

**ESTIMATING CHANGES IN THE
FEDERAL INDIVIDUAL INCOME TAX:
A DESCRIPTION OF THE INDIVIDUAL
TAX MODEL FOR 2023**

Prepared by the Staff
of the
JOINT COMMITTEE ON TAXATION



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I. OVERVIEW

One of the responsibilities of the staff of the Joint Committee on Taxation (“Joint Committee staff”) is providing the Congress with estimates of the fiscal impacts of proposed tax legislation. Providing the Congress with this information starts with an economic analysis of the proposed legislation. This document¹ reviews the economic modeling that the Joint Committee staff undertakes in analyzing proposed changes to the individual income tax.² In addition, this document highlights several updates to the economic modeling since the Joint Committee staff’s previous publication describing individual income tax analysis, JCX-75-15.³

The Federal individual income tax is complex and has many interacting features such as exclusions, deductions, and credits. This complexity makes analyzing the effects of proposed changes to the tax law a difficult task. An analysis of proposed changes to the tax law evaluates two mechanisms of change: first, the mechanical changes to tax liability calculations under the proposal, such as modifications to tax rates or rate brackets, which change taxpayers’ liability even when taxpayer behavior remains the same; and second, the behavioral changes that taxpayers are expected to make in reaction to the incentives created by the proposal. Behavioral changes may include, for example, taxpayers’ reallocation of savings and investments across various tax-advantaged accounts, and changes in consumption decisions to take advantage of certain deductions and credits. The degree to which taxpayers are likely to shift their behavior in response to changing tax incentives to achieve more personally advantageous outcomes is a central subject of economic theory and research. The effects of both mechanical and behavioral changes are central to the Joint Committee staff’s economic analyses, such as how tax receipts will change in future years and how a proposed change may affect the distribution of tax burdens.

The primary tool used by the Joint Committee staff to evaluate proposals to modify the Federal individual income tax is the Individual Tax Model (“ITM”).⁴ The ITM is a microsimulation model: the ITM simulates economic outcomes for many microeconomic agents, namely individuals and families that are, or could be, required to file individual income tax returns. The ITM is composed of two fundamental components: first, a database of tax returns

¹ This document may be cited as follows: Joint Committee on Taxation, *Estimating Changes in the Federal Individual Income Tax: A Description of the Individual Tax Model for 2023* (JCX-48-23), October 30, 2023. This document is also available on the Joint Committee on Taxation website at www.jct.gov.

² The staff of the Joint Committee on Taxation welcomes comments from interested readers who have studied modeling of the Federal individual income tax. Direct comments to Chief of Staff, Thomas A. Barthold, and Deputy Chief of Staff, Robert Harvey, Joint Committee on Taxation, 502 Ford House Office Building, Washington, D.C. 20515.

³ The previous publication, *Estimating Changes in the Federal Individual Income Tax: Description of the Individual Tax Model* (JCX-75-15), April 20, 2015, is available on the Joint Committee on Taxation website at www.jct.gov.

⁴ This document describes the ITM as developed and used by the Joint Committee staff in 2023, and references to the ITM in this document refer to the 2023 edition of the ITM.

and other detailed taxpayer information,⁵ and second, a set of tax calculators that uses the database to compute tax liability under present law and under proposed changes to the law. Together these components are the starting point for economic analysis of a vast array of tax proposals. As standard practice, the Joint Committee staff incorporates economic research findings into the ITM to anticipate an array of taxpayers' behavioral responses to the changes. The ITM provides a detailed accounting of the revenue effects from these behavioral responses.

Data

The first fundamental component of the ITM is built on data from an income-stratified random sample of approximately 360,000 Federal individual income tax returns filed with the Internal Revenue Service ("IRS") in calendar year 2020. Generally, these data represent the sampled taxpayers' information for tax year 2019.⁶ The taxpayers' income tax return information is augmented with numerous other data sources. For example, several information returns filed with IRS, such as employees' Form W-2, *Wage and Tax Statement*, are linked to the taxpayers in the sample.

The analysis of a proposed change in tax law often requires additional taxpayer data not found on tax or information returns. For example, although many taxpayers contribute to charities, most take the standard deduction and so cannot claim the itemized deduction for charitable contributions. Thus, the amounts of their contributions are unreported on their tax returns and are unobserved by the Joint Committee staff. Evaluating proposals to change the Federal tax treatment of charitable contributions for non-itemizers nevertheless requires information on the amount of non-itemizers' contributions.⁷ When unobserved in the tax return data, such information is often imputed for the ITM's sample of taxpayers to enable the analysis. As discussed in Part III of this document, these imputations may be inferred from information reported to the IRS by third parties, historical data and trends from taxpayers' returns, survey data, and other sources.

For a comprehensive analysis of the Federal tax system, such as an analysis of tax burdens across income categories, the scope of the ITM must cover the entire U.S. population and not just the taxpayers that file an income tax return.⁸ Consequently, the ITM requires information about nonfiling taxpayers. The Joint Committee staff therefore imputes the size, demographic

⁵ Throughout this document "taxpayers" refers to individuals connected to the U.S. Federal tax system, including U.S. residents and nonresidents, who may file individual income tax returns ("filers") or not ("nonfilers"), and who may appear as dependents on other taxpayers' returns.

