, some additional source of revenue must eventually be identified, which means that tax rates might need to be increased or tax preferences reduced, and how that revenue is made up would affect the analysis. Note also that there are some smaller provisions that would be difficult to dispense with, as discussed below, and if they were restored, an additional revenue shortfall would occur.

There is an additional reason that the proposals may not be truly revenue neutral even within the context of the baseline used. The adoption of Roth-type savings accounts reduces current losses from deductions in traditional accounts, but loses revenue in the future. Such a loss could be significant. For example, some rough estimates suggest that a similar proposal by the Administration that gained a small amount of revenue in the budget horizon could eventually cost around $50 billion at current income levels, an amount equal to about 4% of current income tax revenues.[6]

Simplification

Both proposals contain many elements that would simplify tax compliance. The elimination of itemized deductions would simplify tax filing. The proposal would, however, add complexity to current non-itemizing returns, which account for 70% of all returns, by allowing the charitable deduction, health insurance deduction, and mortgage credit. Some non-itemizers do not give in amounts that exceed the threshold for charitable deductions (1% of income), and either rent their homes (about a third of the population rents) or have paid off their mortgages. But for those who have either a mortgage payment or significant charitable deductions, or who purchase health insurance, tax filing will be more complicated. Charitable deductions, in particular, require record keeping, although floors may eliminate the need of those with small contributions relative to income to do so.

[5] Based on data in CRS Report RS22045, *Baseline Budget Projections Under Alternative Assumptions*, by Gregg A. Esenwein and Marc Labonte.

[6] See CRS Report RL32228, *Proposed Savings Accounts: Economic and Budgetary Effects*, by Jane G. Gravelle and Maxim Shvedov.

The proposal, on its surface, also eliminates some itemized deductions that are difficult to dispense with, such as the casualty loss deduction, the deduction for extraordinary medical costs, and the deduction for miscellaneous items such as employee and investment costs. Because the panel remained silent on these other itemized deductions, there is no way to know how they would be treated. These exemptions, all over a floor (except for casualty losses for hurricane victims in 2005), are designed to allow offsets for unusually large costs relative to income. It is difficult to imagine not allowing some deduction for these extraordinary costs, but allowing the deductions for all taxpayers would significantly add to the complexity of the tax form. Under current law, two factors limit the claiming of these deductions to truly large costs: the floor, and the fact the deduction is itemized (so that low-income individuals must have a significant dollar loss). Since itemized deductions are no longer feasible, since there is no longer a standard deduction, restoring these deductions would be complicated and undo much of the apparent simplification with respect to itemized deductions.

There are also "above the line" deductions, such as those for alimony and for moving expenses, as well as some credits that might be thought desirable (the child care credit) whose retention might prove important. Given the extension of tax benefits to non-itemizers, and the possibility of reintroducing some additional deductions, it is not clear whether simplification for individual tax filers on the whole is increased or decreased. A considerably simpler approach to reform would have been to eliminate the state and local income tax deduction while leaving other itemized deductions in place; calculations based on the public use file suggest that change would have reduced the number of itemizers from 30% to about 20%.[7]

All taxpayers should experience simplification from the collapsing of deductions, exemptions, and credits into a single family credit, and, for higher-income taxpayers, from eliminating phaseouts and the AMT. Higher-income taxpayers who save will also benefit from the simplified savings accounts.

Allowing cash accounting and expensing for small businesses under the income tax would also significantly simplify their tax compliance, although much of this benefit would be lost if state income taxes do not make similar adjustments. The provision requiring small business bank accounts to be handled separately from personal accounts could complicate the affairs of those with occasional small amounts of self-employment income unless a de-minimus rule were adopted. (An example would be a professional who receives a small consulting fee, but whose major source of income is employment, or a skilled workman who occasionally moonlights). Complications would also occur for those who use assets for both business and personal use (e.g., homes and cars). Although there is some simplification of the depreciation system for larger businesses, most of the current complexities would remain, as would most of the challenges in allocating international income for multinationals which cannot be eliminated. The elimination of the production activities deduction is an important simplification, however.

On the whole, the income tax proposal appears to simplify the tax system for higher-income taxpayers and the self-employed, while possibly complicating it for lower- and middle-income wage earners. The consumption tax proposal should achieve more simplification for business because all acquisitions would be expensed. In this system, there is no need to keep depreciation accounts or inventories.

[7] This information was provided by Maxim Shvedov of CRS based on simulations from the Statistics of Income public use file.

Fairness and Equity

Issues of tax equity may concern vertical equity (how effective tax rates rise as incomes rise) and horizontal equity (how different taxpayers with similar circumstances are treated). The discussion below suggests that the income tax replacement has relatively small effects on either vertical or horizontal equity, and indeed may increase inequities across family types. It is more difficult to characterize the growth plan, which is essentially a consumption tax, but there is a case to be made that such a tax would be much less progressive than the current income tax system. In any case, the distributional method used in the panel's study for their progressive consumption tax is inconsistent with the one they suggest is appropriate for another economically equivalent consumption tax—the VAT.

Vertical Equity

A second objective of the panel was to maintain the current progressivity of the tax system. The panel's report shows both the SIT and the GIT to be distributionally neutral, at least across broad income classes. (There is no detail about the extremely high-income individuals at the top who constitute only a tiny fraction of taxpayers but a large fraction of income). Note that this distributional comparison is with respect to the assumption that the 2001-2003 tax cuts, which favored higher-income individuals, are in place. Even so, there are questions about the distributional neutrality of the plans.

Proposals to reduce taxes on capital income through reducing or eliminating taxes on dividends, capital gains, and interest income, would likely shift the burden, other things equal, away from high-income individuals to the middle class. The commission's distributionally neutral system is likely, in part, a temporary artifact of the shift into back-loaded savings accounts (which can raise revenue from owners of assets in the short run but lower it dramatically in the long run).[8] The magnitude of this effect is difficult to determine, but analysis of the President's budget proposals of this nature, which had less generous contribution limits and negligible revenue effects in the budget window, suggested the long-run revenue loss could easily be $50 billion or more at current income levels, an amount equal to 4% of FY2005 corporate and individual income taxes. This saving would accrue to individuals in the higher income levels, as savings of any sort tends to be concentrated there.

Distributional issues are far more problematic in the case of the consumption tax proposal. Although distributional tables are presented that also show distributional neutrality, that conclusion is not clear. As in the case with the income tax proposal, some of the overall effect reflects the effects of savings accounts, and these effects are even more important in the GIT because all defined contribution plans (such as 401(k)s) will be converted into backloaded plans. Moreover, because dividends and capital gains are taxed under this proposal, the long-run sheltering of income by high-income individuals may be even more important. The effects will likely be larger than the effects in the SIT, which are already significant.

A second, and more important, problem with evaluating vertical equity under the GIT is how to distribute the tax that is collected. One might propose to allocate the tax according to consumption, along with a credit for wage tax reductions due to graduated rates. Indeed, in discussing the VAT, which is also a consumption tax, the study indicates that tax would be allocated according to consumption and would be regressive, not progressive, requiring additional

[8] See CRS Report RL32228, *Proposed Savings Accounts: Economic and Budgetary Effects*, by Jane G. Gravelle and Maxim Shvedov, for an explanation of this budget effect.

fixed-rate credits and, even in that case, resulting in lower shares of tax paid by the highest-income individuals. However, for the GIT, which is simply a VAT imposed in a different form with a wage credit, a different distributional methodology was used. The business cash flow tax is allocated according to income, and thus the tax is modeled as if it were an income tax.

A consumption tax is a tax on wage income and a lump sum tax on old capital that is effectively collected over time as the assets are consumed. For very-high-income individuals who indefinitely pass on assets in estates, that consumption may never occur. If one distributed the tax on the basis of consumption, the tax would decline as income rises despite the rate structure. The tax was, however, distributed as if it were an income tax and thus the cash flow tax at the firm level (which is really a lump sum tax on old capital that may or may not be translated into an effective tax on consumption) is treated as if it is a tax on income and falls on high-income individuals.

To illustrate the importance of these approaches, consider a recent study that compared the distributional effects of an "x tax" with a 15% and 30% rate and a demogrant (rebate to lower-income individuals to offset the tax) under both approaches.[9] This plan is similar in many respects to the panel's proposal. If distributed according to consumption, the middle quintile has an effective tax rate of 23.3%, the top quintile a tax rate of 12.1% and the top 1% a tax rate of 6.1%. If distributed according to income, the tax rate is 11.4% for the middle quintile, 22.5% for the top quintile, and 22.0% for the top 1%.

Distributing a consumption-based tax in the short run is tricky, and there is no perfect answer because the cash flow tax is a tax that causes asset values (or their purchasing power) to fall, but does not burden new investment which can be purchased at a discount. However, in the long run the consumption tax base tends to be similar to a wage tax base, except that it also favors higher-income people, even in the long run, because they are less likely to consume all of their lifetime wage income. Thus it is highly unlikely that the GIT is distributionally neutral; it makes the tax system less progressive by largely exempting capital income from tax.

Horizontal Equity

Horizontal equity refers to the equal treatment of those with similar circumstances. There are three basic issues of horizontal equity that could be considered: equal treatment of different family sizes, equity in the treatment of different age cohorts, and equity in the treatment of taxpayers who vary in their preferences for tax-favored activities.

