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WHY INDIVIDUAL INCOME TAX REVENUES GROW FASTER THAN GDP

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ABSTRACT

Using the latest long-term budget projections from the Congressional Budget Office, we project that individual income tax revenues under current law will increase as a share of GDP from a little over 9.5 percent in 2025 to a little less than 13.3 percent in 2090, an increase of over 3.7 percentage points. This paper describes the factors that explain this differential in growth rates and provides estimates from the Tax Policy Center's new long-run microsimulation model of the relative importance of each of these factors over the 2025-2090 period. We find that 80 percent of the increase in revenues as a share of GDP occurs because current law does not adjust some individual income tax parameters for inflation and none of the parameters for changes in real income.

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Using the latest long-term budget projections from the Congressional Budget Office (CBO), we project that individual income tax revenues under current law will increase as a share of GDP from a little over 9.5 percent in 2025 (the end of the current 10-year budget window) to a little less than 13.3 percent in 2090 (the final year of CBO's long-term projections), an increase of over 3.7 percentage points.[1,2] This paper describes the factors that explain this growth rate in the ratio of revenues to GDP and provides estimates from the Tax Policy Center's (TPC) new long-run microsimulation model of the relative importance of each of these factors over the 2025-2090 period. The Appendix describes TPC's model.

CBO's long-run budget projections "generally reflect current law and estimates of future economic conditions and demographic trends."[3] Changes in spending and tax policies as well as differences from CBO's estimates in actual future economic conditions and demographics will make the path of both individual income tax revenues and GDP differ (perhaps considerably) from current projections. In particular, note that the individual income tax share of GDP is already near historical peaks by 2025 in CBO's projections, and then grows far above those peaks by 2090. These long-term projections should therefore not be viewed as predictions of the future, but as insightful guides to how the income tax is designed and the pressures for change that may arise in coming years.

SOURCES OF FASTER GROWTH

GDP and individual income tax revenues both grow over time as a result of the growth of population, inflation, and real income. But individual income tax revenues also grow due to a number of design features of the tax under current law. We group these features into five categories:

1. <u>Unindexed parameters</u>. Many individual income tax parameters are indexed for inflation, but some important parameters are not. Parameters not indexed for inflation include the amount of the child tax credit and its income phaseout ranges; the thresholds for including social security benefits in adjusted gross income (AGI) and the surtax on net investment income; the income ceiling for making IRA contributions; and the maximum dollar value of loans eligible for the mortgage interest deduction. If these parameters were indexed for inflation, individual income tax revenues would grow more slowly.

[1] Congressional Budget Office, *The 2015 Long-Term Budget Outlook* (June 2015). CBO only provides projections of total revenues as a percentage of GDP after 2040. We projected individual income tax revenues for fiscal years 2041 to 2090 based on the additional detail provided in the long-term projections made by CBO last year, *The 2014 Long-Term Budget Outlook* (July 2014).
[2] Note that the refundable portions of individual income tax credits (such as the EITC) are counted as outlays in budget projections, rather than as reductions in revenues. Consistent with that treatment, all of the individual income tax revenues reported in this paper exclude the refundable portions of credits.
[3] CBO (June 2015), page 91.

2. Real bracket creep. Even if all income tax parameters were indexed for inflation, individual income tax revenues would grow faster than GDP due to real income growth. Growth of real incomes causes an increasing share of taxable income to be taxed in higher income tax brackets, raising average tax rates (the ratio of taxes to income). Real income growth also means that other income tax parameters (such as the standard deduction and personal exemptions) grow more slowly than income, which also makes average tax rates rise over time.

3. Changes in the distribution of income. Because the income tax is progressive, changes in the distribution of income affect the growth of revenues relative to income. We project that income will continue to grow more rapidly at higher income levels, causing individual income tax revenues to grow faster than income.

4. Demographic changes. Single filers generally pay more income tax than do married filers with the same level of income, filers with children generally pay less income tax than do filers with the same level of income and no children, elderly filers generally pay less income tax than do younger filers, etc. So changes over time in the demographic composition of income tax filers at each income level affect the rate of growth of income tax revenues relative to income. We project that an increasing share of tax returns will be filed by single taxpayers, causing individual income tax revenues to grow faster than income.