⁶ This sample is also used to prepare the tabulations published in the *Statistics of Income—2019 Individual Income Tax Returns*, an annual publication produced by the Statistics of Income Division of the IRS.

⁷ A temporary deduction for charitable contributions made by non-itemizing taxpayers was allowed by the Coronavirus Aid, Relief, and Economic Security ("CARES") Act of 2020, Pub. L. No. 116-36.

⁸ Although some situations require a taxpayer to file an income tax return, not all taxpayers have a filing requirement. For some taxpayers, having gross income below a threshold determined by filing status and age, as published in the IRS instructions for Form 1040, *U.S. Individual Income Tax Return*, eliminates the most typical filing requirement.

composition, and economic characteristics of the nonfiling population to allow for these analyses.⁹ As discussed in Part III.A of this document, the information about nonfiling taxpayers comes primarily from information returns for these taxpayers, such as Forms W-2.

Projecting data for the budget period

Congress generally uses a period of 10 years for budget planning and fiscal analysis. For tax analysis over that period, the Joint Committee staff aligns its models of the tax system under present law, and often under a proposed tax system, with the Congressional Budget Office’s (“CBO”) budgetary, macroeconomic, and population forecasts for the 10-year budget period. To bring the ITM’s underlying data in line with CBO forecasts, the Joint Committee staff developed a set of methods to extrapolate the ITM’s base year taxpayer data (2019 for the 2023 edition of the ITM) to reflect CBO’s economic and population forecasts in subsequent years (2020 through 2033 for the 2023 edition of the ITM). The resulting extrapolated data are statistically weighted to represent the population of U.S. taxpayers in size and tax-related characteristics in each year of the budget period.

The ITM’s tax calculators

The second fundamental component of the ITM is its tax calculators, computer programs that calculate Federal tax liability under both present law and one or several alternative tax regimes. The ITM applies these computer programs to the extrapolated taxpayer data to produce estimates of tax liability for each year of the Congressional budget planning period. The tax calculators also provide detailed information about the sources or mechanisms of changes in liability for various subgroups of taxpayers.

The economic analyses performed by the Joint Committee staff are not “static” analyses because they account for taxpayers’ behavioral responses to changes in tax law. The tax calculators themselves include many, but not all, of the mechanisms used to factor taxpayer behavior into reported revenue estimates.¹⁰ In particular, the tax calculators include several behavioral response algorithms that are primarily mathematical in nature and directly affect final liability, such as a taxpayer’s choice of claiming the standard deduction or itemizing deductions, or which of the higher-education incentives to include on their return. These “on-model” behavioral responses contrast with “off-model” responses that the Joint Committee staff accounts for in calculations beyond the output of the tax calculators. For example, an off-model adjustment may reduce the loss of revenue that is anticipated from the introduction of a new tax credit if

⁹ The population represented within the ITM is the total U.S resident population alive at any time during the year plus the population of taxpayers and their dependents who reside in a foreign country and file an individual income tax return with the IRS.

¹⁰ Revenue estimates are the most common economic analyses performed by the Joint Committee staff. Generally, revenue estimates compare predicted Federal revenues under a proposal with predicted Federal revenues under present law. Further discussion of the Joint Committee staff’s revenue estimates is included in *The Joint Committee on Taxation Revenue Estimating Process*, January 27, 2023, available on the Joint Committee on Taxation website at www.jct.gov.

research suggests that not all eligible taxpayers will claim the credit while it is new and unfamiliar.

Uses of the ITM

The Joint Committee staff's use of the ITM dates to the 1960s. The ITM is updated annually with new data and modeling innovations. Over the years, the Joint Committee staff has used the ITM to analyze and estimate tens of thousands of proposed changes to the Internal Revenue Code (the "Code"). The ITM is commonly used to analyze

- the economic effects of a single proposed tax provision or a set of provisions;
- separate effects of the specific components of a set of multiple provisions;
- how multiple provisions interact;
- the sensitivity of the tax system to certain features of the Code;
- the effects of taxpayers' behavioral responses to proposed changes to the Code;
- marginal and average tax rates, and how they may change in response to proposed tax law changes;
- the effects of proposed tax law changes on individual taxpayers over time;
- the distribution of the effects of proposed tax law changes across groups of taxpayers;
- amounts of tax liabilities for certain other Federal taxes (*e.g.*, Social Security taxes); and
- economic and demographic descriptions or tabulations for the U.S. population, or certain subgroups.

Organization

This document provides a review of the material covered in greater detail in JCX-75-15 and primarily focuses on the updates to the ITM made since that publication. References to JCX-75-15 are provided where significantly more detail is provided therein. Part II of this document describes the base data of the ITM. Part III discusses the imputations that the Joint Committee staff makes to augment the ITM's base data. Part IV explains how the base data are projected into the future years of the Congressional budget period. Part V describes the ITM's tax calculators. Finally, Part VI reviews how the Joint Committee staff uses the ITM to model proposed changes to tax policy.