A recent study used an equivalency index (similar to the poverty levels that vary across family size) to compare tax burdens on families of different sizes.[10] This analysis suggested that in the lower-income levels, families with children tend to be heavily favored compared to singles and childless couples with similar abilities to pay, whereas the reverse is the case at the higher income levels. The tax reform plans appear largely to preserve these features of the tax system. The benefits for families with children at lower income levels arise from the earned income tax credit and child credits, which are maintained. At higher income levels families with children are penalized because the adjustments for family size are not large enough; this problem may be magnified by the converting of personal exemptions into credits, but reduced by the repeal of the

[9] See Leonard Burman, Jane Gravelle, and Jeff Rohaly, *Towards a More Consistent Distributional Analysis*, forthcoming in the Proceedings of the National Tax Association, 2005 Conference.

[10] See Jane Gravelle and Jennifer Gravelle, "Horizontal Equity and Family Tax Treatment: The Orphan Child of Tax Policy," forthcoming, *National Tax Journal*, September, 2006.

alternative minimum tax and phase-outs of deductions. On the whole there appears to be no major change in this aspect of the tax system.

Consumption taxes, such as the GIT, inevitably shift the burden of the tax towards the current older generation and away from young and future generations. Essentially, those with assets who expect to consume out of these assets are subject to a substantially higher tax. This shifting across the generations is relieved to some extent by the transition rules that allow some recovery of depreciation, but this offset is quite limited. That shift means that older people pay a higher lifetime tax than younger or unborn generations.

The elimination of preferences for investment types, the most frequent type of tax preference in the income tax, is generally not viewed as important to horizontal equity in the long run, since capital and pre-tax returns shift to equate returns after tax. The tax revisions continue to favor homeownership, although, as seen below, to a lesser degree. The proposals eliminate the preferences for taxpayers in states with higher taxes, and appear to reduce the benefits for those covered by employer provided health care while allowing benefits for those not covered by employer plans. Charitable contributions effects are mixed as the benefit is provided to non-itemizers, but also subject to a floor. On the whole, the proposals appear to improve horizontal equity as measured on this basis.

Efficient Allocation of Capital and the Taxation of Capital Income

In the broadest terms, a tax reform can alter economic behavior by changing the tax rates on labor and capital income. One of the most important ways in which the tax reform proposals would affect the nature of the tax system is through changes in the taxes on capital income. Indeed, the indications from a recent dynamic analysis of the tax reform proposals suggest there is little or no change in either average or marginal tax rates on labor income from the proposals. It is largely in the treatment of capital income that the proposals have a potential effect.

Change in the treatment of capital income can improve economic efficiency if they lead to a better allocation of capital to different uses. In general, more even taxation of different types of assets is more efficient. If investors tend to equate returns after tax on different investments, then more neutral taxation will more clearly equate the pre-tax, or social, return, leading to a higher level of output and well-being. A lower aggregate tax rate on capital income can also reduce distortions and lead to a more optimal savings behavior.

The method for examining this issue begins with measuring the effective tax rate on the returns to capital invested in different types of assets. In the absence of external effects or other "market failures," capital is allocated most efficiently when all returns are taxed in at the same rate and when financial choices are not influenced by the tax code.[11] Effective tax rates can vary across physical assets (such as equipment and structures), across organizational forms (corporate versus non-corporate businesses), and financial form (corporate debt versus equity).

Effective tax rates presented in this section are estimated effective rates on income from prospective investments; they take into account the timing of deductions and the fact that a tax benefit received today is more valuable than a tax benefit received in the future because of the

[11] Market failure is a technical term which indicates not that markets do not function, but that they do not function perfectly so that prices represent true resource costs. In practice, market failures are numerous, but in most cases are small, or cannot be easily determined and quantified, and thus make effective government intervention difficult or capable of worsening rather than improving the market failures.

time value of money (i.e., money received today can be invested and yield more money in the future). (See **Appendix A** for a more detailed explanation.) These effective tax rates can differ substantially from average tax rates in the economy because the timing of deductions has a different (and in the long run, more powerful) effect on tax burdens on new investment than is reflected in average tax rate measures. Indeed, it is possible for effective tax rates on new investments to be negative, while average tax rates are positive. However, it is the effective tax rates on new investment that affect the allocation and size of the capital stock. Aside from the statutory tax rate, the main provision affecting the tax burden on new investment is how quickly the cost of the asset is recovered via depreciation deductions.

When tax depreciation matches economic depreciation, the effect is to tax the return to capital (investment income) in each period and the effective tax rate is the statutory rate, when considering a firm's tax burden. The same effect occurs as long as the present discounted value of depreciation deductions is equal to the present discounted value of economic depreciation deductions.[12] Two opposing forces can affect depreciation (and therefore effective tax rates). Because depreciation is based on historical acquisition cost, the real value of depreciation deductions is undermined by inflation. Thus, higher inflation means higher effective tax rates.[13] This inflation effect, other things equal, raises the effective tax rate more for shorter-lived investments than for longer-lived ones. However, depreciation deductions are generally allowed more quickly than the rate that would be justified by economic decline, and that tendency is particularly pronounced in the case of equipment, which increases the deductions' value and leads to a lower effective tax rate. Under current law, most equipment assets, for example, have their costs deducted in five to seven years, although they last a much longer period of time. The Internal Revenue Code specifies that buildings are deducted over 39 years (although residential structures are deducted over 27.5 years).

The maximum acceleration of depreciation allows investments to be deducted when incurred, and is a feature of the consumption tax (GIT) at the firm level. The effective tax rate on new investment is zero.

Tax rates can be measured in different ways. The tax rate at the corporate level on equity financed investment, which is calculated first, shows the effects of depreciation rules across asset type (e.g., computing equipment, buildings). Effective corporate tax rates can also be measured as the total tax at both the corporate and personal level, which also reflects the deductibility of interest by corporations and the imposition of individual income taxes on interest, dividends, and capital gains. This measure indicates the change in the total burden on corporate investment. Tax rates can also be separated into total rates on debt financed and equity financed investment, to examine the degree of distortion that favors debt finance. The total tax rate can also be compared with tax rates on non-corporate investment to measure the differential between the total tax on investment in the corporate and non-corporate sectors, as well as federal income taxes on owner-occupied housing (which tend to be around zero). Tax rates also affect the dividend payout choice, arising from differential treatment of retained earnings (which give rise to capital gains) and dividends, and the realization of capital gains. Finally, the overall tax rate in the economy, which requires weighting by asset type, can affect savings decisions.

[12] The present discounted value is the value of a future dollar discounted by dividing it by $(1+r)^t$, where r is the interest rate and t is the time period. For depreciation, all of the values are summed up.

[13] Higher inflation can, however, benefit debt-financed investment if the tax rate of the firm is higher than the tax rate of the creditor, because nominal rather than real interest is deducted.

Differential Taxes Across Asset Types

Table 1 shows the effective tax rates across different types of assets for the corporate sector with a corporate level tax and shows how even the tax rates are. Two different types of tax rates for current law are reported, one without and one with the 9% production activities deduction enacted in 2004. The statutory rate without the production activities deduction is 35%, and the effective statutory rate with the production activities deduction is 31.85%, similar to the statutory rate of 31.5% in the panel's income tax revision. The last column reports the effective tax rates using the depreciation system in the panel's income tax plan. Although the corporate tax rate under the panel's consumption tax plan is 30%, it is not really relevant to the effective tax rate, since all investments are effectively subject to zero tax rate.

Table 2 reports these tax rates aggregated across basic composite asset types, and assumes a third of assets is eligible, under current law, for the production activities deduction.[14] This table indicates that the panel's income tax reform evens out tax rates slightly and very slightly increases the effective tax rate (by a percentage point). Essentially that plan does not differ much from current law. The consumption tax reform, however, results in a zero effective corporate tax rate on all assets.

Table 1. Differential Tax Rates Across Asset Types

Asset	No Production Deduction	With Production Deduction	Panel's Income Tax Reform Plan
Autos	34	31	39
Office/Computing Equipment	31	28	36
Trucks/Buses/Trailers	29	26	34
Aircraft	29	26	28
Construction Machinery	23	21	27
Mining/Oilfield Equipment	28	25	27
Service Industry Equipment	28	25	27
Tractors	27	24	27
Instruments	28	25	27
Other Equipment	27	24	25
General Industrial Equipment	25	23	25
Metalworking Machinery	23	21	23
Electric Transmission Equipment	33	30	32
Communications Equipment	19	17	22
Other Electrical Equipment	24	21	22
Furniture and Fixtures	23	20	22

[14] See CRS Report RL32099, *Capital Income Tax Revisions and Effective Tax Rates*, by Jane G. Gravelle, for data on the share of assets eligible. This report also contains data on the effective tax rates before the 2001-2004 revisions and presents a more extensive discussion of effective tax rates.

Asset	No Production Deduction	With Production Deduction	Panel's Income Tax Reform Plan
Special Industrial Equipment	21	19	21
Agricultural Equipment	21	19	20
Fabricated Metal	29	26	39
Engines and Turbines	36	33	32
Ships and Boats	17	15	13
Railroad Equipment	18	16	17
Mining Structures	7	6	20
Other Structures	40	37	37
Industrial Structures	37	34	34
Public Utility Structures	27	24	24
Commercial Structures	34	31	32
Farm Structures	26	23	23
Residential Structures	31	NA	30

Source: Congressional Research Service. See **Appendix A** for method of computation and assumptions.

