Long Run Tax Rates and Long Run Growth: Macroeconomic Effects of the Aging Baby Boomers and of the Changing Federal Tax System

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Introduction

This paper presents results of a study on the long-run implications for tax rates and the macroeconomy of forecasted demographic trends, and of the long-run interaction between the current-law tax system and the macroeconomy. We find significant effects of these interactions on expected tax rates, federal budgets, and macroeconomic variables; we report long-run simulation results for the year 2035.[2] The study was performed using a microsimulation model that provides forecasts of tax rates and a macroeconomic model that provides short- and long-run forecasts. Both models are calibrated to match Census demographic forecasts, and to match CBO budget assumptions within the ten-year budget horizon; the macroeconomic model is further calibrated to reflect CBO long-run budget projections.

The study was motivated by four questions. First, the aging of the baby-boom generation will cause unprecedented changes in federal spending and transfers.[3] But, what will be the effect of an aging population on revenues and on the macroeconomy? Second, under the current-law tax system, nominal income growth subjects an increasingly larger share of taxpayers to the (unindexed) Alternative Minimum Tax (AMT), doubling as a share of receipts from about one percent in 2006 to two percent in 2016. But, because the top AMT tax rate is lower than the top ordinary tax rate taxpayers with sufficiently high income are not impacted by the AMT. Thus, while nominal income growth tends to push taxpayers toward the AMT, real income growth induces bracket creep in the ordinary tax system, keeping taxpayers off the AMT. Will nominal income growth in the long run be sufficient to make taxpayers too rich for the AMT? Third, nominal and real income growth result in taxpayers facing higher effective tax rates. These higher rates create disincentives to work and invest capital, potentially suppressing growth, and thereby dampening the growth in tax rates. To what extent will revenues grow faster than GDP? Fourth, assuming transfers grow more rapidly than receipts, deficits will grow to unprecedented levels, crowding out private borrowing, pushing up interest rates and potentially suppressing growth. To what extent will likely future deficits affect the macroeconomy? To answer these and other questions, we needed to develop a modeling methodology that resulted in a long-run forecast that is internally consistent between the microsimulation model and the macroeconomic model.

We explore the effects of the aging of the baby-boom generation (with its expected effect on federal transfer programs) by performing a simulation where the total population growth projection is left unchanged, but in which the current age-profile of the population is held constant. The assumed constant age-profile has a substantial effect on the macroeconomy, federal revenues, and transfers. Real GDP would be thirteen percent higher; average tax rates would be roughly five percentage points higher, and real federal transfers would be a fifth lower.

We investigate the extent to which the current-law tax system and macroeconomy is affected by the AMT by simulating its repeal. Our simulations show that repeal of the AMT reduces the income-weighted overall marginal and average tax rates. But repeal of the AMT also lowers real revenues, and thus, because of crowding out, it reduces real GDP. If it were possible to eliminate crowding out by enacting a deficit-neutral decrease in lump-sum, non-valued, non-taxed transfers, then the incentive effects caused by lower tax rates under the regular tax system would increase real GDP.

To identify the macroeconomic effects of the changing effective tax rates under current law, we simulate effective tax rates that are fixed at their current-law 2016 level, thereby holding revenues constant as a share of GDP. Results are broadly similar to repeal of the AMT.

Finally, to examine the effect of increasing budget deficits, we perform simulations in which the deficit share of GDP is held at its 2016 level, either by substantially increasing tax rates, or by substantially decreasing lump-sum transfers. Increasing tax rates decreases real GDP somewhat, despite a higher real capital stock induced by crowding in. Were it possible to hold deficits constant by substantially decreasing lump-sum transfers, the elimination of the disincentive effect of higher tax rates means that real GDP and consumption would be higher, though still not as high as in the simulation where the population does not age.