5. Other factors. The income measure used to determine most individual income tax liability, AGI, does not grow at exactly the same rate as GDP.[4] Itemized deductions do not grow at the same rate as income.[5] Credits not directly related to income (e.g., the education credits) also do not grow at the same rate as income. The net effect of these and other features of the income tax not captured in the preceding steps is to make revenues grow faster than GDP.

TPC SIMULATIONS FOR 2025-2090

We use TPC's new long-run microsimulation model to estimate the contribution of each of the five factors that explain the 3.7 percentage point increase in individual income tax revenues as a share of GDP between 2025 and 2090.[6] We begin by running the model under current law in 2025 and 2090 in order to establish "baseline" levels of individual income tax revenues, unindexed tax parameters, the distribution of income, and the number of tax return units with

[4] AGI includes items not included in the income measure of GDP, which is gross domestic income (GDI), such as capital gains and some Social Security benefits. AGI excludes some items included in GDI, such as most employer-provided fringe benefits and taxes on production and imports (excise and sales taxes).
[5] Differential growth rates for itemized deductions result in more (or fewer) taxpayers itemizing as well as differential levels of deductions because some deductions are affected by caps or floors and some are AMT preference items.
[6] CBO provides a similar analysis for the 2015-2040 period, but covers all revenue sources rather than just the individual income tax, must account for expired and new tax provisions (there are none after 2021), and groups the features of the individual income tax somewhat differently than we have.

various demographic characteristics.[7] We then simulate revenues in 2090 by sequentially taking into account each of the five factors in order to isolate the effects of each on individual income tax revenues as a share of GDP (Table 1).

TABLE 1

The Growth in Individual Income Tax Revenues as a Share of GDP

2025-2090

	Amount ($trillions)	Share of GDP (percent)	Portion of growth in share of GDP (percent)
Individual income tax revenues in 2090			
Current projection	$57.1	13.3%	
Projected level if share of GDP unchanged from 2025	$41.0	9.5%	
Growth in share of GDP	$16.1	3.7%	100.0%
Factors Explaining Growth in Share of GDP:			
1. Unindexed parameters	$2.6	0.6%	16.0%
2. Real bracket creep:			
a. Income tax brackets	$3.6	0.8%	23.0%
b. Standard deduction, personal exemptions, and AMT exemption	$4.7	1.1%	29.0%
c. All other parameters	$1.9	0.4%	12.0%
3. Changes in the distribution of income	$0.9	0.2%	6.0%
4. Demographic changes	$1.2	0.3%	8.0%
5. Other factors	$1.1	0.3%	7.0%

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0515-1).
Notes: Detail may not add to totals due to rounding. The TPC model calculates individual income taxes on a calendar year basis and excludes revenues collected on amended returns and from late payments and enforcement actions, whereas CBO projects GDP and revenues on a fiscal year basis and includes all sources in individual income tax revenues. Model outputs have therefore been adjusted to correspond to CBO projections.

Individual income tax revenues in 2090 are projected to be $57.1 trillion (about 13.3 percent of GDP), but would be only $41.0 trillion if the share of GDP does not change after 2025 (when revenues are projected to be about 9.5 percent of GDP). The difference, $16.1 trillion or 3.7 percent of GDP, is the combined effect of the five factors that make individual income tax revenues grow faster than GDP. By far the most important factor is real bracket creep, which accounts for $10.2 trillion of the difference (2.3 percent of GDP). This consists of $3.6 trillion (0.8 percent of GDP) from reducing the width of income tax brackets relative to GDP per return, an even larger $4.7 trillion (1.1 percent of GDP) from reducing the ratios of the standard deduction, personal exemptions and the AMT exemption to GDP per return, and another $1.9 trillion (0.4 percent of GDP) from lowering the ratios of all other income tax parameters to GDP

[7] In TPC's microsimulation model the entire U.S. population is grouped into "tax return units." For income tax filers, these units are the same as a tax return—the (primary) filer, the spouse (secondary filer) on joint returns, and all dependents. Nonfilers (including the dependents of nonfilers) are grouped into the tax return units they would be expected to appear on if they filed. Note that some tax returns are filed by dependents of other filers, so individuals appearing on these returns are already counted in the population and are not counted again on the dependent return.

per return. In total, real bracket creep accounts for roughly two thirds (64 percent) of the growth in individual income taxes as a share of GDP between 2025 and 2090.