Table 2. Weighted Average Effective Corporate Firm Level Tax Rates (Assuming No Debt) on Reproducible Capital

Asset Type	With Average Production Deduction	Panel's Income Tax Reform Plan	Panel's Consumption Tax Reform Plan
Equipment	25	27	0
Structures	30	31	0
Inventory	37	35	0
Total	29	30	0

Source: Congressional Research Service. See **Appendix A** for method of computation and assumptions.

Note: Structures reflect a weighted average of the last seven rows of **Table 1**. The remaining assets are equipment.

These comparisons across asset types indicate that the depreciation system in the income tax reform plan is quite similar in its features to the current provision. Equipment assets are slightly favored relative to structures and inventory, and tax rates are reasonably close to their statutory rates. The income tax reform slightly narrows these differentials, but, in general, is quite similar to current law. The consumption tax reform plan is completely neutral across assets because all investment is expensed, leading to a zero effective tax rate at the firm level (taxes may still be paid at the individual level, however).[15]

[15] The beneficial treatment of mineral investment, largely in oil and gas, arises from provisions that allow much of the cost, including unproductive tracts and wells, as well as all intangible drilling costs (supplies, labor, etc.), to be deducted immediately. The deduction of losses, while consistent with accounting rules, is a subsidy because the cost of unproductive tracts and wells is part of the cost of finding productive ones and should be, in theory, deducted over the useful life of productive properties. The calculations assume that unproductive wells and tracts will continue to be deducted as losses under the income tax reform option, but intangible drilling costs will be recovered, as will other costs, under cost depletion.

The Debt Equity Distortion

Another issue is the differential tax treatment, within the corporate sector, of debt-financed versus equity-financed capital. Debt is favored at the corporate level under current income tax rules and under the income tax reform because corporations deduct interest payments. If taxes applied only to real economic profits, the tax rate on debt financed earnings would be zero and the tax rate on equity would be the statutory rate, currently 35% for most corporate income. However, under current law, debt is subject to a subsidy at the firm level, for two reasons. First, interest is deducted at the statutory rate (adjusted for the production activity deduction, which on average lowers the rate to 34%) whereas the income is taxed (as suggested above) at a lower effective rate of 29% due to accelerated depreciation. Second, nominal rather than real interest is deducted. Together these effects mean that debt, at the firm level, enjoys a 32% subsidy, whereas equity has a 29% tax.[16]

These tax rates are increased and the differences are moderated, however, because equity is favored at the individual level. Capital gains and dividend tax rates are lower, and capital gains can be deferred until the stock is sold and are never paid if shares are passed on at death. (Note that this calculation uses the lower rates on capital gains and dividends adopted in 2003 and technically scheduled to expire in 2010; tax rates would be higher if these provisions expire.) Individual taxes on the return to capital are also reduced because they are imposed on profits after the corporate tax, and thus the corporate tax is effectively deductible from the individual tax base. For an individual in the 30% tax bracket, for example, the tax on interest income is 30% for a dollar of earnings, but the additional individual tax on equity is only 20% (0.3 X (1-0.35)). The recent temporary revisions lowered the tax rate on capital gains (for most recipients) from 20% to 15% and extended these lower tax rates to dividends—a change favoring equity investment. There was also a temporary benefit to debt finance, from the individual tax rate reductions.

These effects are shown in the first three rows of **Table 3**, which shows that the tax reform plans narrow the differentials between the two types of finance. In fact, the consumption tax reform results in slightly higher tax burdens for debt finance. Under this plan, the only tax is at the individual level, and because of the preferential treatment of capital gains (about half is effectively not taxed through deferral and step up in basis at death), the effective burden on equity-financed investment is lower than that on debt-financed investment.

The effective tax rate on debt vs. equity is, however, complicated by the existence of tax-favored forms of individual investment, through pensions and IRAs, where individual tax rates are effectively zero. If these effects are taken into account, current tax rates are lower and the effect of changes in individual tax rates less important. Since these pension funds and IRA account managers (whether or not self directed) can also choose between debt and equity, the case with these effects incorporated is probably more realistic.

Determining exactly what weight to assign to tax exempt assets is not entirely clear. Although roughly half of interest and dividends are in funds where they are eligible for exemption under current law, it is not clear whether half of the marginal investments were exempt because some assets were in accounts where investment was made up to the limit. The account limits reduce the share of investments that were non-taxable at the margin. In addition, because of the restraints on these investments, such as penalties for early withdrawal or lack of access to funds, assets in tax

[16] With a 0.075 nominal interest rate and a 0.02 inflation rate, and with the production deduction reducing the tax rate by 3%, the after-tax discount rate to the firm is 0.075*(1-0.35*0.97)-0.02. Dividing that discount rate by (1-0.29) produces a pre tax return of 0.0416. The real interest rate is 0.055 (0.075-0.02), so the difference of 0.0146 is 32% of the pre-tax return.

exempt accounts at the margin also pay an implicit cost that offsets, to some extent, the tax benefit.

Table 3. Effective Tax Rates on Debt-Financed vs. Equity Financed Corporate Investments

Tax Regime	Debt	Equity
Excluding Tax Exempt Forms		
Current Law	9	37
Panel's Income Tax Reform Plan	16	33
Panel's Consumption Tax Reform Plan	15	12
Including Tax Exempt Forms (50% or 100% exempt)		
Current Law (50%)	-11	33
Panel's Income Tax Reform Plan (50%)	-3	31
Panel's Consumption Tax Reform Plan (50%)	8	6
Panel's Income Tax Reform Plan (100%)	-23	30
Panel's Consumption Tax Reform Plan (100%)	0	0

Source: Congressional Research Service. See **Appendix A** for method of computation and assumptions.

It is clear, however, that the share of investment financed from tax exempt sources is likely to increase under the reform commission proposals, and for that reason a case is shown that is financed 100% with tax exempt investment. These plans increase the exemption levels to $10,000 and allow both a retirement account and a savings account—where withdrawals may be made for health, education, or purchase of a primary residence—to replace existing IRAs that are limited to $5,000, as well as existing health and education savings plans that also tend to have smaller limits. Income limits would also be abolished.[17] In addition, for the income tax plan, the exemption of dividends and most of capital gains should allow more interest-bearing assets to be placed into exempt accounts.

Once tax exempt forms are considered, and the exempt share is assumed to be larger for the reform plans, it is no longer obvious that the income tax reform narrows the debt-equity distortion compared to current law. In comparing tax rates with large discrepancies, and particularly those with negative rates, a more meaningful comparison is the tax wedge, or the excess by which the pre-tax return must exceed a fixed after-tax return, which is measured by t/(1-t), where t is the tax rate. Thus under current law without considering tax exempt forms effects, a debt-financed return must exceed the after-tax return by 10% (0.09/(1-0.09)), whereas an equity-financed return must exceed the after-tax return by 59% (0.37/(1-0.37)). The difference between those is 49% of after-tax return. The difference between the wedges for the income tax reform proposal is 30%. However, the difference between the wedges for current law with 50% tax exempt finance is 59%, whereas the difference for the tax reform proposal is 48% for 50% tax finance and 62% for 100% tax finance. (The differences are negligible for the consumption tax plus tax on financial income reform.)

[17] Note that recent tax legislation allowing a one time rollover of assets in 2010, including nondeductible traditional IRAs, without income limits effectively eliminates the income limit for a few years. All individuals are eligible for non-deductible traditional accounts which allow a deferral of income, and by opening those accounts in the next five years and rolling them over into Roth IRAs, high-income individuals can effectively open tax exempt accounts.

These measures suggest that the income tax reform is likely to narrow the differences between debt and equity finance, but perhaps not by very much, whereas the consumption tax reform would eliminate virtually all of the differences.

Distortions of Payout and Realization Decisions

Under current law, the tax system favors the retention of earnings in corporations and the delay in the realization of capital gains, because capital gains that arise from retained earnings are not taxed until the asset is sold, and are never taxed if held until death. As a result the effective tax rate on capital gains for taxable investors is about half the rate of dividends, and the distortion is small (about an eight percentage point differential) because most dividends and capital gains are taxed at a flat 15% rate. There are no distortions for tax exempt investments. This basic treatment is retained in the consumption tax reform provision, although the share of tax exempt investment is likely larger. The income tax revision actually reverses the relationship, because the tax rate on dividends is zero, but only 75% of capital gains are excluded. That treatment creates an incentive to pay out earnings. The magnitude of the distortion is probably less, however; the maximum capital gains effective rate will be only about 8%.

Corporate Versus Non-corporate Business Distortions

Aside from the distortion between debt and equity, the corporate tax also discourages investment in the corporate sector. **Table 4** examines the total effective tax rate in the corporate sector as compared with the non-corporate sector under the different tax regimes.

Table 4. Effective Tax Rates on Alternative Business Forms

Tax Regime	Corporate	Large Non-Corporate	Medium Non-Corporate	Small Non-Corporate
Excluding Tax Exempt Forms				
Current Law	32	20	20	18
Panel's Income Tax Reform Plan	30	22	20	18
Panel's Consumption Tax Reform Plan	14	6	6	6
Including Tax Exempt Forms (50% or 100% exempt)				
Current Law (50%)	25	16	16	14
Panel's Income Tax Reform Plan (50%)	25	18	16	14
Panel's Consumption Tax Reform Plan (50%)	7	3	3	3
Panel's Income Tax Reform Plan (100%)	20	14	12	10
Panel's Consumption Tax Reform Plan (100%)	0	0	0	0

Source: Congressional Research Service. See **Appendix A** for method of computation and assumptions.