II. THE ITM'S BASE DATA

A. Base Data from Tax Returns

The starting point in constructing the ITM's data file is the IRS Statistics of Income ("SOI") Division's 2019 INSOLE data file,¹¹ a stratified random sample of individual income tax returns¹² that are reviewed and edited and represent the tax year 2019 filing population.¹³ Most taxpayers filed their 2019 tax return by the extended deadline of July 15, 2020,¹⁴ though a significant number of taxpayers filed for and automatically received an additional extension to October 15, 2020. IRS continued to receive 2019 returns after this date, particularly from taxpayers with large incomes or complex tax situations. Once a return was received, IRS entered the information from the return into its computer systems and performed several consistency checks, including identifying math errors. Once the return was checked and deemed "accepted," the data from the return was posted to the master file from which SOI selected the INSOLE sample. Returns that were selected for the sample received additional data review, editing, and consistency checks by SOI and were assigned a sampling weight so that the results of statistical analyses of the data can be made representative of the entire tax-filing population.¹⁵ The design of the INSOLE sample nevertheless limits the Joint Committee staff's analysis to the national level.¹⁶

¹¹ "INSOLE" is the SOI's name for the file of individual and sole proprietorship returns.

¹² *Statistics of Income –2019 Individual Income Tax Returns*, Publication 1304, Internal Revenue Service, Washington, DC. As a stratified random sample, taxpayers within certain subgroups are selected for the sample at higher rates. For example, while most subgroups are sampled at a rate of approximately 0.1 percent, or one-in-1,000, the subgroup of taxpayers with the highest income is sampled at a rate of 100 percent, meaning all of the highest-income taxpayers are included in the sample. The increased sampling rate allows for accurate estimates of the effects of proposals within some smaller subgroups that are consistent with the sampling design.

¹³ The INSOLE sample contains a small number of prior-year returns. These prior-year returns were filed in calendar year 2020 but contain information relating to a tax year prior to 2019 (usually tax year 2018). SOI's long-standing assumption is that these prior-year returns are a fair representation of those 2019 tax year returns that similarly were not received and processed by SOI by the end of the 2020 processing period but will be filed in a future calendar year.

¹⁴ As a result of the COVID-19 coronavirus pandemic, the Department of the Treasury and IRS extended the filing deadline for tax returns from April 15, 2020, to July 15, 2020. As described in *Statistics of Income –2019 Individual Income Tax Returns*, the processing of tax year 2019 returns by IRS and SOI was delayed, with many tax year 2019 returns not being processed until the early months of 2021. In a typical year, such returns would have been part of SOI's 2021 sample selection of primarily tax year 2020 returns. For the 2019 INSOLE data file, however, SOI's sampling of tax returns included timely-filed returns which were processed before the middle of July 2021.

¹⁵ Detailed information about SOI's sampling methods, data cleaning, and estimation of weights is available in its *Statistics of Income –2019 Individual Income Tax Returns*, Section 7, "Description of the Sample." JCX-75-15 includes additional descriptions of the methods and timing of SOI data availability.

¹⁶ The INSOLE sample is designed to reflect U.S. taxpayers' filings at the national level. The sample is not appropriate for State-level or Congressional district-level analyses for several reasons, including the INSOLE sampling rate and taxpayer address reporting. The sampling rate for most returns, approximately one-in-1,000, is sufficient for generating a sample large enough to properly analyze the effects of proposed tax policies across all U.S. taxpayers. That sampling rate, however, generates too few returns for any individual State, particularly those States with smaller populations, to reliably estimate such effects at the State level. This issue is more pronounced for Congressional districts, which have, excepting single-district States, even fewer taxpayers than States. With respect to taxpayer-

The taxpayer information obtained from a tax return, combined with supplementary information for the same filer (or filers in the case of a joint return), comprises a single record in the ITM data base. Each of the 360,033 sampled records contains the information entered on each line of the taxpayer's Form 1040, *U.S. Individual Income Tax Return* or Form 1040-SR, *U.S. Tax Return for Seniors*, and from the auxiliary forms and schedules attached to the return. In its processing, SOI further adds certain demographic information for each taxpayer by linking their information to databases gathered by the Social Security Administration ("SSA"). Namely, SOI adds year of birth, year of death (if deceased), and sex to nearly every person in the sample from the SSA data. In total, the INSOLE file contains more than 2,900 dollar-valued data fields (*e.g.*, taxable amount of pension and annuity income) and more than 800 pieces of other descriptive information (*e.g.*, whether a taxpayer checks the box to report being blind), including those provided by SSA.