1. Unindexed parameters. In this model run for 2090, all individual income tax parameters that are not indexed for inflation under current law were indexed for the cumulative effects of inflation between 2025 and 2090. For this indexing, we used CBO's projection for the increase in the Consumer Price Index (CPI), which is 2.4 percent per year for every year between 2025 and 2090.[8] The difference in revenues from this run and the "baseline" run for 2090 ($2.6 trillion or 0.6 percent of GDP) is the effect of unindexed parameters.

2. Real bracket creep. All income tax parameters were indexed by the growth between 2025 and 2090 in (nominal) GDP per tax return unit.[9] To isolate the effect of real income growth on tax brackets alone, we first ran the model for 2090 with only income tax brackets (including the AMT brackets) indexed for the growth in GDP per tax return unit. The difference in revenues from this model run and the run in Step 1 ($3.6 trillion or 0.8 percent of GDP) is the effect of real income growth on tax brackets alone. The second model run for 2090 indexed the standard deduction, personal exemptions, and the AMT exemption levels, as well as income tax brackets, for the growth in GDP per tax return unit. The difference in revenues from this run and the first run ($4.7 trillion or 1.1 percent of GDP) is the effect of real income growth on the standard deduction, personal exemptions, and the AMT exemption levels. In the third run for 2090, all income tax parameters were indexed for the growth in GDP per tax return unit. The difference in revenues from this run and the second run ($1.9 trillion or 0.4 percent of GDP) is the effect of real income growth on all other income tax parameters.[10]

3. Changes in the distribution of income. The distribution of income changes over time in TPC's extrapolation because the average incomes of high-income and lower-income tax return units grow at different rates, and because the number of high-income units grows more rapidly.[11] Two adjustments are required to isolate the effects of these distributional changes while preserving the total number of tax return units and these units' total income in 2090. To do this, we first adjust average income on all tax return units to grow at the

[8] Note that the 2.4 percent annual increase in the CPI in CBO's long-term projections is less than the projected increase in inflation as measured by the GDP deflator, which, as noted in the text above, is 2.0 percent.
[9] We use per tax return unit GDP growth for this indexing to account for the change in the number of tax return units over time, which by itself would increase total GDP even in the absence of inflation.
[10] Note that because income tax parameters are indexed by the CPI, which grows 0.4 percentage points faster than the GDP deflator between 2025 and 2090 in CBO's projections, 0.4 percentage points of the growth in real GDP per tax return unit is taken account of by CPI indexing.
[11] As part of TPC's extrapolation, income from two sources (wages and Social Security benefits) is grown faster for high-income returns than for lower-income returns. This part of the extrapolation alone makes average incomes grow faster on high-income units. But average incomes may also grow faster (or slower) on high-income units because the extrapolation uses different (but uniform across all units) rates of growth for other sources of income. These differential growth rates may make average incomes grow faster (or slower) on high-income returns because the mix of income sources differs across the income distribution. TPC also targets the income (AGI) distribution as part of the extrapolation. These targets are met primarily by differentially adjusting weights on tax return units at different points in the AGI distribution. The largest weight increases are made for high-income returns.

same rate from 2025 to 2090 as total AGI per tax return unit.[12] Then we proportionately adjust the weights on all tax return units that were in the same AGI class in 2025 so that the weighted number of these units in 2090 is the same as it would have been if the weights on all returns had grown at the same rate.[13]

These two adjustments restore the 2025 distribution of income while preserving demographic shifts within AGI classes (which are adjusted for in Step 4). We ran the model for 2090 with these two adjustments as well as the indexing adjustment from the second run in Step 2. The difference in revenue from this model run and the third run from Step 2 ($0.9 trillion or 0.2 percent of GDP) is the effect of changes in the distribution of income.