As in the debt vs. equity case, calculations are also done taking into account the lower individual tax rates for pensions and IRAs. Since these entities would not invest directly in unincorporated businesses (such as sole proprietorships and partnerships), the non-corporate numbers consider

only the case when the providers of loans are not fully subject to tax. However, since non-corporate investment is not a viable alternative for passive investment entities such as pension plans, the more relevant measure may be the tax rates without incorporating these effects, since it is among taxable accounts that choices might be made about investing directly in businesses rather than financial instruments.

This table also considers the differential treatment of small businesses (which are largely non-corporate). The smallest businesses (which account for most non-corporate investment) are assumed to operate on a cash basis and expense equipment investments, whereas the medium sized businesses would also be on a cash basis but would depreciate equipment and buildings. Cash accounting produces a zero effective tax rate on inventory investment. For current law, the calculations assume that small non-corporate businesses would be able to expense investments in equipment under current provisions of the tax law that allow expensing with a ceiling.

As in the case of the debt equity choice, the income tax reform proposal appears to narrow the differentials between corporate and non-corporate investment although the reduction is generally small. The consumption reform significantly narrows the differentials.

Business versus Owner-Occupied Housing and Total Burden

Table 5 provides estimates of the total tax burden on business investment for owner-occupied housing and for aggregate investment in the economy.

The income tax reform, in general, narrows the differences in tax rates between business investment and owner-occupied housing, from a difference in tax wedges of about 40% under current law to a difference of about 27%. The consumption tax reform narrows the wedge to less than 15%. Thus both reforms would reduce the distortions between business investment and housing.

A final rate shown in **Table 5** is the overall marginal tax rate in the economy. The income tax reform proposal keeps about the same effective tax rates if the same assumptions are made about tax exempt finance, but it would be likely to slightly lower the overall tax rate because of the increased amount of tax exempt finance. The consumption tax proposal with the tax on financial income would lower overall tax rates, and is likely to produce a negative overall tax rate. A negative tax rate could occur when most investment comes from tax exempt forms (and thus there is little or no tax on financial investment) and combines a virtually zero tax on business investment with a negative tax on owner-occupied housing, due to the mortgage credit. A negative tax rate on capital income, like a positive one, causes an intertemporal distortion.

Table 5. Effective Tax Rates on Reproducible Capital

Tax Regime	Business Investment	Owner-Occupied Housing	Total Economy Wide
Excluding Tax Exempt Forms			
Current Law	28	-3	18
Panel's Income Tax Reform Plan	24	3	17
Panel's Consumption Tax Reform Plan	11	0	7

Tax Regime	Business Investment	Owner-Occupied Housing	Total Economy Wide
Including Tax Exempt Forms (50% or 100% exempt)			
Current Law (50%)	22	-13	11
Panel's Income Tax Reform Plan (50%)	21	-1	13
Panel's Consumption Tax Reform Plan (50%)	6	-8	1
Panel's Income Tax Reform Plan (100%)	17	-6	9
Panel's Consumption Tax Reform Plan (100%)	0	-17	-6

Source: Congressional Research Service. See **Appendix A** for method of computation and assumptions.

Effects on Savings, Labor Supply, Growth, and Output

If tax rates on capital and labor income affect labor and savings and if they are altered, output and growth rates in the near and intermediate term can change.[18] Despite the presumption that lower tax rates will increase supply, such an outcome is neither theoretically nor empirically certain. For both of these effects, there are offsetting income and substitution effects. A rise in after-tax wage income can cause work effort to decrease because the individual wishes to consume more of everything, including leisure, offsetting the incentive to shift consumption from leisure to other goods, with the outcome uncertain. Similarly, a rise in the after-tax rate of return can allow individuals to achieve a target amount with smaller savings, offsetting the effects of the incentive to save more to achieve a higher target. Simple empirical evidence suggests that effects are small because labor supply and savings responses are relatively small.[19]

Economists at the Treasury Department recently prepared a dynamic analysis of the tax reform plans, and that analysis will be used to discuss the potential growth effects.[20] The Treasury study, in addition to examining the two reform plans, also examined a personal consumption tax (PCT) that was similar to the panel's consumption tax (GIT), but excluded the 15% tax on financial income (interest, dividends, and capital gains) and had a slightly higher top individual tax rate (35% rather than 30%).

The Treasury used three different models to analyze the effects. One model is a standard neoclassical growth model with fixed labor supply and an elasticity of savings with respect to the rate of return equal to 0.4. The other two models used in the Treasury study were the standard intertemporal models: the Ramsey model, which depicts the economy as a single infinitely lived

[18] In most growth models changes in savings rates and labor supply cannot affect the long-run growth rate, which is determined by population growth and exogenous technological change. There are models of endogenous growth, but the factors that drive those growth rates are unlikely to be affected by the tax changes in the reform plan.

[19] For a review of the empirical evidence see CRS Report RL31949, *Issues in Dynamic Revenue Estimating*, by Jane G. Gravelle.

[20] Robert Carroll, John Diamond, Craig Johnson, and James Makie III, *A Summary of the Dynamic Analysis of the Tax Reform Options Prepared for the President's Advisory Panel on Federal Tax Reform*, U.S. Department of the Treasury, Office of Tax Analysis, May 25, 2006, prepared for the American Enterprise Institute Conference on Tax Reform and Dynamic Analysis, May, 2006.

person; and the overlapping generations model (OLG), which traces cohorts of individuals over time. These intertemporal models were developed to bring the microeconomic foundations of decisions regarding savings and labor supply into macroeconomic models. Although more satisfying theoretically to many economists, these models have not been tested empirically and are highly stylized in many ways.

Table 6 summarizes the effects on output of the various reform plans using the three models in the first 10 years, in year 20, and in the long-run steady state. As the numbers in this table indicate, two results are clear. First, the income tax reform has very small effects on growth in any of the model simulations, because it has little effect on tax rates. None of the proposals had a significant effect on marginal and average-wage tax rates, and only the consumption tax proposals had an effect on tax rates on investment.[21] Second, for those proposals that had a noticeable effect on the capital income tax rate, the results vary significantly depending on the model used. In the first 10 years, on average output increases by 1.9% for the Ramsey model, 1.5% for the OLG model, and 0.1% for the Solow model. In the long run, output is larger respectively by 4.8%, 2.2%, and 1.4%.

Table 6. Percentage Change in National Income, Treasury Study

Plan	Solow Model	OLG Model	Ramsey Model
Simplified Income Tax (SIT)			
Budget Window	0.0%	0.4%	0.0%
Year 20	0.1%	0.8%	0.2%
Long Run	0.2%	0.9%	0.3%
Consumption Tax Plan (GIT)			
Budget Window	0.1%	1.5%	1.9%
Year 20	0.4%	2.1%	3.7%
Long Run	1.4%	2.2%	4.8%
Personal Consumption Tax (PCT)			
Budget Window	0.2%	0.7%	2.3%
Year 20	0.6%	2.6%	4.5%
Long Run	1.9%	2.8%	6.0%

Source: Treasury Department, Office of Tax Analysis.

Explaining the causes of these different results and evaluating the reasonableness of the models is quite complicated, and the technical discussion is contained in an appendix to this paper. However, the major conclusions suggested in that appendix are as follows:

- Straightforward empirical evidence indicates that savings could rise or fall and even in the model with the most modest results (the Solow model) it is not clear

[21] The Treasury study reports the marginal and average income tax rates on labor income at 24% and 13% respectively. Under the income tax plan, these rates are estimated at 24% and 12.8%, whereas in the consumption tax plan they are 23.5% and 13.3% respectively. The marginal and average rates go up slightly in their personal consumption tax plan (PCT), to 26.4% and 14.7%. For capital income, the Treasury study estimates a current marginal tax rate of 13.9%. For the income tax reform, the rate falls slightly to 12.8% but for the consumption plan (GIT), the reduction is much larger, to 1.1%. Their personal consumption tax rate is -3.7%. The tax rates used in their analysis are similar to the ones calculated in this study in **Table 5**.

that the effects would, indeed, be positive, as some time-series elasticities are negative.

- The use of Roth-type IRAs and, in some cases, 401(k)s from traditional IRAs would, according to the theory embedded in intertemporal models, be less likely to induce savings as individuals would no longer need to save the up-front tax reduction to pay future taxes. This effect could be particularly pronounced in the GIT where defined contribution pension plans will be converted to Roth style plans, as substituting a Roth for a deductible plan should *reduce* savings. These effects are not accounted for.
- Intertemporal models, while theoretically appealing in many ways, involve some fairly heroic assumptions about the abilities of individuals to make complex decisions and have not been empirically tested. Much of the savings response reflects intertemporal substitution of labor in response to interest rate changes, where virtually no evidence of a response is available. Alternative "rules of thumb" savings behavior may be more consistent with individual savings behavior and tend to imply a zero or negative elasticity. This view of behavior suggests that automatic enrollment in employer retirement plans, facilitated by the proposals, might increase savings, for which there is some direct evidence.
- The Ramsey model also suffers from some serious limitations, as it requires some strict assumptions to achieve an internal solution (i.e., where there is general ownership of capital across many people, as observed in the economy), including homogeneous preferences, asexual reproduction, and a common tax rate, thereby making it impossible to apply the model to a progressive tax rate structure, an open economy, or to incorporate differential state tax rates.
- Even within the context of the intertemporal models, many of the implicit elasticities are inconsistent with the empirical evidence, including the labor supply elasticities and particularly the intertemporal labor substitution elasticity, which empirical work suggests is less than 0.2, but which is set at around 0.75 in the Ramsey model and around 0.5 in the OLG model. Standard labor supply elasticities also tend to be higher than most empirical estimates, especially in the Ramsey model. Part of the reason for these high elasticities is the somewhat arbitrary choice of hours available for additional work.
- Even where the higher growth effects are expected, these effects are quite modest compared to the normal growth of the economy. For example, the largest growth is projected for the GIT by the Ramsey model. In that simulation, over the 20-year period, output rises by 3.7%, for an average annual growth rate of less than 2/10 of a percent. Normal growth is usually 2 to 3% and growth per worker typically 1% or more. Growth induced by even a significant tax change of this nature is not likely to materially affect the fiscal outlook—that is, we cannot grow our way out of the deficit by changing the shape of the tax system.