Related Literature

A number of studies have looked at the long-run implications of the demographic transition on federal transfer programs, though most of these studies are characterized by a fixed macro economy.[4] There are several studies that investigate the effects of the demographic transition in an endogenous macroeconomy, but we do not know of any other study that attempts to simulate this transition taking into account the combined effect of tax rates, transfers, and the macroeconomy.[5]

In addition to the predicted changes in the age structure of the US population, there are significant changes projected to occur for the federal tax system. Burman, Gale, and Rohaly (2003) document the projected changes in the federal tax system resulting from the AMT. While the AMT has a flat rate that is lower than the top ordinary rates, they show that for an increasingly larger portion of taxpayers subject to the AMT, it actually increases their marginal tax rate. Using the Joint Committee on Taxation individual simulation model we also find that repeal of the AMT leads to lower average and marginal rates.

Modeling Strategy

In order to assist in producing the analyses for which they are responsible, the non-partisan staff of the Joint Committee on Taxation (JCT) maintain two types of models. For the purpose of providing conventional revenue estimates, the JCT staff develop a number of microsimulation models, the most significant of which is a model of the individual tax system, which we will refer to as the Joint Tax Individual Model (JIM).[6] And for the purpose of providing analyses of the macroeconomic effects, the JCT staff have developed, or modified, a number of macroeconomic models. For this analysis, we use the Macroeconomic Equilibrium Growth (MEG) model, discussed in detail below.[7] We combine the results of these two models in such a way that they are internally consistent, and can be used to forecast the long-run effect of alternative assumptions and policy simulations on tax rates and on macroeconomic variables.

Individual Model

The individual microsimulation model, JIM, allows us to model the individual tax code in such a way that for each taxpayer in an extrapolated sample, we can compute their tax liability under present law or under a proposed change to that law. This model is extrapolated as follows: It starts with a cross-sectional sample of individual tax returns from a given year (currently 2003). This sample is then augmented by matching the tax return with information returns and age and gender data from the IRS and the Social Security Administration. Current Population Survey data is then added to the data through a statistical match to add additional demographic information as well as to include representative non-filer sample data. This augmented sample is then extrapolated to form a series of cross-sections that represent the tax-filing (and non-filing) population within the ten-year budget horizon. The extrapolation starts by growing income sources at rates that are consistent with the CBO budget forecast. The resulting sequence of cross-sections are then re-weighted in order to hit a selection of target values for certain forecasts of demographic, income, tax liability, and other variables (Joint Committee on Taxation, 2005). The individual tax code is modeled in such a way that for every observation in the sample, tax liability can be computed under current law, or under a proposed change from that law. This means that we can also determine taxpayers' average and marginal effective tax rates on different sources of income.[8] These tax rates are a key input to the macroeconomic models.[9]

Macroeconomic Model

The MEG model is a general equilibrium model that allows for temporary disequilibria via an adjustment mechanism. It has capital sectors for housing and all other business, along with a roughly modeled rest of world international sector (see Joint Committee on Taxation , 2003). It has representative agents who differ in their responsiveness to tax rate changes (representing the differing responses of primary and secondary workers, both lower and higher income). These agents are myopic--they assume that the world tomorrow will look just like the world today. While this certainly understates people's forecasting abilities, myopic expectations allow this model to compute solutions, even in a fiscally unstable environment.[10] By contrast, models in which agents have a great deal of foresight, such as rational expectations models, need to converge to a sustainable steady-state in order to compute solutions. If agents foresee that a long-run policy is unsustainable, then they cannot formulate decision rules, and it is impossible to compute a solution.

Given the tax rate forecast from JIM, we calibrate MEG to be consistent with census long-range demographic assumptions, as well as with CBO's budget assumptions within the budget horizon, and with CBO's long-run assumptions about the growth of transfer programs (U.S. Census, 2004; and Congressional Budget Office, 2005 and 2006). The next section explains how we combine JIM and MEG.