In addition to producing the confidential INSOLE data file provided to the Joint Committee staff, SOI makes a substantial amount of information and data available for public use. Although publicly available taxpayer information is generally published in summary format (*e.g.*, indicating the number of taxpayers or the total dollars reported for specific items reported on tax returns), SOI has also produced Individual Public-Use Microdata Files containing individual return-level values. The individual values in these microdata files are heavily edited to protect the privacy of taxpayers.¹⁷ Nevertheless, several economists and policy organizations use these public-use data files to create individual tax models. In comparison to the public-use data, the INSOLE data used for the Joint Committee's ITM are more recent, include more taxpayers, provide a greater number of taxpayer characteristics and tax return details than do the public-use data, and are not subjected to privacy-protection editing. In contrast to the ITM's base tax year of 2019, the most recent public-use file is for tax year 2015.

reported "Home address" on an income tax return, that address generally reports a taxpayer's mailing address as of the date of filing, which may differ from tax-year residence for several reasons. First, because the date of filing can be several months after the end of the tax year, during which time the taxpayer may have moved, the reported address may not reflect the taxpayer's State or Congressional district of residence during the tax year. Further, taxpayers do not provide information on multiple residencies within the tax year, or the duration of their residencies. Finally, in some cases, a taxpayer will report the address of an associate or family member as a more reliable address for receiving notices via mail. These factors prevent the appropriate allocation of any estimated policy effects across States or Congressional districts for such taxpayers and limit the Joint Committee staff's analysis to the national level.

¹⁷ To protect taxpayer confidentiality, public-use files are constructed from a smaller sample and specific data fields are rounded or "blurred." See Victoria Bryant, John Czajka, Georgia Isvin, and Jim Nunns, "Design Changes to the SOI Public Use File (PUF)," 2014, available at www.taxpolicycenter.org/publications/new-resources-microdata-based-tax-analysis/full. Further, unlike the ITM's base data, the public-use data generally do not contain linked information returns.

B. Base Data from Information Returns

The Joint Committee staff augments the taxpayers' tax return data with additional data sources available from the IRS. In particular, a number of information returns received by the IRS from third parties are linked to the taxpayers in the base sample. The information returns that are linked to taxpayers in the sample are¹⁸

- Form 1095-A, *Health Insurance Marketplace Statement*;
- Form 1095-B, *Health Coverage*;
- Form 1095-C, *Employer-Provided Health Insurance Offer and Coverage*;
- Form 1098, *Mortgage Interest Statement*;
- Form 1098-E, *Student Loan Interest Statement*;
- Form 1098-T, *Tuition Statement*;
- Form 1099-DIV, *Dividend Income*;
- Form 1099-G, *Certain Government Payments*;
- Form 1099-INT, *Interest Income*;
- Form 1099-MISC, *Miscellaneous Income*;
- Form 1099-Q, *Payments from Qualified Education Programs (Under Sections 529 and 530)*;
- Form 1099-R, *Distributions from Pensions, Annuities, Retirement or Profit-Sharing Plans, IRAs, Insurance Contracts, etc.*;
- Form 1099-SA, *Distributions from an HSA, Archer MSA, or Medicare Advantage MSA*;
- Form 5498, *IRA Contribution Information*;
- Form 5498-SA, *HSA, Archer MSA, or Medicare Advantage MSA Information*;
- Form RRB-1099, *Payments by the Railroad Retirement Board*;
- Form SSA-1099, *Social Security Benefit Statement*;
- Form W-2, *Wage and Tax Statement*; and
- Form W-2G, *Certain Gambling Winnings*.

For taxpayers with wage information, the linked Forms W-2, *Wage and Tax Statements*, provide important information about their employment and expand the ITM's scope for policy analysis. In addition to information on non-wage compensation, retirement, and special pay categories found on each Form W-2, these forms contain the earnings base (*e.g.*, wages, salaries, and tips) and withholding for Social Security taxes and Medicare taxes, allowing the ITM to be used to simulate proposed changes to payroll taxes. Further, each Form W-2 in the sample is

¹⁸ Other information returns are added on an as-needed basis.

linked to the employer's Form 941, *Employer's Quarterly Federal Tax Return*, using the employer identification number ("EIN") of the worker's employer.¹⁹ Form 941 provides information about the employer, such as the number of employees and the North American Industry Classification System ("NAICS") industry code of the firm or entity.²⁰ The Joint Committee staff may thus analyze proposals that provide for special treatment of employees based on the size or industry of their employer. These data also facilitate analysis of proposals related to specialized treatment for employers with certain characteristics.

¹⁹ JCX-75-15 provides additional discussion of the links created using Form W-2.

²⁰ NAICS is the standard classifier used by Federal statistical agencies to group business establishments according to their primary industry for the purpose of collecting, analyzing, and reporting statistical data for the U.S. economy.

C. Data Related to Income Tax of Estates and Trusts

In addition to that for individual taxpayers, the ITM includes data for fiduciaries of estates and trusts as reported on Form 1041, *U.S. Income Tax Return for Estates and Trusts*. These taxpayers report income and calculate tax liabilities in a sufficiently similar way to individuals that the ITM provides a natural framework for modeling their responses to proposed changes to tax law. To create a dataset of fiduciary taxpayers for the ITM, the Joint Committee staff has selected a stratified random sample of 19,371 Form 1041 returns, nearly all of which were filed for tax year 2019.²¹ The sample represents the approximately 2.8 million filed Form 1041s. For the fiduciary taxpayers in the sample, the file contains the estates' or trusts' income and deductions, their income tax liabilities, as well as their distributions to beneficiaries.