International Tax Treatment

The panel proposes a significant change in the tax treatment of foreign source income in its income tax proposal, and proposes to treat taxes in its consumption tax proposal (GIT) in the same manner as a VAT.

Under current income tax law, income of foreign subsidiaries of U.S. parents is not taxed until repatriated as dividends, a treatment referred to as deferral. Income of foreign branches of U.S.

companies is taxed currently as is certain passive income (Subpart F income) of subsidiaries that is easily subject to abuse. When income is taxed, firms can take a credit against foreign taxes paid up to the amount of the U.S. tax due, and these credits are aggregated across countries, so that unused credits for taxes in high-tax countries can be used to offset U.S. tax due in low-tax countries. This offsetting of credits across countries is referred to as cross-crediting. Certain passive income is segregated into a separate foreign tax credit "basket."

The international tax regime has several problems relating to economic efficiency and tax compliance. First, because of deferral and cross-crediting, too much of U.S. investment flows to low-tax countries (where its pre-tax return is too low) and too little to the United States and high-tax countries. Deferral does not produce as large a disincentive as outright exemption, but once income is earned abroad there is an incentive to reinvest abroad to avoid the repatriation tax. Second, the potential to reallocate profits from high- to low-tax jurisdictions complicates tax administration and compliance. Profits may be reallocated by setting prices for inter-company transactions and by assigning patent rights to operations in low-tax countries. In addition, since companies control their tax liability through repatriation decisions, they engage in complex planning to minimize their taxes, and, indeed, very little tax is paid on foreign source income.

One reform approach would be to tax all income currently, which would eliminate the repatriation issue. Also, if it were administratively feasible (although there are claims that it is not), foreign tax credits could be separated into country baskets, a treatment that would eliminate incentives for investment in low-tax countries (although it would increase the disincentive to invest in high-tax countries). But even with cross-crediting, a case can be made that this change would lead to greater economic efficiency through eliminating much of the incentive to invest in low-tax countries. Moreover, there would be less incentive to transfer income across different countries. U.S. individual investors could avoid some of this current tax by investing in foreign parents, and there would also be incentives for U.S. parents to transform into foreign parent corporations (corporate inversion). The evidence suggests that these effects would probably be small, and corporate inversions could be discouraged with legislation. Revenue raised from this approach could be used to reduce the corporate income tax rate and top income tax rates, if the distributional effects are to be held constant.

An argument is sometimes made that this type of change would lead to an unfair disadvantage to companies that must compete in low-tax countries with firms from other countries who do not tax their subsidiaries' income. It could lead to a smaller presence abroad of U.S. firms, but, nevertheless, the investment that takes place in the United States would earn a higher return and benefit the U.S. economy. That is, from the point of view of U.S. society as a whole this is not so much an "unfair competition" but rather a system that diverts resources to their best uses.

The panel did not choose current taxation of foreign source income, but rather a complete exemption of active income, and current taxation of passive income including royalties. This latter provision would eliminate the ability of companies to shift income abroad through the use of royalties. This option suggests the panel wanted to focus more on the international abuses and reduction of planning costs, as this treatment eliminates the repatriation decision and reduces the opportunity to shift income through royalties. The panel argues their plan on the basis of conforming to what most other countries do and also invokes the "level-playing-field" argument discussed above. They also suggest that the tax shelter problem is more severe than the real allocation of capital. But the plan can be criticized as not only increasing real asset allocation

distortions but also giving up the opportunity to reduce transfer pricing and expense allocation methods of shifting profits to low-tax jurisdictions.[22]

For the consumption tax plan, since the tax is no longer a corporate income tax, all of these mechanics would be abandoned. Two approaches that are generally equivalent for a uniform tax (and this tax is relatively uniform) are an origin basis tax (where output is taxed where produced) and a destination basis tax (where output is taxed where consumed). In the destination approach, as used in the VAT, taxes would be rebated on exports and imposed on imports. The panel recommends a destination basis because it eliminates the incentive to shift taxable sales into low-tax countries.

Other Tax Incentives

The tax reform proposal eliminates a series of tax preferences, some of which are discussed in the document and some of which are simply presumed to be eliminated based on general statements. An analysis of this myriad of tax incentives is beyond the scope of this report, although it is possible to argue that many of them tend to distort the allocation of resources and many are simply accidents of history.[23] Some provisions, however, are substitutes for what might be desirable spending programs that are channeled through the tax system, and repealing them without providing an alternative spending program may be questioned.

An example is the low-income-housing credit, for which a case may be made that use of the tax system is inefficient, but where the goal (helping low-income people obtain decent housing) may be laudable. Another example is the education tax credit and deduction, which was aimed at making higher education more affordable for the middle class and was phased out at higher incomes. The tuition credits and deductions were criticized because a direct system for delivering aid was already in place, and using the tax system simply made the system more complicated. One can also debate the desirability of expanding aid to middle class, given the extensive subsidies that already exist, but that is a debate about education, not tax, policy. It is the case, however, that the proposal retained the subsidies for saving for higher education through the "Save for Family" accounts, subsidies that are likely to be more concentrated to higher-income families who can afford to save for a long period of time.

As noted above, many of the provisions in current law affect the allocation of capital investment, and the major ones are incorporated in the analysis of capital income taxes. There are certain consumption items that are favored in a significant way by the current tax law, and these will be discussed briefly in this section. Perhaps the most significant, in terms of lost dollars of revenue, is the current benefits for health care, and specifically for health insurance. Also discussed is the subsidy for charitable giving and the effect on state and local governments (due to the deductibility of state and local taxes and the exclusion of interest on tax exempt bonds). The panel's proposal would make changes in all of these areas. Although a full analysis of these issues is beyond the scope of this report, some brief discussion is provided.

[22] For a recent study which compares these systems, with a discussion of these profit-shifting issues, see Harry Grubert and Rosanne Altshuler, "Corporate Taxes in the World Economy: Reforming the Taxation of Cross Border Income," presented at the James A. Baker III Institute for Public Policy Conference, "Is It Time for Fundamental Tax Reform?: The Known, Unknown, and Unknowable," Houston, TX, April 27-28, 2006.

[23] For a brief discussion of each of the more than 100 tax expenditures, see U.S. Congress, Senate Committee on the Budget, *Tax Expenditures: Compilation of Background materials on Individual Provisions*, Prepared by the Congressional Research Service, S. Prt. 108-54, December 2004.

Health Care

Some of the largest subsidies in the tax code accrue to health care, with forgone revenues of $90.4 billion in FY2006 for the exclusion of health insurance benefits from employees' income. There is also a $3.8 billion loss for exclusion of health insurance for the self-employed. Some part of spending for cafeteria plans, where employees choose benefits, is associated with health care; these plans result in a revenue loss of $27.9 billion. In addition to these benefits for private health insurance, $7.5 billion is lost in itemized deductions for major health costs (those over 7.5% of income). There are also some losses due to exclusion of employee benefits and Medicare benefits, the latter being relatively costly.

There are reasons for government intervention into the health care market, which is subject to adverse selection (differential premiums for people with poor health histories) and moral hazard (encouraging too much spending on health care due to insurance). In addition, our society does not wish to deny critical medical care to people due to lack of ability to pay.

The revisions in the panel's plan may reduce some of the problems but possibly aggravate others. The exclusion of insurance for employer plans (and the self-employed) can be criticized on the grounds that it adds to moral hazard (by encouraging coverage of ordinary medical expenses) and is unfair because it does not benefit employees of firms without plans. At the same time, employer plans, by pooling individuals in the workplace, can address adverse selection. The proposal to limit employer contribution deductions (it is not practical to tax this implicit income to employees) might reduce moral hazard without interfering with the benefits of offsetting adverse selection, and thus may be considered an efficient reform. Allowing a deduction for health insurance premiums to those not covered by employer plans has both desirable effects—it would be more equitable and would improve coverage—and undesirable effects—it would increase moral hazard and could undermine the employer system with its improvement of adverse selection. In addition to including health-related fringe benefits, the plan would eliminate the extraordinary medical expense deduction, a provision that allowed relief for families with significant medical costs and one which might be difficult to dispense with.

Charitable Contributions

The panel's proposals would restrict the current deduction for charitable contributions to amounts over a floor equal to 1% of income, and would also extend the benefits to all taxpayers, not just itemizers. The proposal would also permit individuals to sell assets and donate the cash to charity without paying a capital gains tax if the cash is donated within a short time frame, a provision that would eliminate the tax benefits of donating property directly.