Combining Models to Produce Consistent Long-run Forecasts

Since MEG was designed to provide long-run forecasts, while JIM was designed to be used for conventional revenue estimates within the budget horizon, we developed a methodology for extrapolating JIM to the same long-run horizon as MEG.[11] The extrapolation requires re-weighting to hit a demographic forecast, and it requires a macroeconomic forecast to grow sources of income and deductions.[12] Since the macroeconomic forecast will depend recursively on the tax rate forecast implied by JIM, it was clear that we would need to iterate back and forth between the models until they converged. The starting point for such an iterative process is arbitrary; but a reasonable starting point is to extrapolate JIM using the macroeconomic growth rates contained in the "middle" projections from the CBO long-run forecast. The resulting tax rates are fed into MEG; the resulting macro forecast is fed back into JIM; and we continue in this manner until both the tax rates and the macroeconomic forecast change insignificantly between one iteration and the next.

The changes in tax rates and macroeconomic variables that result from iteratively converging between the models are economically significant, as can be seen in tables 1 and 2. For instance, the average tax rate on wages changes by nearly a half a percentage point, as can be seen by comparing columns 3 and 4 of table 1. And real GDP changes by 0.3 percent, as can be seen in column 1 of table 2. These effects on tax rates and the macroeconomy are comparable with the effects of some of the policy changes discussed later in the paper.

Tax and Fiscal Policy under the Converged Forecast

The forecast for tax rates both within the budget horizon and in the long run is characterized by increasing average and marginal tax rates. Tax rates within the budget horizon are shown in the first two columns of table 1. As a result of income growth and the expiration of the 2001 and 2003 tax cuts, the average and marginal tax rate on wages are forecasted to increase 34 percent and 16 percent, respectively. Not surprisingly, the largest increase is forecasted to be for dividend income, with an average tax rate increase of 62 percent, because of the expiration of preferential rates on this income source. In the long run, nominal and real income growth push effective tax rates higher, as can be seen in column 4 of table 1, which shows tax rates in the converged forecast. For example, the average tax rate on all individual income increases by four percentage points from its level of 17.0 percent in 2016 to its level of 21.1 percent in 2035. Marginal rates are also increasing; the marginal income tax rate on wages increases by 3.5 percentage points from its level of 27.8 percent in 2016 to its level of 31.3 percent in 2035.

The tax policy implied by the converged forecast is summarized in chart 1, which shows historical and forecast tax receipts as a share of GDP, by source. Historically, the receipts share of GDP from 1950 through 2005 has averaged about 18 percent of GDP, plus or minus a standard deviation of about one percent of GDP. In part, this narrow range is accounted for by the fact that whenever the receipts share has moved above this range, subsequent tax legislation has brought the share back down. In the long run, we forecast that this will rise to 23 percent of GDP, under current law. We cannot know whether such a rise is politically tenable, but to explore its macroeconomic implications, we will later discuss simulations where it does not occur, because the tax system is assumed to maintain its 2016 rate structure.

One of the significant sources of increase in the share of federal revenues can be seen by comparing the top line in chart 1 with the next line down; the difference between these two lines is the share of revenues owing to the Alternative Minimum Tax (AMT). To explore the impact of the AMT on our forecast, we will later discuss simulations under which it is repealed.

The combination of tax policy implied by current law and assumed growth in spending associated with transfer programs results in a shift in fiscal policy from deficits that are small as a share of GDP, one percent in 2016, to deficits that are large and growing as a share of GDP, ten percent in 2035. By comparison, the deficit share from 1950 through 2005 averaged 1.8 percent plus or minus a standard deviation of 1.9, with the largest deficit share being 6 percent in 1983. In part, this range of the deficit share of GDP owes to policy changes, either raising taxes or reducing spending. We cannot know whether our current-law forecast is consistent with likely policy changes.[13] To explore the consequences of bringing the deficit share back to its 2016 level, we simulate policies where the deficit share is held constant either by an increase in tax rates or a lump-sum change to taxes or transfers.