The Joint Committee staff employs stratified sampling of the filed Form 1041 returns to create a representative sample of the fiduciary population. The sampling strata are based on the amount of income tax liability attributed to the estate or trust, with higher-liability returns sampled more often than returns with lower liabilities. At the high end, a 100-percent sampling rate applies to returns reporting an income tax liability of over \$2 million. Conversely, many trusts and estates receive large amounts of income but have no income tax liability because they distribute the entirety of their income to beneficiaries. Separate sampling strata based on income are employed for these returns to ensure sufficient diversity of taxpayer circumstances within the sample.

²¹ IRS's Compliance Data Warehouse ("CDW") databank contains the complete data file of all Form 1041s filed except for Form 1041-A, *U.S. Information Return Trust Accumulation of Charitable Amounts*. The Joint Committee staff creates the ITM sample of fiduciary tax returns from this master file.

III. IMPUTATIONS TO THE ITM DATA

The Joint Committee staff supplements the INSOLE taxpayers' base data, extracted from their tax and information returns, with additional data from a variety of sources. These additional data support the modeling of policies that depend on taxpayer characteristics which are not reported on tax returns and not observed by the Joint Committee staff. The supplementary data is added to the taxpayers' records within the ITM through a variety of methods, depending on the source of the data, as described below. Collectively, these data additions are referred to as "imputations." Some imputations included in the ITM are necessary to analyze provisions of present law enacted or modified after the 2019 base year of the data. Others relate to required information about people or types of income, expenses, or deductions that are not reported on tax returns, often because these people or income are not taxed, or these expenses may not be deducted under present law. Still other imputations address missing data in the underlying data files.

A. Constructing the Nonfiling Population

Some proposed changes to the tax law would affect individuals who do not file Federal income tax returns under present law. In addition, the Joint Committee staff is sometimes asked to produce analyses of the entire U.S. resident population.²² Consequently, in addition to the filing population represented by the sample of filed income tax returns, the ITM data must also represent the population of nonfilers. Table 1 shows the methodology for estimating the number of nonfilers that need to be represented in the ITM's core data for full population analysis. In general, the size of the nonfiling population is estimated as the difference between the total U.S. resident population and the U.S. resident population represented by the sampled non-dependent individual income tax returns.

²² For analyses of the U.S. resident population, the Joint Committee staff includes all residents of the 50 States and the District of Columbia alive at any time during the tax year. This definition of the U.S. resident population focuses on the scope of the U.S. tax system: under present law, all such individuals may face a tax-filing requirement. Bona fide residents of U.S. territories, who are included in CBO's estimates of the U.S. population, are generally not required to file an income tax return.

Table 1. Determining the Size of the 2019 Nonfiling Population

	Population (millions)
Congressional Budget Office estimates	
End-of-year 2019 U.S. resident population^[1]	329.2
Total deaths in 2019 ^[2]	2.9
Total resident population alive at any time in 2019	332.1
People represented on tax returns	
Number of people reported on individual tax returns for 2019^[3]	294.4
Less population on tax returns of taxpayers living overseas	-1.5
Less adjustment for excess dependent children claimed ^[4]	-0.6
Total resident population represented on tax returns	292.3
Implied nonfiling resident population	39.8

[1] CBO’s population definition includes people living in the U.S. territories. To exclude territory populations from yearly U.S. resident population estimates, the Joint Committee staff uses the ratio of the Census Bureau’s 2019 estimate of the U.S. resident population, which does not include territory populations, to CBO’s 2019 estimate of the population, by single year of age.

[2] The National Center for Health Statistics, www.cdc.gov/nchs/data/databriefs/db395-H.pdf.

[3] Tabulations from the 2019 SOI INSOLE file. This population consists of non-dependent filers, spouses on joint returns, and any dependent eligible for the child tax credit or credit for other dependents.

[4] The Joint Committee staff estimates that 0.6 million children are the bases for claims of the child tax credit or credit for other dependents but are not U.S. residents. The adjustment is further explained in Part III.H. of this document.

Information about the nonfiling population is derived from the nonfilers included in the Continuous Work History Sample (“CWHS”), another statistical sample of tax and information returns. The CWHS was originally developed to meet the informational needs of the early Social Security system and is composed of all individuals whose Social Security number (“SSN”) ends in one of 10 unique four-digit numbers.²³ Because the last four digits of SSNs are random, the CWHS comprises a large, random statistical sample of U.S. individuals. SOI produces CWHS data files by aggregating more than 50 distinct information returns filed with the IRS for all members of the CWHS. The Joint Committee staff cross-references the CWHS members in the information return data with the list of all SSNs appearing as filers or dependents on any filed tax return to identify those CWHS members that are not associated with a filed individual income tax return. The information returns of the nonfiling members of the CWHS enable the Joint Committee staff to estimate the overall distributions of some important tax characteristics of nonfilers, such as wages as reported on Form W-2.

Despite the wealth of information about nonfilers inferred from the information returns of the nonfilers sampled in the CWHS, their information returns lack the necessary details, such as marital status, to infer how nonfilers would complete income tax returns. Alone, the nonfilers in the CWHS are representative of nonfiling individuals and not “tax units,” the groups of related taxpayers who, as families or households, would appear together on an income tax return if filed. To properly model the population of nonfiling tax units within the scope of the ITM, the Joint Committee staff constructs a hypothetical sample, composed of thousands of hypothetical tax units, drawn from the population of nonfiling tax units, and adds their imputed income tax returns to the ITM’s core data.²⁴ The creation of these representative nonfiling tax units, and their hypothetical income tax returns, begins with the information returns of the nonfiling members of the CWHS.²⁵ As represented by these individuals when weighted, the size of the nonfiler population, by detailed age class, nearly equals, but is less than, the known nonfiler population. The Joint Committee staff uses a small weight adjustment to make the weighted sample size equal the nonfiler population target.