4. Demographic changes. To isolate the effect of demographic changes on the growth of revenues, the growth in return weights must be equalized across all tax returns units while preserving the total number of tax return units. To do this, we first computed a weight growth equalization factor for all tax return units as the ratio of the total projected number of tax return units in 2090 to the total projected number of units in 2025. We then multiplied the 2025 weights on all units by this equalization factor. Using these adjusted weights, the demographic composition of tax return units in 2090 is the same as in 2025. We ran the model for 2090 with these adjustments and the indexing adjustment from the third run in Step 2. The difference in revenue between this model run and the run from Step 3 ($1.2 trillion or 0.3 percent of GDP) is the effect of demographic changes.

5. Other factors. We did not explicitly model the relatively small effects of these other factors. Instead, the effect of these factors was simply computed as the residual between the total change between 2025 and 2090 and the combined effects of steps 1 through 4 ($1.1 trillion or 0.3 percent of GDP).

These estimates indicate that 80 percent of the growth in individual income tax revenues as a share of GDP between 2025 and 2090 would not occur if all individual income tax parameters were adjusted for real, as well as inflationary, growth in GDP per tax return unit. However, these results may depend on the sequence in which each factor was taken into account (the so-called "stacking order" of the runs). It is possible, for example, that the estimated effect of full indexing would be smaller than shown in Table 1 if the effect of changes in the distribution of income had been estimated first in the sequence.

[12] All sources of income grow at this same rate, in particular capital gains and qualified dividends, which are taxed at preferential rates, and the components of "net investment income", which are subject to a special surtax rate for higher-income taxpayers. We also grow all above-the-line deductions and AMT preference items at this rate.
[13] The uniform rate of growth in weights is the ratio of the projected number of tax return units in 2090 to the projected number in 2025.

APPENDIX: TPC'S MICROSIMULATION MODEL*

The Urban-Brookings Tax Policy Center's large-scale microsimulation model produces revenue and distribution estimates of the U.S. federal tax system. The model is similar to those used by the Congressional Budget Office (CBO), the Joint Committee on Taxation (JCT), and the Treasury's Office of Tax Analysis (OTA).

The TPC model produces estimates for each individual year from 2011 through 2025—the end of the ten-year budget window. We recently expanded our model by developing a long-run module that produces revenue and distribution estimates at ten-year intervals for the period from 2030 through 2090.

I. TAX MODEL DATABASE

The model's primary data source is the 2006 public-use file (PUF) produced by the Statistics of Income (SOI) Division of the Internal Revenue Service (IRS). The PUF contains 145,858 records with detailed information from federal individual income tax returns filed in the 2006 calendar year.[1] Beginning with the 2006 data, we employ a two-step process to create a file that is representative of the tax filing population for the 2011 tax year.[2] In the first step of the process, we use published tax data to calculate per-return average growth rates for types of income, deductions, and other items reported on tax returns between 2006 and 2011 by adjusted gross income (AGI) class. We then use these growth rates to adjust the dollar amounts on each PUF record. In the second step of the process, we use a constrained optimization algorithm to reweight the records in order to match an extensive set of about 100 targets for both return counts and dollar amounts. We refer to the resulting file as the 2011 "Look-Alike Public Use File" or LAPUF.

We next use cross-tabulations of age, filing status, and income sources provided to us by SOI and implement a raking algorithm to impute the ages of taxpayers and their dependents onto the LAPUF. We add information on other demographic characteristics and sources of income that are not reported on tax returns through a constrained statistical match of the LAPUF with data for 2011 from the March 2012 Current Population Survey (CPS) of the U.S. Census Bureau. That match also generates a sample of individuals who do not file individual income tax returns ("non-filers"). The dataset combining filers from the LAPUF (augmented by demographic and other information from the CPS) and non-filers from the CPS provides us with a representative sample of the entire population rather than just the segment that files income tax returns. This

*The Appendix was written by Surachai Khitatrakun, Gordon Mermin, Jeff Rohaly, and Joseph Rosenberg.