Before turning to these simulations of alternative tax policies, note that the increase in the deficit share occurs despite a current-law increase in the receipts share of GDP. The aging of the baby boomers and the associated increases in transfers more than offsets the forecasted increases in receipts. Thus, before turning to discussion of the effects of alternative tax policies, it is useful to first discuss the effect of assumed demographic trends.

Effect of Demographic Trends

To explore how the demographic changes associated with the aging of the baby boomers affects long-run tax rates and the long-run macroeconomy, we simulated both JIM and MEG under the assumption that those changes would not occur. Specifically, we assumed that the size of the population would be the same as the Census forecast, but that the age-profile would be held constant at the 2016 age-distribution. The effect on tax rates is shown in the final two columns of table 1. Comparing the constant demographic simulation with the converged results suggests that the aging U.S. population will result in lower average and marginal tax rates on all sources of income, except capital gains (which receive preferential treatment under current law).[14] As the baby boom population ages they will earn less income and subsequently pay less in taxes.

The significant effects on macroeconomic and budgetary variables are shown in the final column of table 2. Since MEG's projections of the growth rate of Social Security and of Medicare depend explicitly on the size of the retiree population, holding the age-profile constant results in significantly decreased transfer payments, which decline by 22 percent. Further, higher effective tax rates, plus an increased level of economic activity, push revenues higher by nearly a fifth. As higher taxes combine with decreased transfers, the federal budget turns from a large deficit to a small surplus, pushing interest rates down and prompting a large, 25 percent increase in the capital stock. The combination of a higher capital stock with a greater portion of the population that is working pushes aggregate real wages and real GDP higher, despite the disincentive posed by the fact that tax rates are pushed up by higher real incomes.

Effect of Long-Run Policy Assumptions

As discussed above, the trends of tax and fiscal policy under current law suggest several tax policy simulations that are of interest, the results of which are shown in tables 4 and 5. The first policy simulation is to keep effective marginal and average tax rates at their 2016 levels. The second policy simulation is to repeal the AMT. And finally the third policy simulation is to implement an across the board tax rate increase in 2017 and thereafter to maintain the deficit at 2016 levels.[15] In addition, to isolate the effects the policy change from the effect of crowding-out or crowding-in, we simulate variations in which the policy is made deficit neutral via lump-sum changes to non-valued, non-taxed federal transfers.

The first simulation keeps tax rates constant at their 2016 levels, which implies a roughly constant receipts share of GDP. Because the rates and or brackets would have to change each year, the implicit underlying legislation would be non-trivial to enact. The policy would bring the overall average tax rate in 2035 down by about a fifth--just over four percentage points--while decreasing marginal tax rates by slightly less (in percentage point terms), owing to the progressive structure of the income tax. Despite a significant decrease in tax rates, macroeconomic activity is suppressed because lower tax rates result in crowding out, with a resulting two percentage point increase in interest rates. If lump-sum tax changes could be implemented to fully offset the change in the surplus share of GDP, then aggregate economic activity would increase somewhat.

The second policy simulation investigates the economic impacts of the current law AMT by comparing current law with the repeal of the AMT after 2016. Our forecast inside the budget horizon, using JIM, is that the AMT in 2006 will affect 4 million taxpayers and result in a collection of $21.5 billion (one percent of receipts); and in 2016 will affect 32 million taxpayers and collect $89 billion (two percent of receipts). Using the combined, converged forecasts from JIM and MEG, we forecast that by 2035 the AMT will represent roughly 16 percent of the federal individual income tax receipts.