The Joint Committee staff uses the CWHS’s nonfiling individuals to create multi-person tax units by first assigning a marital status as “single” or “married” to each nonfiling person. These assignments are made using the marriage rates of similarly aged, low-income taxpayers. Using the nonfilers imputed as “married,” the Joint Committee staff creates joint returns by linking 8.1 million weighted male nonfilers to 8.1 million weighted female nonfilers to form

²³ While the first five digits of an SSN were previously linked to geographic area and time of issue, the last four digits of an SSN are a sufficiently random number. See www.ssa.gov/employer/randomization.html. Thus, each person in the United States has an approximately one-in-1,000 chance of being selected for the CWHS. In cases where the taxpayer does not have an SSN, an alternative Individual Taxpayer Identification Number (“ITIN”) is used for selection. ITINs are briefly discussed below.

²⁴ For a detailed description of the process of creating the nonfiling population, see James Cilke, “The Case of the Missing Strangers: What We Know and Don’t Know About Non-Filers”, *NTA Proceedings, 2004, 107th Annual Conference* available at www.ntanet.org/wp-content/uploads/proceedings/2014/029-cilke-case-missing-strangers-know-don.pdf.

²⁵ The information returns used for the nonfilers in the 2023 ITM are for tax year 2019 and have an SSN (or ITIN) with a CWHS-associated final four digits that does not appear on a 2019 individual tax return filed with the IRS through approximately October of 2021.

married couples.²⁶ Individuals who are linked by assigned marriage into a joint return are from the same age class, such that the distribution of joint nonfiler returns by age class generally follows the same distribution as that of filers. With these assignments, the number of married persons with a U.S. address on the ITM is very close to estimates of the total number of married persons in the U.S. resident population.

The Joint Committee staff then designates all “single” nonfilers aged 16 and under, as well as a subset of those aged 17 to 18, to be the dependents of nonfiling adults.²⁷ The procedure also designates as dependents a subset of nonfilers aged 17 to 23 who received a Form 1098-T information return for tuition expenses, with the likelihood of being designated as a dependent declining with age. Some of the identified dependents are linked to the imputed married couples and the remainder to the unmarried taxpayers. Nonfilers assigned as parents are between 18 and 65 years of age and do not have wages, based on the assumption that low-income wage earners with children would file a tax return to claim the earned income tax credit.

Finally, the Joint Committee staff creates hypothetical tax returns to bring this population of nonfilers into the return-oriented structure of the ITM. The Joint Committee staff assigns “married filing jointly” filing status to the created married couples, “head of household” filing status to unmarried taxpayers that are linked to a nonfiler dependent child, and “single” filing status to the remaining single, non-dependent taxpayers.²⁸ For these hypothetical tax returns, the various information returns provide data on sources of income and deductions: wages come from Form W-2, Social Security benefits from Form SSA-1099, unemployment benefits from Form 1099-G, and so on.

²⁶ Legally married individuals, regardless of the sex of their spouse, have been required to file as “married filing jointly” or “married filing separately” since 2013. Between 2013 and 2015, the number of States with legal same-sex marriages grew from 12, and the District of Columbia, to all States recognizing same-sex marriages in 2015. As additional years of tax data provide information about the characteristics of same-sex married couples, the Joint Committee staff anticipates including these couples in its imputation of nonfiling taxpayers.

²⁷ Further details on the assignment of dependents to nonfiling tax units are discussed in JCX-75-15.

²⁸ The percentage of taxpayers filing “married filing separately” returns or “qualifying widow(er)” returns is sufficiently small that the Joint Committee staff has not included such filing units in its constructed nonfiling population.

B. Missing Age Data and Missing Death Status Indicators

SOI can identify, with some exceptions described below, the year of birth, year of death (when relevant), and sex of every taxpayer using an exact match to SSA data. In some cases, the year of birth is missing. For example, the year of birth is often missing for taxpayers who use an Individual Taxpayer Identification Number (“ITIN”) as an identification number rather than an SSN.²⁹ Further, some taxpayers, especially dependents, have missing SSNs or ITINs. The most common reason for a missing SSN or ITIN is that the individual is a newborn. The Joint Committee staff imputes missing ages using data on the number of unobserved individuals of each age. The imputed age is consistent with other information on the return. For example, if a taxpayer claims the additional standard deduction available to taxpayers older than 64, the imputed age is greater than 64. Further, unusually high or unusually low ages in the ITM base data are considered errors and a corrected age is imputed. The Joint Committee staff applies these corrections for taxpayers reported as older than 108 and for non-dependent taxpayers reported as younger than 15, as the Census Bureau reports both cases to be exceedingly rare.