[1] We choose to use the 2006 PUF because it is more representative of a steady-state economy than the "boom" year of 2007 or the recession year of 2008.

[2] The information for 2011 was the latest available data at the time we began the model update process.

allows us to estimate the revenue and distributional impact of tax proposals that would potentially affect current non-filers.

We then augment the tax model database by imputing wealth, education, consumption, health, and retirement-related variables for each record in the matched LAPUF-CPS file.

A. Wealth Imputations

Because the income tax data in our model contain no direct information about wealth holdings, we rely on information from the Survey of Consumer Finances (SCF) to develop imputations of assets and liabilities. Specifically, we impute assets and liabilities to each record in the income-tax file based on probit and ordinary least squares (OLS) regressions of those wealth components against explanatory variables that exist on both the SCF and SOI datasets. To mitigate the problem of the SCF's small sample size—it contains fewer than 5,000 observations—we pool data from the 2010 and 2013 surveys. In addition to roughly doubling the sample size, combining data from the two years mitigates some of the temporal variation in asset values. We then calibrate the imputed number of individuals owning each type of asset (and liability) and their aggregate values to match SCF totals, augmented by the net worth of the Forbes 400.[3] We further adjust the imputed distribution of each asset and liability by income class to more closely resemble those reported in the SCF.

B. Education Imputations

In order to model tax incentives for education and their interaction with Pell Grants, we impute student characteristics to the tax model. First, we use data from the 2011-2012 National Postsecondary Student Aid Study (NPSAS)[4] combined with an indicator from the PUF as to whether a particular tax unit reported education tax incentives (such as the Lifetime Learning Credit or the above-the-line deduction for education expenses) to impute the presence of post-secondary students to each record in the database. We then use the NPSAS to impute student characteristics such as enrollment intensity, class year, and institution type, as well as education expenses, including tuition and fees, books, room and board, and transportation. We use these imputed characteristics to calculate potential education tax incentives and Pell Grants and assign take-up rates in order to match actual tabulations by income from SOI and the Department of Education. Imputing receipt of both education tax incentives and Pell Grants allows us to examine in detail all federal assistance to post-secondary students.

[3] The SCF specifically omits data on the Forbes 400. We need to add them to the file to account for the substantial share of assets that they own. For 2011, we add approximately $1.7 trillion in net worth to the $90 trillion implied by the SCF.
[4] The NPSAS is produced by the National Center for Education Statistics.

C. Consumption Imputations

In order to model the distributional impact of federal excise taxes and a variety of other indirect taxes, including broad-based consumption taxes (e.g., a value-added tax or VAT) and environmental taxes, we impute consumption spending to each record in the tax model database. We use data from the Consumer Expenditure Survey (CEX) to produce estimates of consumption expenditures across 16 categories of goods and services for each household in our model. We also use the Urban Institute's Dynamic Simulation of Income Model (DYNASIM) to estimate the amount of future consumption financed out of current wealth, which allows us to analyze transitional issues for options that move the tax system from an income base to a consumption base. This allows us to estimate the distributional impact of hybrid income-consumption tax systems and other comprehensive reform options, such as the plans endorsed by the President's Advisory Panel for Federal Tax Reform in 2005 and, more recently, by the Bipartisan Policy Center's Debt Reduction Task Force.

D. Health Imputations

In order to analyze tax subsidies for health insurance and medical expenses, we impute health insurance status and employer-provided health benefits to each record in our database. We begin by assigning initial health insurance status using data from our statistical match with the 2012 CPS. We then modify coverage to be consistent with CBO projections of coverage after implementation of the Affordable Care Act (ACA). We impute employer-provided health benefits by statistically matching tax units with employer-sponsored health insurance to employers offering health coverage in the 2010 and 2011 Kaiser/HRET employer surveys.[5] The health benefits we impute include premiums for health insurance, dental insurance, and vision insurance, as well as contributions to Health Savings Accounts, Health Reimbursement Arrangements, and Medical Flexible Spending Accounts. These imputations allow us to analyze tax expenditures for employer-provided health benefits and ACA tax provisions including the high premium excise tax, the penalty on individuals with insufficient coverage, the penalty on employers offering insufficient coverage, and tax credits for non-group insurance purchased through health insurance exchanges.