Some have proposed that the AMT should be repealed, while others have argued that the AMT is an implicit tax reform, arguing that it has a broader base and lower rates (Graetz, 1997). On the contrary, we find that relative to current law, the repeal of AMT decreases tax rates. In part, this is because despite the fact that the AMT statutory rates are 26 and 28 percent, the phase-out of the AMT exemption pushes effective rates higher. Even taxpayers who do not pay any AMT liability under current law are still affected by the AMT. This surprising result can occur because the AMT disallows the standard deduction, while continuing to allow some itemized deductions. Thus, even if a taxpayer's itemized deductions are smaller than their standard deduction, their AMT liability may be lower if they claim the itemized deductions. Moreover, some taxpayers who are subject to the 15-percent ordinary rate have AMT liability, resulting in an increase in marginal rates. Repeal of the AMT decreases tax rates somewhat less than keeping tax rates constant at their 2016 levels, so the macroeconomic effects are roughly the same, but somewhat muted.

The third policy that we consider is one in which the deficit share is held constant at its 2016 level, roughly one percent of GDP (somewhat below its post-WWII average). If tax rates are increased across the board to achieve this, they would have to be increased by roughly 46 percent relative to current law. Not surprisingly, this suppresses macroeconomic aggregates. Offsetting the decline in economic activity, the markedly decreased need for the federal government to borrow decreases interest rates by about two percentage points. This significantly offsets the disincentives posed by higher tax rates, increasing real capital and thereby the capital labor ratio. The extent of the disincentive effects can be seen by comparing this with the final column of table 6, in which it is assumed that the same budget effect can be achieved with lump-sum tax changes, and in which real GDP moves up by about four percentage points (from a .4 percentage point decline to a 3.7 percentage point increase).

Conclusion

This paper presents result of the combined effects on tax rates and the macroeconomy of projected changes to the age composition of the US population and projected interactions between the federal tax system and the macroeconomy over the next thirty years. We show that it is important to use internally consistent tax models and macroeconomic models: The effect of convergence between the two models is similar in magnitude to the changes in real GDP resulting from the modeling of alternative policy simulations. We find that the aging composition of the U.S. population reduces economic activity and reduces the overall effective average and marginal tax rates. We find that the incentive effects of the AMT reduce growth, because of higher effective average and marginal tax rates, but that this is more than offset by the fact that the AMT pushes revenues higher, reducing crowding out, and thus leading to higher growth. We find similar effects for holding the tax system constant at its 2016 level. Finally, we find that increasing tax rates sufficiently to hold the deficit constant at its 2016 level would decrease long run growth, despite crowding in.

Table 1, Tax Rates by Year

	Tax Rates Under Given Assumed Macroeconomic or Demographic Forecast				
	CBO Inside-Horizon Forecast		CBO Long Run Out-side Hori-zon	Con-verged JIM and MEG	Con-verged Constant Demo-graphic
	2007	2016	Long Run (2035)		
	Average Income Tax Rates by Source (Percent)				
All Individual Income	12.7	17.0	20.9	21.1	22.1
Wages	11.7	15.7	20.0	20.4	21.4
Business Income	22.4	29.4	32.5	32.4	33.0
Gains	12.3	15.7	15.7	15.7	15.7
Dividends	11.6	18.8	21.7	21.8	22.7
	Marginal Income Tax Rates by Source (Percent)				
Wages	23.9	27.8	31.2	31.3	31.8
Business Income	25.3	30.0	31.7	31.7	32.2
Gains	16.2	20.4	20.5	20.5	20.5
Dividends	16.1	28.7	31.0	31.0	31.9

Table 2, Change in Macroeconomic Variables Owing to Differing Extrapolation Assumptions

	Converged Macro vs CBO Long Run	Converged Constant Demographic vs Converged Macro
	Long Run (2035)	
	Percent Change	
GDP Deflator	-0.4	-4.1
Real GDP	0.3	13.2
Real Aggregate Wages	0.5	15.8
Real Capital	1.2	24.9
Real Consumption	-0.1	5.5
Private sector employment	0.0	8.2
Total Real Revenue	3.2	19.9
Real Transfer Payments	0.3	-22.4
	Level Change in Percentage Points	
Long-Term Interest Rate	-0.4	-4.6
Surplus Share of GDP	1.5	12.0
Revenue Share of GDP	0.6	1.3