Charitable contributions are subject to a market failure in that, assuming individuals benefit from the goods financed by charitable contributions, individuals can "free-ride" on others' contribution. Because of this "free-ride," people count on others to fund charities and do not give enough in the aggregate. Thus there is a justification for a subsidy. The tax benefit is potentially subject to abuse as people attempt to gain private benefits, overstate their deductions, and exaggerate values of property donated. Even for taxpayers who are intending to be honest, valuation of property is often difficult. This problem would be reduced to some extent by the provision allowing the property to be sold and then donated.

The 1% floor would contribute to target efficiency, which focuses on how much charitable contributions are increased for each dollar of revenue loss. Target efficiency is often referred to as "bang for the buck." The floor would also achieve administrative simplicity by disallowing small deductions. Among itemizers, it would reduce the overall incentives for giving (for those with

contributions under the threshold). According to calculations using the public use statistics of income file, about 63% of itemizing contributors gave over 1% of income.[24] These contributors accounted for 95% of giving, with 18% under the floor and 77% above the floor. These numbers suggest for itemizers that the floor will create a more target efficient system without doing much to reduce giving, since 78% of the revenue gain from the floor is associated with the loss deductions by those already over the threshold who will retain an incentive to give at the margin.

The extension of the deduction to non-itemizers may offset the reduction in coverage and also will be more efficient than a deduction without a floor. Thus, overall this change is likely to lead to a more effective incentive for charitable giving.

State and Local Tax Deductions; Tax Exempt Bonds

The proposal eliminates the existing deductions for state and local taxes, which include income, property, and, as a temporary alternative to income tax deductions, sales tax deductions. The property tax deduction can be considered as part of the general beneficial treatment to owner-occupied housing, as well. But, in general, the argument against deducting state and local taxes is that these taxes pay for state and local goods and services that are not taxed to the recipients; hence the deduction encourages more expenditure on these goods. Of course, there is no close relationship between taxes and services as there is for private spending or even fees (such as those for national parks), so this argument is not entirely straightforward. The deduction also encourages the use of deductible taxes (income and property, and, temporarily, general sales taxes); some consider this effect to be an inappropriate interference in choice, but others may support the encouragement to use more progressive taxes, especially the income tax. Another argument for allowing a deduction is that these taxes are not voluntary and reduce ability to pay, although the deduction can also be criticized as favoring taxpayers in high-tax states. Whether the deduction for state and local taxes is desirable or undesirable, therefore, is difficult to determine.

Another major subsidy in the tax system is the exemption of interest on state and local bonds. On theoretical grounds, this benefit is questionable because there seems no particular reason to favor spending on investment goods (which generally are the purposes of these bonds). In addition, some of the subsidies go to investments which are not really public goods through localities financing (for example) sports stadiums and convention centers, or through the use of private activity bonds which are permitted to benefit private investors with restrictions on the purposes and amounts. Although there is no explicit elimination of the subsidy, the expansion of tax-favored savings accounts in both plans will, however, diminish the tax benefit.

Transition Issues

In any major tax revision, transition issues become difficult. In the case of the income tax plan (SIT), these transition issues are likely to be most problematic for moderately high- and higher-income homeowners who have purchased homes with values high relative to income, and will lose part of the value of their mortgage deductions and their deduction for property taxes.

The transition problems are much more severe for the consumption tax proposal and, indeed, may be severe enough to make adoption of such a proposal impossible. In shifting from an income to a consumption base, businesses would normally lose all of their recovery of costs of existing assets, including depreciation deductions, basis in the sales of assets, and costs of goods sold when selling items in (or produced from) inventory or intermediate purchases.

[24] These estimates were provided by Maxim Shvedov of CRS based on the Statistics of Income public use file.

A consumption tax is, as noted above, equivalent to a wage tax and a lump sum tax on capital income. Under a consumption tax without transition rules, the value of assets falls because the full value of the asset will be taxed upon sale. Also, because the consumption tax does not include financial assets in its base but does not require a price accommodation (as might be the case for a VAT or a retail sales tax), that lump sum tax on old assets falls on the equity share of capital. It should also be reflected in stock market share values, where, absent adjustment costs, the imposition of a 30% consumption tax should be expected, given that about one third of assets is debt financed, resulting in a theoretically predicted fall in asset value of 45% (20%/(2/3)).[25] Taxpayers with heavily debt-financed assets not only would be unable to deduct interest costs, as well as depreciation or costs of goods sold, but also could suffer a significant burden if they wish to sell their business or major asset, with the tax due on sale exceeding their cash proceeds.[26] Examples of taxpayers who might be adversely affected are individuals with substantial inventory going out of business (and unable to deduct the cost of their goods sold) or individuals who own and wish to sell a single piece of property, such as a building.

These effects are adjustment costs, and can be reduced by transition rules, but transition rules for recovery of depreciation or inventory costs would be extremely expensive. This lump sum effect would be offset in part if depreciation deductions and recovery of old inventory costs were still allowed. However, without adjustment costs, assets would still lose about half of their value because the present value of depreciation deductions is less than the current value of the property.[27]

The panel's transition rules are quite limited. There would be a four-year phaseout of depreciation deductions and interest deductions—80% in the first year, 60% in the second, 40% in the third, and 20% in the fourth. (Interest would be taxed in the same proportions.) No other transitions are allowed, and sale of an asset would terminate depreciation transitional rules and new financial contracts would terminate interest deduction allowances.

Based on this transition rule, a taxpayer with a new nonresidential building purchased before the tax was imposed would lose approximately 95% of scheduled deductions on buildings, about 65% of deductions for equipment (for a typical seven year asset), and all of the deductions for existing inventory (either goods for sale or goods in process). The loss would be smaller in present value for the buildings and, to some extent, for equipment, and smaller for older assets. But inventories would bear virtually the full loss, and the loss is substantial. "Current inventories" for the fourth quarter of 2004 were $1.7 trillion, thus, providing any sort of partial relief would be extremely costly, as most inventories are turned over very quickly.

Taxpayers with outstanding debt would also lose a significant fraction of interest deductions unless they can refinance. Not all bonds can be called. According to bondmarket.com, out of $207.7 billion of corporate bonds with maturities of over a year, over half, or $121.7 billion, are not callable.[28] The average maturity of bonds is approximately seven years.[29] For a seven-year bond paying a coupon, taxpayers would lose 71% of interest deductions. The loss would be greater for longer maturities: 80% for a 10-year bond, 90% for 20-year bond, and 93% for a 30-year bond.

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[25] These effects are smaller in the short run, if there are adjustment costs.

[26] See CRS Report RL32603, *The Flat Tax, Value-Added Tax, and National Retail Sales Tax: Overview of the Issues*, by Jane G. Gravelle, for a further discussion.

[27] See Leonard Burman, Jane Gravelle, and Jeff Rohaly, *Towards a More Consistent Distributional Analysis*, forthcoming in the Proceedings of the National Tax Association, 2005 Conference.

[28] See http://www.bondmarkets.com/story.asp?id=2234.

[29] See http://www.bondmarkets.com/story.asp?id=2235.

Presumably all depreciation would be lost when an asset is sold and presumably the basis of the asset would not be recovered (all proceeds taxed). Thus all depreciation would be lost for these assets.

These transition problems impose a very significant barrier to the possibility of adopting a consumption tax.

Conclusion

Of the two proposals presented by the panel, the income tax revision may be more likely to have any chance of ultimate adoption. The consumption tax has gains in efficiency (through the allocation of capital), possibly some gains in growth (although the analysis in this report suggests these effects may be modest), and some significant gains in simplicity, especially for business, that exceed those of the income tax proposal. However, the analysis presented in the last section suggests that the progressive consumption tax proposed by the panel would be very difficult to implement. Moreover, the consumption tax is likely, when appropriate distributional analysis is considered, to significantly reduce the progressivity of the federal tax system.

These observations suggest a focus on the income tax proposal (SIT). There are some important simplifications in the SIT, especially for businesses and high-income individuals, although lower-income taxpayers may find their affairs more complicated. In translating the income tax plan to a more detailed proposal that deals with small, but important, deductions, however, some of these simplification gains may be lost. The SIT faces revenue sufficiency problems that will require some taxes to be increased in the future, and is probably not entirely distributionally neutral, but shifts some of the burden away from high-income taxpayers. There are efficiency gains in a number of areas, although probably little effect on growth, and the change to international tax may increase inefficiency and even exacerbate tax sheltering. There are also some transition problems, but they are small compared to the consumption proposal.

Whether the gains from the changes under the SIT are worth the costs is unclear. Historically, it has been difficult to make major changes to the tax code because of the disruption in taxpayers' affairs. Nevertheless, there are some limited aspects of the proposals that do seem to have many advantages and few drawbacks. The proposal for a floor on charitable deductions has a salutary effect on both target efficiency and tax administration and simplification. Removing barriers to automatic enrollment in employer retirement plans is, as well, a proposal that is likely to facilitate savings. A ceiling on deductions by employers in health insurance plans appears to preserve the benefits of reduced adverse selection in health insurance markets while reducing both moral hazard effects and differential treatment of taxpayers. It may be that the greatest contribution of the panel study is to identify some possibilities for more limited reforms.