E. Retirement Imputations

In order to analyze the revenue and distributional implications of tax measures related to retirement savings, we impute a comprehensive set of pension and savings variables for each household in our database. These variables include each taxpayer's eligibility for a defined benefit pension, a defined contribution pension, and an Individual Retirement Arrangement (IRA) as well as contribution amounts, accrued benefits, and asset balances. We rely on information from the SCF to impute pension characteristics as well as pension and IRA asset balances. We

[5] The Kaiser/HRET annual survey of employer sponsored health benefits is sponsored by the Kaiser Family Foundation and Health Research & Educational Trust.

use SOI data to impute IRA characteristics. We supplement and calibrate these imputations to match publicly available administrative data by incorporating information from other sources such as the Department of Labor, Treasury, Census, and DYNASIM.

F. Other Imputations

To complete the tax model database, we perform a number of other imputations. First, we use tabulations from the Urban Institute's TRIM3 microsimulation model to adjust the reported values of certain non-taxable transfer payments.[6] The reported values obtained through our statistical match with the CPS generally undercount both the number of recipients and the total dollar amounts for food stamps (SNAP), Temporary Assistance for Needy Families (TANF), and Supplement Security Income (SSI). We therefore adjust our counts and amounts to match the TRIM3 reported values more closely.

This latest version of the tax model also includes improved imputations of mortgage interest on second homes and of deductible interest on home equity loans. The model also contains imputations for all itemizable deductions—including charitable contributions, medical expenses, and home mortgage interest—for "non-itemizers," people who claim only the standard deduction on their tax return. These imputations allow us to model the distribution and revenue implications of proposals to replace certain deductions with credits that would be available to all taxpayers regardless of itemization status.

II. AGING AND EXTRAPOLATION PROCESS

The full tax model database is a representative national sample of the population for calendar year 2011. In order to carry out revenue and distribution analysis for future years, we "extrapolate" or age the 2011 data.

For the years from 2012 to 2026, we "age" the data based on CBO projections for the growth of various types of income; CBO and JCT baseline revenue projections; IRS estimates of future growth in the number of tax returns; JCT estimates of the distribution of tax units by income; and Census data on the size and age-composition of the population. We use the actual 2012 and preliminary 2013 tax data available at the time we developed the database (early 2015). A two-step process produces a representative sample of the filing and non-filing population in years beyond 2011. We first inflate the dollar amounts of income, adjustments, deductions, and credits on each record by their appropriate forecasted per capita growth rates. We use the CBO's forecast for per capita growth of each major income source, such as wages,

[6] TRIM3 is maintained and developed by the Urban Institute under primary funding from the Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation (HHS/ASPE). Information presented here is derived in part from the Transfer Income Model, Version 3 (TRIM3) and associated databases. TRIM3 requires users to input assumptions and/or interpretations about economic behavior and the rules governing federal programs. Therefore, the conclusions presented here are attributable only to the authors of this report.

capital gains, and non-wage income (interest, dividends, Social Security benefits, and others). We assume that most other items grow at CBO's projected growth rate for per capita personal income. In the second stage of the extrapolation, we use a linear programming algorithm to adjust the weights on each record so that the major income items, adjustments, and deductions match aggregate targets. We also attempt to adjust the overall distribution of income to match published information from the Statistics of Income (SOI) division of the IRS for 2012 and published estimates of the 2015 distribution from JCT. We extrapolate recent trends to obtain projected distributions for other years beyond 2015 and modify those distributions in order to hit CBO's published forecasts for baseline individual income tax revenue.