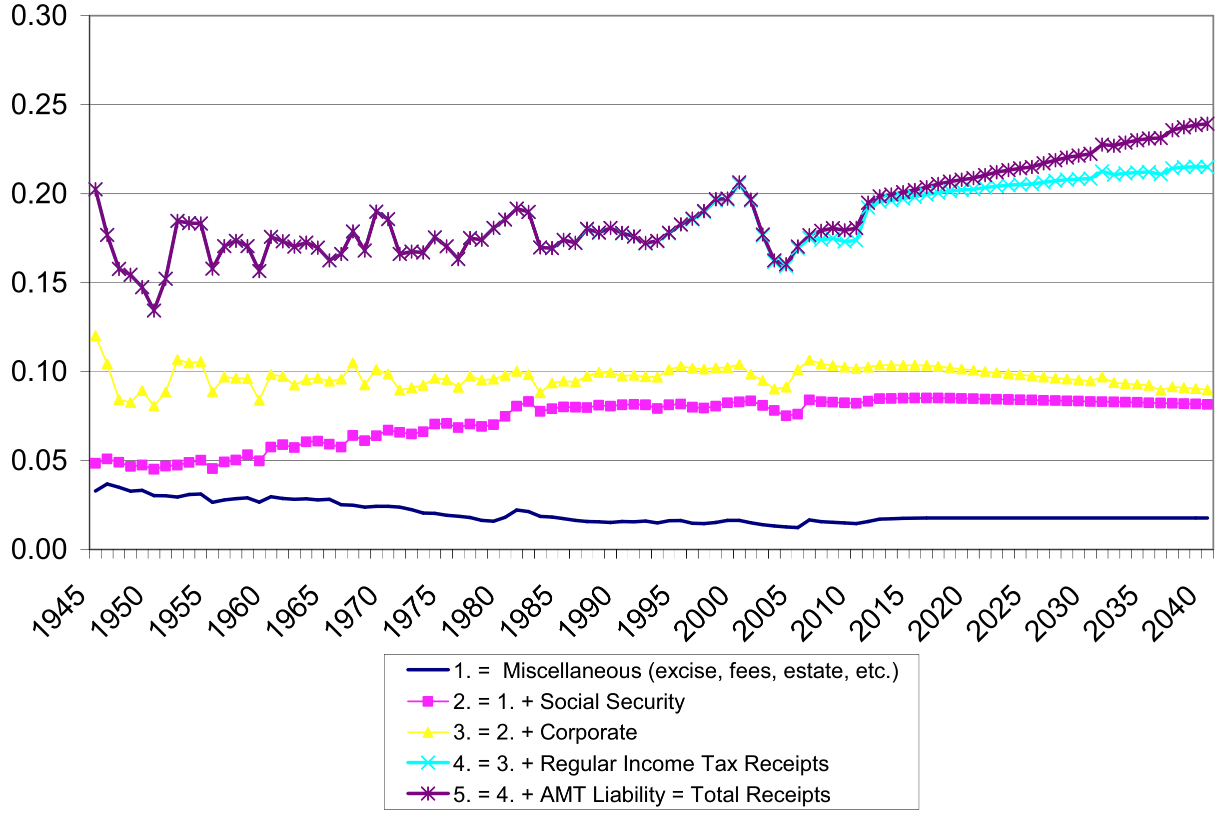
Table 3, Tax Rates in 2035 under each Policy Sensitivity Assumption

	Converged JIM and MEG Current Law	Constant 2016 Effective Rates	Repeal AMT after 2016	Increase Rates to Keep Constant 2016 Deficit Share
	Long Run Tax Rates (2035)			
	Average Income Tax Rate by Source (Percent)			
All Income	21.1	17.0	18.2	30.7
Wages	20.4	15.7	17.0	29.7
Business Income	32.4	29.4	31.1	47.2
Gains	15.7	15.7	15.5	22.9
Dividends	21.8	18.8	19.7	31.7
	Marginal Income Tax Rate by Source (Percent)			
Wages	31.3	27.8	29.4	45.0
Business Income	31.7	30.0	31.2	46.5
Gains	20.5	20.4	20.2	27.7
Dividends	31.0	28.7	30.6	45.0