Appendix A. Calculating Effective Capital Income Tax Rates

The tax rates in this paper are calculated by first determining, given a required after-tax return and an expected rate of decline in productivity of the asset due to depreciation, how much the investment must initially produce in order for the sum of profits after tax over time, discounted by the after-tax return, to equal the individual investment outlay (i.e., to break even). Then all of the tax payments and deduction are eliminated and the before profit flows are used to determine what pre-tax discount rate would sum the flows to original cost. The effective tax rate is the pre-tax rate of return minus the after-tax rate of return, divided by the pre-tax rate.

Discounting means dividing each flow by a discount factor; for a flow earned a year from now, the discount factor is $(1+r)$, for a flow earned two years from now $(1+r)^2$, for a flow three years from now $(1+r)^3$, where r is the discount rate. In practice, however, the analysis uses a continuous time method with continuous compounding. The formula derived from this method is

(1) $r = (R+d)(1-uz)/(1-u) - d$

where r is the pre-tax return, R is the after-tax discount rate of the corporation, d is the economic depreciation rate, u is the statutory tax rate, and z is the present value of depreciation deductions (discounted at $R+\pi$, where π is the inflation rate). The effective tax rate for equity at the firm level is $(r-R)/r$. When including individual level taxes and debt finance, the tax rate is measured by determining r as above, where $R = f(i(1-u)-\pi)+(1-f)E$, where f is the share debt financed, I is the nominal interest rate, and E is the real return to equity before individual tax but after corporate tax. E is equal to D + g, where D is the dividend rate and g is the growth rate. The after-tax real return $R*$, is $f(i(1-t)-\pi)+(1-f)(D(1-t)+g(1-c))$, where t is the effective individual tax rate and c is the effective capital gains tax rate. The total tax rate is $(r-R*)/r$.

For a more complete description of the methodology and data sources, including useful lives for depreciation purposes, formulas for measuring z, and the allocation of assets in the economy, see Jane G. Gravelle, *The Economic Effects of Taxing Capital Income*, Cambridge, MA, MIT Press, 1994.

For purposes of this analysis, the following assumptions were made: the interest rate is 7.5%, the inflation is 2%, and the real return to equity before individual taxes is 7% , with a 4% return (or 57% of real profits) paid as dividends. The corporate rate is 35%, the average individual marginal tax rate on investment income is 23% (data consistent with calculations in the National Bureau of Economic Research TAXSIM model). Statutory tax rates on dividends and capital gains are 15% under current law and under the consumption alterative; taxes on gains are half the rates on dividends to reflect exclusion and deferral at death. Under the income tax reform, 50% of capital gains is excluded to reflect deferral and exclusion at death, and 75% of the remainder is excluded because of the exemption rule, with the remainder taxed at 23%.

Within businesses, the following asset shares apply: 62.2% in corporations, 5.3% in large non-corporate firms, 2.7% in medium non-corporate firms, and the remainder in small non-corporate firms. Owner-occupied housing is 40% of total assets.

Appendix B. Discussion of the Macroeconomic Analysis of the Tax Reform Plans by the Treasury Department

The model that yields the smallest results in the dynamic analysis is the Solow model, where labor supply is fixed, but savings is responsive to changes in the rate of return. The savings response is based on a direct estimate of the savings elasticity from time series evidence. Most evidence of labor supply is consistent with a relatively unresponsive supply. This evidence reflects the historical stability of participation and hours by prime-age men, cross section studies of labor supply, and studies using contrived or natural experiments. Similarly, times series estimates of saving tend to suggest a small response that is not surprising given the relative constancy of the savings rate over time as well as the constancy of the capital output ratio, despite significant changes in tax rates. These estimates may be positive or negative but are close to zero, and the 0.4 elasticity estimate used in that model is about at the upper range of estimates of savings supply response from time series studies.[30]

Although it is possible to construct an intertemporal model with a fixed labor supply, a standard labor supply response is included in the two intertemporal models; however, that standard response is only part of the effect that labor has in the model. In addition to a potential permanent decrease or increase in the labor supply due to within-period choices of leisure and consumption, there can be an intertemporal shift. Indeed, this intertemporal shift in labor can play a major role in the short-run response to a tax cut in capital income, as occurs in a shift to consumption taxes. This effect comes about because of the desire to shift leisure from the present to the future, so that the agent works more today, saves that income, and works less in the future. In addition to these labor supply effects, there is the normal savings response that would occur even in models with fixed labor supply, a savings response that depends on the rate of return. This savings response tends to have a very small effect on output in the short run, but can be significant in the long run.

There are several issues surrounding the use of these intertemporal models to project the effects of tax changes. These issues are also discussed in considerable detail in a CRS report on dynamic revenue estimating.[31] However, three questions may be raised about these intertemporal models.

The first question is how realistic such models are as a way of depicting how people actually behave. These models are attractive to economists because they rest on the basic micro-foundations of consumer behavior. Nevertheless, the Ramsey model originated as a planning model rather than a description of how people actually behave and can only be considered as a representation of economy-wide behavior if strict assumptions are met. Since the model treats society as an infinitely lived person, it requires asexual reproduction if dynasties are to be represented as an infinitely lived person. And, in order to avoid reaching a "corner solution" where all capital is owned by one group, it requires completely homogeneous tastes (i.e., all individuals have the same preferences for present and future consumption), and common marginal tax rates. Thus, the model cannot be used if there are differential marginal tax rates

[30] For a survey of evidence on labor supply see CRS Report RL31949, *Issues in Dynamic Revenue Estimating*, by Jane G. Gravelle, cited above. For a brief survey on the savings evidence, see Jane G. Gravelle, *The Economics of Taxing Capital Income*, Cambridge: MIT Press, 1994. Further discussion of the historical evidence and savings response can be found in CRS Report RL32517, *Distributional Effects of Taxes on Corporate Profits, Investment Income, and Estates*, by Jane G. Gravelle.

[31] CRS Report RL31949, *Issues in Dynamic Revenue Estimating*, by Jane G. Gravelle.

either through progressivity in tax rates, or differential tax rates across states of the United States, or differential rates across countries.

The overlapping generations (OLG) life-cycle model does not suffer from these problems, and a planning horizon of 50 years or more provides significant savings effects. In addition, because income is shifted from the old to the young, savings may increase for that reason as well. Some economists doubt the appropriateness of such a model because of the extreme complexity of the decision the individual is making. The model presumes individuals to make optimal decisions choosing work decisions, savings, and consumption for, typically, around a 55-year adult life. Individuals may not be able to make these decisions because they do not have the knowledge and skills to do so, or even the self control and freedom from procrastination. An alternative model, sometimes referred to as a "bounded rationality" model, suggests that people may make choices based on rules of thumb, and the most common rules of thumb, a fixed fraction of income saved, or a target retirement fund, imply zero or negative savings elasticities. There is some empirical evidence to support this type of model, and, indeed, evidence on the importance of defaults on savings in retirement plans is a justification for the automatic savings provisions for employer plans included in the panel's report.[32] In addition, the life cycle model is sensitive to many types of assumptions that may be made in an arbitrary fashion, including how retirement occurs, how bequests are left, whether there are precautionary as well as retirement savings, and many other characteristics.

The OLG model can also have outcomes that depend on specific model features. However, the OLG model used by Treasury does avoid one troublesome problem in some other OLG models: it has a fixed retirement age. That feature means that an effect common in an OLG model with endogenous retirement, older people returning to work in significant numbers due to the lump sum tax on older people's assets under a consumption tax, a phenomenon that seems unlikely given the adjustment costs and health issues, does not occur.[33]

The second question is whether the models have been empirically tested, and the basic answer to that question is no. Although relationships are based on certain empirical estimates of substitutions across time, there are no estimates of substitution elasticities across long periods of time. Basically, the models presume that the substitutability across far-apart periods is the same as for close-together periods. In addition, the models often predict very dramatic short-run changes in savings and labor supply that are difficult to reconcile with the stability of these relationships over time.

The third question is how closely the models, given that structure, track those empirical relationships that we can observe, and how those empirical relationships, in turn, drive the model. There are actually four types of empirical relationships to draw on: the substitution effect for the static labor supply response, the income effect for the static response, the intertemporal substitution elasticity for consumption bundles over time, and the intertemporal labor supply elasticity, and these in turn govern the short run labor supply response, the initial savings

[32] See CRS Report RL33482, *Saving Incentives: What May Work, What May Not*, by Thomas L. Hungerford, for a discussion.

[33] That phenomenon causes an OLG with endogenous retirement, such as that presented in Alan Auerbach and Laurence Kotlikoff, *Dynamic Fiscal Policy*, Cambridge, Cambridge University Press, 1987 to have larger effects in the short run than a Ramsey model. For a discussion see Eric Engen, Jane Gravelle, and Kent Smetters, "Dynamic Tax Models: Why They Do the Things They Do" *National Tax Journal*, vol. 50, September 1997, pp. 657-682. In these simulations of a shift from a flat income tax to a flat consumption tax, the OLG model increased labor supply by 3.8% compared to the 2.4% in the Ramsey (infinite horizon) model, even though the time horizon for the Ramsey model is greater.

response, and, ultimately, the long run effect on the capital stock. Both labor supply and consumption can be shifted over time due to changes in expected wages over time or changes in the rate of return.

It is possible to sort out some of these effects, in a rough fashion, to compare them with empirical estimates. Those empirical estimates include the static income and substitution (compensated) elasticities of labor supply with respect to wage changes, the intertemporal substitution elasticity (how consumption shifts across time, with respect to the interest rate), and the intertemporal labor supply elasticity (how labor supply shifts with respect to the wage rate).