²⁹ An ITIN is a nine-digit number assigned to individuals (*e.g.*, foreign nationals with U.S. income) who need to file an individual tax return but do not have, and are ineligible to receive, an SSN from the Social Security Administration. See “Individual Taxpayer Identification Number (ITIN),” online at www.irs.gov/individuals/individual-taxpayer-identification-number.

C. Statistical Matches to Survey Data

Tax forms generally only gather information that is necessary to administer the prevailing tax laws. Yet the Joint Committee staff regularly analyzes alternative tax laws and systems that would require additional or complementary information. For these types of analyses, taxpayers' information reported on existing tax returns, on information returns, and linked through other administrative records as described above does not fulfill the data needs of the ITM. In cases where policymakers ask for analysis of a proposed tax law change that requires unreported information, the Joint Committee staff frequently must impute such information for taxpayers. Statistical matching is an imputation method that uses the statistical relationships between a set of variables common to two or more data sets to find statistically similar observations across data sets and once identified, "fill in" variables that are missing or unobserved in one dataset with the values observed for those variables in the other data sets.³⁰ Although the imputed values are not the exact, true values for each individual taxpayer in the resulting data, statistical matching aims to preserve important distributional features and serve as a representation of those values for the population as a whole. Using the variables common to the tax records and large, national surveys of U.S. residents, the Joint Committee staff augments the ITM's taxpayer data to include an array of otherwise unobserved characteristics of the population of U.S. residents and taxpayers.

Statistical match to the Household Component of the Medical Expenditure Panel Survey

To impute a broad spectrum of unobserved taxpayer characteristics, the Joint Committee staff matches the ITM's taxpayers to the Household Component of the Medical Expenditure Panel Survey ("MEPS"), produced by the Agency for Healthcare Research and Quality of the Department of Health and Human Services.³¹ The MEPS is an ongoing annual survey of approximately 30,000 individuals across 15,000 U.S. noninstitutional households, providing nationally representative data on demographic characteristics, work and income, medical care use and cost, and health insurance coverage. Each household in the MEPS is interviewed five times covering a two-year period to track changes in individual and family characteristics, such as job and insurance status, with annual review of income information occurring around tax-filing season. The information gained from the MEPS match includes amounts of excludable income such as workers' compensation, which is unobserved on tax returns, and healthcare-related information such as Medicare insurance coverage and out-of-pocket medical expenses by type of expense.

The 2023 edition of the ITM includes a statistical match to the MEPS household data from calendar years 2017, 2018, and 2019, with the earlier data inflation-adjusted and population-scaled to 2019 levels. Self-reported demographic, relationship, and income information in the MEPS identify individuals and family groups which correspond to tax units that would file individual, joint, and dependent income tax returns. These MEPS tax units are statistically matched to the ITM's tax units by first segregating tax units in both datasets according to their number of filers (*i.e.*, joint versus non-joint returns), number of dependents claimed on their

³⁰ Additional discussion, examples, and references for statistical matching are provided in JCX-75-15.

³¹ Information about the Medical Expenditure Panel Survey, of which the Household Component is one survey, is available at meps.ahrq.gov/mepsweb.

returns (none, one, or two or more), age category of the taxpayer (or higher-earning taxpayer in the case of joint returns), and income quintile. Within the resulting groups of tax units, the matching algorithm creates pairs of ITM/MEPS matches by selecting tax units from each that are most similar across filers' actual ages, sex, marital status and dependency (for non-joint returns), range of dependents' ages, and rank within income categories including wages, interest, dividends, business income, retirement income, and Social Security, as well as by any dependents' age ranges. For the 2023 edition of the ITM, statistically matching MEPS records to the taxpayer data provides imputations for

- health status and disability indicators;
- foreign birth status;
- workers' compensation benefits received;
- child support payments received;
- other public assistance benefits received;
- food assistance receipt indicators;
- total and out-of-pocket medical expenses;
- indicators of health insurance coverage under the Indian Health Service and individual components of Medicare;
- indicators of insurance coverage for prescriptions, vision, and dental services; and
- contributions to a healthcare flexible spending account program.

Statistical match to the Interview Survey of the Consumer Expenditure Surveys

Federal tax revenue, especially from excise taxes, is often generated by production or sales of various goods and services and which are unobserved on individual tax returns. The Joint Committee staff statistically matches the Interview Survey of the U.S. Bureau of Labor Statistics's Consumer Expenditure Surveys ("CES") to the ITM's taxpayers to impute various expenditures related to Federal taxation.³² The CES is a nationwide household survey of civilian, noninstitutionalized consumers' spending, with approximately 5,000 addresses completing the survey each calendar quarter. In addition to demographic, household, and family characteristics, the survey collects expenditure information ranging from rent and mortgage information to expenditures on alcohol and tobacco products.