Table 4, Macroeconomic Changes under each Policy Sensitivity Assumption

	Change from Converged Current Law					
	Long Run, 2035					
	Constant 2016 Effective Rates	Constant 2016 Effective Rates, Deficit-Neutral	Repeal AMT after 2016	Repeal AMT after 2016, Deficit Neutral	Increase Rates to Keep Constant 2016 Deficit Share	Lump-Sum Change to Keep Constant 2016 Deficit Share
	Percent change					
GDP Deflator	1.8	-0.7	1.4	-0.5	-1.7	-3.2
Real GDP	-0.7	1.5	-0.8	0.9	-0.4	3.7
Real Aggregate Wages	-1.5	2.1	-1.5	1.3	-1.0	5.6
Real Capital	-5.4	1.9	-4.2	1.5	9.1	12.3
Real Consumption	1.3	1.4	0.6	0.9	-5.1	-1.2
Private sector employment	1.1	0.8	0.6	0.5	-1.8	-0.2
Total Real Revenue	-12.6	-10.8	-9.0	-7.6	25.5	3.2
	Level Change in percentage points					
Long-Term Interest Rate	2.0	-0.7	1.5	-0.5	-2.0	-3.7
Surplus Share of GDP	-5.8	0.1	-4.2	0.1	9.1	8.7
Revenue Share of GDP	-2.7	-2.7	-1.8	-1.9	5.8	-0.1

Chart 1, Federal Receipts as a Share of GDP, by Source



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Endnotes

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[1] The views expressed in this paper are strictly our own and do not represent those of the Joint Committee on Taxation or any Member of Congress. We would like to thank Rosanne Altshuler, Tom Barthold, Harry Grubert, Pam Moomau, Susan Yang, and George Zodrow for their helpful comments.

[2] We chose 2035 as "long run", because by then the baby boomers will all be 70 or older, and also because we wanted to be able to provide comparable results for all of the simulations that we consider. Some of the simulations we consider increase long-run deficits sufficiently that the simulations eventually fail to converge in the mid 2040's. Thus, we chose 2035 as sufficiently far into the future that it captures significant demographic and tax-system effects, while still exhibiting stable simulation results for all the variations that we consider.

[3] The share of the population sixty-five and older is forecasted to increase from 12 percent in 2005 to 20 percent in 2035 (U.S. Census Bureau, 2004). Social Security expenditures are forecast to rise from 4.2 percent of GDP in 2005 to 6.2 percent of GDP in 2035, while Medicare and Medicaid expenditures are forecasted to increase from 4.2 percent of GDP to 10.1 percent of GDP over the same period (intermediate projection from Congressional Budget Office, 2005).

[4] See Lee and Anderson (2003) for a general discussion of the causes of the demographic transition and the some of their implications. Congressional Budget Office (2005) analyses the long run effects of the federal transfer and tax systems on federal debt by varying key parameter assumptions. Lee and Tuljapurkar (2001) analyze the long-run solvency of the Social Security system using stochastic time series analysis. Following in the footsteps of Auerbach, Gokhale, and Kotlikoff (1994) a number of studies analyze the generational aspects of changes to federal transfer programs. Auerbach and Oereoupolus (2000) look at the extent to which immigration can mitigate some of the federal fiscal imbalances. Cutler and Sheiner (2000) analyze the Medicare program and find that the rate of return declines for each successive cohort, but is still positive and in excess of income growth because there is a structural imbalance in the program. The Social Security Administration actuarial reports find that "The fundamentals of the

financial status of Social Security and Medicare remain problematic under the intermediate economic and demographic assumptions." (Social Security Administration, 2006). All of these studies find that there are serious long-run imbalances in the federal tax and transfer system.