The formula for percentage change in labor from a static model is[34]

$$(1)\ \frac{l}{(H+La)}\left[E(1+a)\frac{dt_m}{(1-t_m)}-\frac{dt_a}{(1-t_a)}\right]$$

where l is hours of leisure, H is the time endowment, L is hours of labor, E is the substitution elasticity between leisure and consumption, a is the ratio of non-labor income to labor income, t_m is the marginal tax rate, and t_a is the average tax rate.

In the model, the share of the time endowment in leisure was 0.6 in the Ramsey model and 0.5 in the OLG model, and the elasticities were 0.8 and 0.6 respectively. Given the tax rate changes in the text, this effect suggests a reduction in labor for the SIT of about -0.1% (because of the slight fall in the average tax on labor income, whose income effect causes less work). For the GIT, where the marginal tax rate fell and the average tax rate rose, both income and substitution effects led to a 0.5% increase in the Ramsey model and a 0.4% increase in the OLG. In the full simulations by the Treasury, in the Ramsey model, the labor supply fell in the first 10 years, on average, by 0.1% in the SIT, but rose by 0.3% in the OLG model. These small differences could have arisen because of some small amount of intertemporal shifting and variations in income effects. For the GIT, however, labor supply rose in the first 10 years by 1.3% and 1.2% respectively. Moreover, while labor supply changes over time stayed relatively constant for the SIT (-0.2% and 0.4% in year 20 for the Ramsey and OLG, -0.3% and 0.4% in the long run), they show a significant decline in the GIT. For the Ramsey model, the labor supply increase was 1.3% in the first 10 years, 1% in year 20, and 0.1% in the long run. For the OLG model, the labor supply increase was 1.2% in the first 10 years, 0.7% in year 20, and 0.6% in the long run.

The intertemporal labor supply response also affects saving because the increase in labor is for the purpose of saving to permit more leisure in the future. There was additional savings as well in the GIT simulation, since, even as labor increased, consumption fell.These calculations suggest that, at least in simulating the GIT (and the PCT) that the intertemporal labor supply response is important.

Several empirical measures govern these responses. For labor, the static responses imply a compensated elasticity (which captures the positive effect on wages on labor supply and multiplies the marginal tax rate term in equation (1), with the value of a ranging from zero to 0.2) of 0.48 to 0.53 and an income elasticity of -0.56 to -0.6. For the OLG model the substitution elasticity is 0.3 to 0.33 and the income elasticity is -0.45 to -0.5. The smaller elasticities in the OLG model reflect the lower leisure share (0.6 in the Ramsey model versus 0.5 in the OLG model) and, with respect to the compensated elasticity, because of the smaller intratemporal substitution elasticity (0.8 in the Ramsey model and 0.6 in the OLG model). These elasticities are

[34] This formula is derived in CRS Report RL31949, *Issues in Dynamic Revenue Estimating*, by Jane G. Gravelle, as are the remaining formulas in this appendix.

likely to be high. Based on surveys of the evidence, the Congressional Budget Office chose an uncompensated elasticity of 0.14 and an income elasticity of -0.07, whereas the Joint Tax Committee chose an uncompensated elasticity of 0.18 and an income elasticity of -0.13.[35] The CBO has recently increased their elasticities.[36] Yet, there is more of a justification for reducing them, because it is likely that the response for women has decreased because of greater participation: for participation, as for hours, the greater the labor supply the smaller the elasticity is likely to be. A recent study suggested that elasticities of women's labor supply had decreased by about 50%.[37]

The second type of elasticity that can be compared with empirical evidence is the intertemporal substitution of labor with respect to the wage rate. This elasticity is

$$(2)\ \frac{l}{L}[\alpha\gamma + (1-\alpha)\rho]$$

where α is the share of total consumption spent on leisure, γ is the intertemporal substitution elasticity, and ρ is the intratemporal substitution elasticity between leisure and consumption. Although the elasticities vary, most of the evidence suggests intertemporal labor supply elasticities that are quite small, in the neighborhood of 0.2.[38] The Treasury elasticities are higher than that value. For the Ramsey model, the elasticity is estimated at 0.75, whereas for the OLG model it is estimated at 0.49.[39]

These relatively high labor supply responses, particularly in the Ramsey model, drive a lot of the short-run response in the GIT. One simple way of reducing these elasticities to conform more closely with the empirical evidence, without disturbing other parts of the model, is to reduce the time endowment available for labor. There are some direct reasons to do so as well. For example, in the Ramsey model, assuming 40 hours of work for a full time worker and eight hours to sleep would result in a "leisure" of 64%, not much above the allowance in the Ramsey model. But this

[35] Congressional Budget Office, *How CBO Analyzed the Macroeconomic Effects of the President's Budget*, July 2003, p. 12; John W. Diamond and Pamela Moomau, "Issues in Analyzing the Macroeconomic Effects of Tax Policy, *National Tax Journal*, Vol 56, September 2003, p. 450. See also the discussion of labor supply elasticities in CRS Report RL31949, *Issues in Dynamic Revenue Estimating*, by Jane G. Gravelle.

[36] CBO apparently subsequently increased their labor supply elasticities, but did not report a weighted average and did not provide the data to calculate such an average. See Congressional Budget Office, *Macroeconomic Analysis of a 10% Cut in Income Tax Rates, May 2004.* However, they indicated that they relied on a survey by Frank Russek which reports a substitution elasticity of 0.2 to 0.4 and an income elasticity of -0.2 to -0.1.

[37] Blau, Francine D. and Lawrence M. Khan, "Changes in the Labor Supply Behavior of Married Women: 1980-2000" NBER Working Paper No. 11230 (2005).

[38] See the review in CRS Report RL31949, *Issues in Dynamic Revenue Estimating*, by Jane G. Gravelle. For a recent study that found no labor supply effect for middle income individuals, and was not included in that review, see Adam Looney and Monica Singhal, "The Effect of Anticipated Tax Changes on Intertemporal Labor Supply and the Realization of Taxable Income," Finance and Economics Discussion Series, 2005-44. This study that used the loss of a dependent to identify an expected change in the marginal tax rate and found a change in labor income but not in labor supply (either in participation, or in hours worked by existing participants). The study did find a curious increase in labor income of men, which is not easily explained, although it is possible that there was a shifting of income over time periods or a shift to fringe benefits, or perhaps an increase in work intensity.

[39] In the Ramsey model, since leisure is 60% of total hours, the ratio of leisure to labor is 1.5; in the OLG model it is 50% of total hours and the ratio is 1. The intertemporal substitution elasticity is 0.25 in the Ramsey model and 0.35 in the OLG model, while the intratemporal elasticities are 0.80 and 0.60 respectively. CRS was unable to obtain the estimate of the share of leisure in expenditure on leisure and consumption, but estimated the leisure share assuming that consumption is 95% of output and labor is 75%, at 54% for the Ramsey model (1.5*.75/(.95+1.5*.75) and 44% for the OLG model.

ratio leaves no time to carry on the essential functions of modern life which are really not leisure but simply necessary tasks, such as commuting, personal grooming, eating and preparing food, shopping, and maintenance of home and possessions.[40]

The intertemporal substitution elasticities, of 0.25 in the Ramsey model and 0. 35 in the OLG model, are consistent with the empirical evidence, suggesting the intertemporal elasticity is below 0.5 and that the average is around 0.3.[41]

Note that there are really no studies that capture some of the other relationships directly such as the labor supply response to a change in the rate of return, or responses across long periods of time. It is these far-apart periods that drive much of the models' results because the savings elasticity with respect to the interest rate is multiplied by the time period so that the savings response in the long run is very large. In fact, in the Ramsey model, the long run steady state does not depend on the intertemporal substitution elasticity as the savings elasticity is effectively infinite; it merely determines the adjustment path. In the long run, in both models, it is the increase in the capital stock that largely causes the increase in output.

Another important elasticity in both models for both the short run and the long run is the factor substitution elasticity, which is set at one. Setting this value at one is common in many models. Nevertheless there are some economists who have studied this issue and argue that the elasticity is much lower, around 0.4.[42] These elasticities can make a great deal of difference. In a simulation study, lowering the elasticity from 1.0 to 0.5 caused the output change to fall by 45%.[43]

Based on this survey of models and elasticities, it is unlikely that the GIT would have as pronounced an effect on output, especially in the short run, as depicted in the models.

There is one final issue that makes the effects also likely to be overstated. In these models, private saving is influenced by the timing of taxes. Thus, in a shift to a consumption tax, that fact that taxes are higher in the retirement years as assets are drawn down results in an increase in savings in the short run. The changes in IRAs and 401(k)s, however, are moving in the opposite direction. Traditional IRAs with deductions up front should cause greater private savings because individuals should save their tax cut today to pay taxes on withdrawals in the future. For the Roth style IRA, there is no up-front deduction, and substituting Roth IRAs for traditional IRAs should cause savings to fall.

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[40] See the review in CRS Report RL31949, *Issues in Dynamic Revenue Estimating*, by Jane G. Gravelle.

[41] Ibid.

[42] Ibid.

[43] Eric Engen, Jane Gravelle, and Kent Smetters, "Dynamic Tax Models: Why They Do the Things They Do" *National Tax Journal*, vol. 50, September 1997, pp.657-682.

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