We use a similar two-stage technique in the long-run module to age the data for 2030, 2040, and each ten-year increment through 2090. For 2030 and beyond, we rely primarily on projections from CBO and from the Urban Institute's DYNASIM3 model. DYNASIM3 is a dynamic microsimulation model that is designed specifically to project the population and analyze the long-run distributional effects of retirement and other aging issues.[7]

In the first stage of the long-run aging process, we use CBO's long-run inflation assumptions together with DYNASIM3 projections for the real growth in major income items such as wages and salaries, business income, capital income, pension income, and Social Security benefits, to grow the dollar amounts on record in the tax model database. In the second stage of the long-run extrapolation, we use our linear programming algorithm to adjust the weights on each record so that the major income amounts and certain other items match aggregate targets derived from the DYNASIM3 and CBO forecasts. For example, we determine long-run targets for health insurance coverage and the number of post-secondary students by applying the demographic trends from DYNASIM to the health insurance status and student counts generated by the tax model for 2025. Similarly, we derive long-run targets for retirement coverage and contributions from a combination of DYNASIM and CBO projections and the baseline imputations in the tax model.

We also use the second-stage reweighting algorithm to hit DYNASIM3 targets for the age distribution of the population and other demographic characteristics, including the number of married and single tax units.

Finally, we use the reweighting process to target the distribution of tax return units by income as projected by DYNASIM3, adjusted in order to hit CBO's projected individual income tax revenue through 2040. For years after 2040, we rely exclusively on DYNASIM3's projection of changes in the income distribution. For those years, we employ a further across-the-board weight adjustment primarily to correct for a population undercount and to ensure that our model generates the level of individual income tax revenue implied by the CBO long-run projections.

[7] For a detailed description of the projection methods employed by DYNASIM, see Smith, Karen E. (2012). "Projection Methods Used in the Dynamic Simulation of Income Model (DYNASIM3)."

III. TAX CALCULATORS

The tax model consists of a set of detailed tax calculators that: (a) compute individual income tax liability for all filers in the sample under current law and under alternative policy proposals; (b) compute the employee and employer shares of payroll taxes for Social Security and Medicare; (c) assign the burden of the corporate income tax and excise taxes to tax units; and (d) determine the expected value of estate tax liability for each tax unit in the sample using an estate tax calculator in combination with age-specific mortality rates.

A. Individual Income Tax Calculator

Based on the extrapolated data set, we can simulate policy options using a detailed tax calculator that captures most features of the federal individual income tax system, including the alternative minimum tax (AMT). The model's current law baseline reflects major income tax legislation enacted through the beginning of 2015, including the American Taxpayer Relief Act of 2012 (ATRA) signed into law in January of 2013. ATRA made permanent most of the provisions enacted in the 2001 and 2003 tax acts (EGTRRA and JGTRRA), permanently patched the alternative minimum tax, extended for five years the enhancements to individual income tax credits originally enacted in the 2009 stimulus legislation, and temporarily extended certain other tax provisions.[8]

In our distribution tables, we assume that the burden of the individual income tax falls on the payer. CBO, JCT, and Treasury all use the same assumption.

B. Payroll Tax Calculator

Using the extrapolated dataset, we also calculate federal payroll taxes for Social Security and Medicare. One complication is that for married couples, our tax return data only provide information on combined earnings whereas payroll taxes are based on individual earnings. This is important because the amount of earnings subject to the Social Security portion of payroll taxes is capped at $118,500 for 2015, a limit that is indexed annually based on wage growth. For married couples, we therefore assign earnings to each individual based on the split in wages observed on the CPS record to which the LAPUF record was matched.

In our distribution tables, we assume that the worker bears the burden of both the employer and employee portions of payroll taxes. This premise is widely accepted among economists. CBO, JCT, and Treasury all make the same assumption for their distributional analyses.

[8] EGTRRA is the Economic Growth and Tax Relief Reconciliation Act of 2001; JGTRRA is the Jobs and Growth Tax Relief Reconciliation Act of 2003.

C. Assigning Corporate Tax Burden to Individuals

Although firms pay the corporate income tax, the economic incidence of the tax falls on individuals. TPC's tax model therefore distributes the burden of the tax to individuals. The incidence of the corporate tax, however, is an unsettled theoretical issue. The tax could be borne by the owners of corporate stock or passed on in part to labor in the form of lower real wages, to consumers in the form of higher prices, or to the owners of some or all capital in the form of lower real rates of return.