[5] Elmendorf and Sheiner (2000) use both a Ramsey and an overlapping generations macro model to analyze the effects of the aging baby boom population on savings. Others have investigated the effects of different immigration policies on federal budgets in CGE models (Storesletten, 2000), or the general equilibrium effects of the aging population on the characteristics of the labor market, the composition of personal consumption, and federal expenditures (Dowd, Monaco, and Janoska, 1998).

[6] JCT staff are responsible for providing conventional revenue estimates of the effect of proposed tax law changes on federal revenue (see Joint Committee on Taxation, 2005).

[7] The JCT staff maintain several macroeconomic models, which vary significantly in the type of simplifications that they make about the economy and behavior. This variation assists the JCT staff in analyzing the range of potential macroeconomic effects of proposed tax legislation.

[8] The average tax rate (ATR) for each source is an income-weighted ATR. Thus, for each taxpayer, the sum across sources of the ATR times income from that source equals total tax liability. Similarly, the marginal tax rate (MTR) for each source is income-weighted, since taxpayers who have disproportionately large shares of a given source of aggregate income, should contribute proportionally to their income in the calculation of the economy-wide average of effective marginal tax rates. Computing these tax rates is nontrivial--for instance, there is no uniquely well-defined method for computing an income-weighted marginal tax rates when some of the taxpayers have negative income, as is the case with business income.

[9] Generally, relevant MTR's affect cost of capital equations; relevant MTR and ATR affect labor supply equations, and the ATR affects tax liability equations that ultimately affect disposable income, as well as the federal budget surplus or deficit, and thereby federal borrowing needs and economy-wide interest rates. See Altshuler et al (2005).

[10] Myopic agents make decisions about consumption, work, and saving as if tomorrow will look like today. But the assumptions underlying the model imply that tomorrow will not look like today; in particular, there is a changing age profile, and the current-law tax structure, combined with nominal and real income growth, implies changing effective tax rates. When tomorrow turns out not to look like today, their decisions are somewhat off the equilibrium, so they attempt to move in the direction of equilibrium. The model is able to continue to compute solutions, year by year, because the agents' decisions are well-defined, even if the policy that is being simulated is eventually unstable.

[11] The extrapolation methodology that we developed is necessarily simpler outside the budget horizon than inside. We use a forecast of CPI growth, to account for the nominal indexing of the tax code. For most components of income as defined by the Internal Revenue Code (IRC), we assume that the best predictor of their growth will be NIPA nominal GDP growth. But for wages as defined by the IRC, we use NIPA wage growth, since these two are more strongly empirically associated.

[12] One slightly complicating factor is that tax rates in JIM are computed with respect to income sources defined according to the IRC, while the macro models use NIPA income sources. For instance, interest income in JIM does not include either interest income from municipal bonds or that is accruing within life insurance policies, but NIPA interest income includes both these types of interest income. By computing calibration ratios for each source of income, we can easily apply the relevant IRC tax rates to NIPA income sources; and we can adjust the ratios if a tax proposal changes the definition of the IRC income base.

[13] Bull and Dowd (2005) explore the macroeconomic implications of an assumed fiscal response that is empirically consistent with historical responses.

[14] Tax rates on business income rise by a lower amount because only a third of that income is taxed directly at the individual level, while corporate rates are assumed to be roughly constant under present law.

[15] These policy simulations are not intended to be realistic, nor are they prescriptive; they are intended to provide further intuition about the sources of change in the current-law forecast. Note also, that the revenue changes reported abstract from some of the many microdynamic responses to tax law that are typically accounted for in JCT conventional estimates. Joint Committee on Taxation (2006) provides examples of some of the ways in which macroeconomic models do not account for microdynamic responses to proposed tax law changes.