In September 2012, we updated the assumptions we use to distribute the corporate income tax: we now estimate that 60 percent is borne by shareholders, 20 percent by all capital owners, and 20 percent by labor. Based on our review of research on the issue, we do not assign any of the burden to consumers. Previously, we assumed that the entire burden fell on all owners of capital. Our current assumptions are similar to those now made by CBO, Treasury, and JCT.

We rely on CBO for our projections of baseline corporate tax liability and, when available, on JCT estimates of changes in corporate tax liability that would result from tax proposals.

D. Estate Tax

Our modeling of the estate tax begins with our SCF-based wealth imputations, which we adjust using SOI data so that they align more closely with the assets and liabilities actually reported on estate tax returns. We then assign values for most estate tax deductions and credits based on averages calculated from SOI estate tax data. Our estate tax calculator then determines potential estate tax liability for each record in the database based on the values for gross estate, deductions and credits, and the relevant estate tax rates and brackets. Finally we multiply the calculated tax liabilities by age-specific mortality rates to estimate each record's expected value of gross estate and net estate tax liability. We employ a linear programming algorithm to reweight the records to ensure that our baseline estimates of the distribution and aggregate values for gross estate and its components match the most recent published estate tax data from SOI.[9]

In our distribution tables, we assume the estate tax is borne by decedents, the same assumption that Treasury used in the past when it distributed the burden of estate taxes. Neither CBO nor JCT includes the estate tax in their incidence analyses.

E. Excise Taxes

Beginning in 2015, TPC includes federal excise taxes in its distribution tables. We include all federal excise taxes, the largest of which are those assessed on motor fuels, alcohol, tobacco, air

[9] For a detailed description of TPC's estate tax methodology, see Burman, Lim, and Rohaly (2008). "Back from the Grave: Revenue and Distributional Effects of Reforming the Federal Estate Tax."

transportation, certain health insurance providers and prescription drug manufacturers, and, effective in 2018, certain high-cost employer-sponsored health insurance plans (the so-called "Cadillac tax"). We also include the excise taxes on individuals without essential health insurance coverage ("individual mandate") and employers that fail to meet minimum essential coverage ("employer mandate") associated with the Affordable Care Act.

We rely on CBO for our projections of baseline excise tax revenues and assume excise taxes are borne by individuals following the methodology of Toder, Nunns, and Rosenberg (2011). That is, we assume excise taxes lower real incomes in proportion to each tax unit's share of labor income plus the portion of capital income that exceeds the normal rate of return. In addition, we assume that excise taxes paid or passed through to the retail level change the relative prices consumers face (i.e., raise the cost of taxed goods and services relative to others). We assign this burden to tax units based on our consumption imputations from the CEX. The exception to this methodology is that we estimate three of the health insurance related excise taxes—the individual mandate, the employer mandate, and the tax on high-cost employer plans—using the TPC model's health module. We assume the burden of these taxes is borne by the individual and/or employee.

F. Income Classifier

In 2013, TPC developed an income concept called "expanded cash income" (ECI) for the purpose of distributional analysis. We construct ECI to be a broad measure of pre-tax income, and we use it both to rank tax units in our distribution tables and to calculate effective tax rates. We define ECI to be adjusted gross income (AGI) plus: above-the-line adjustments (e.g., IRA deductions, student loan interest, self-employed health insurance deduction, etc.), employer-paid health insurance and other nontaxable fringe benefits, employee and employer contributions to tax-deferred retirement savings plans, tax-exempt interest, nontaxable Social Security benefits, nontaxable pension and retirement income, accruals within defined benefit pension plans, inside buildup within defined contribution retirement accounts, cash and cash-like (e.g., SNAP) transfer income, employer's share of payroll taxes, and imputed corporate income tax liability.[10]

[10] For further information about ECI, see "Income Measure Used in Distributional Analyses by the Tax Policy Center" at http://www.taxpolicycenter.org/taxtopics/Explanation-of-Income-Measures-2013.cfm.

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