The CES asks respondents about their expenditures during the three calendar months prior to the month of their interview. To align with the 2019 tax return information, CES data from the four quarters of calendar year 2019 and the first quarter of 2020 are used for the statistical match. As with the MEPS match, demographic and income information are used to identify the households in the CES statistically most similar to the taxpayers in the ITM's return data. The ITM/CES match requires CES households to match exactly the ITM tax units by marital status,

³² Information about the Consumer Expenditure Surveys, of which the Interview Survey is one component, is available at www.bls.gov/cex.

the presence of dependents, and whether the primary filer is 65 years old or older. Within the resulting groups of CES households and ITM tax units, the matching algorithm creates pairs of CES/ITM matches by selecting tax units from each that are most similar across income, the number of additional dependents (if applicable), evidence of homeownership, and geographic region. From the statistical match, the taxpayers in the ITM data are imputed annual expenditure amounts for

- gasoline, fuel, and motor oil;
- telephone services;
- airfare;
- alcoholic beverages;
- tobacco and smoking supplies;
- health care; and
- total expenditures.

These imputed expenditures are primarily used when estimating the distribution of excise taxes across expanded income categories in the Joint Committee staff's distributional analyses.³³ For those analyses, total tax revenue by type of excise tax, as estimated by CBO, is apportioned by taxpayers' imputed expenditures in the relevant category. For example, the revenue from Federal excise taxes on beer, wine, and distilled spirits is apportioned by taxpayers' imputed spending on alcoholic beverages.

³³ A detailed description of expanded income is given in Joint Committee on Taxation, *Modeling the Distribution of Taxes on Business Income* (JCX-14-13), October 16, 2013, available at www.jct.gov.

D. Estimating Potential Itemized Deductions

Some proposals that the Joint Committee staff analyzes would expand the scope of various itemized deductions or decrease the standard deduction. Under these proposals, more taxpayers might be expected to claim itemized deductions rather than the standard deduction. To analyze these proposals, the ITM must include estimates of taxpayers' potential itemized deductions, even when they claimed the standard deduction on their actual, filed tax returns.

To estimate potential itemized deductions, the Joint Committee staff imputes amounts to non-itemizing taxpayers for

- investment interest expenses;
- home mortgage interest expenses;
- private mortgage insurance premiums;
- State and local taxes, including income, sales, real property, and personal property taxes;
- cash and non-cash charitable donations, as well as any donations carried over from previous years;
- miscellaneous expenses subject to the two-percent of adjusted gross income (“AGI”) floor and other miscellaneous expenses;
- casualty and theft losses unrelated to disasters; and
- out-of-pocket medical expenses.

Miscellaneous expenses and medical expenses, which are only deductible when greater than a given percentage of taxpayers' AGI, are also imputed to itemizing taxpayers when their returns otherwise report no such expenses. Similarly, when an itemizing taxpayer deducts either State and local income taxes or State and local sales taxes, the unreported deduction is imputed.

Although some of these itemized deductions are limited or disallowed entirely for tax years 2018 through 2025 under the budget reconciliation act for Federal fiscal year 2018, passed in 2017 (the “2017 Act”), Pub. L. No. 115-97, the ITM is constructed to permit analysis of all years within the budget period, including those years when these deductions are, under present law, again allowed. Further, the value of these deductions for tax years 2026 and later are projected forward using the base year data from 2019. Thus, the Joint Committee staff imputes the full values of all these expenses to taxpayers for their 2019 returns notwithstanding the changes made by the 2017 Act. With an imputed value in place for 2019, the extrapolation process discussed in Part IV below accounts for growth in the amounts of these deductions in later years of the budget period, and the tax calculators discussed in Part V calculate taxpayer liability in those years under the applicable laws for itemized deductions.

The changes in deductions made by the 2017 Act and the update of the ITM's base data to the 2019 tax year necessitated a new approach to the imputation of potential itemized deductions on the ITM. As detailed in JCX-75-15, for ITM models using base data from 2017, the Joint Committee staff relied on the distributions of reported itemized deductions on the 32 percent of income tax returns that itemized to impute the values of potential itemized deductions for non-

itemizers. The 2017 Act significantly raised the standard deduction and modified or disallowed several itemized deductions for tax years 2018 through 2025. As a result, only 12 percent of income tax returns claimed itemized deductions in 2019, and taxpayers on those returns only reported information for those itemized deductions allowed in that year. The reduced number of itemizers and nonreporting of disallowed deductions provides less information about itemized deductions from which to make the needed imputations, particularly for taxpayers with lower incomes: while the rate of itemizing fell from 93 percent of income tax returns in the top one percent of incomes³⁴ in 2017 to 68 percent in 2019, the rate fell from 17 percent to five percent over the same period for returns between 40 percent and 60 percent of the income distribution. With less itemization data to use as a reference, the Joint Committee staff employs a new approach to the imputation of potential itemized deductions for the 2019-based, 2023 edition of the ITM as follows.

The Joint Committee staff generally imputes potential itemized deductions in the order of the bulleted listed above, starting imputation with those items for which information is reported to the IRS: investment interest expenses, home mortgage interest, and private mortgage insurance. Non-itemizers report their allowed investment interest expenses on Form 4952, *Investment Interest Expense Deduction*. Mortgage lenders provide individuals with Form 1098, *Mortgage Interest Statement*, detailing paid amounts for home mortgage interest expenses and private mortgage insurance premiums. These potential itemized deductions are directly linked to non-itemizing taxpayers' returns in the ITM data.

In the case of State and local sales taxes, taxpayers may claim deductions for these taxes based on actual expenses or may use a Form 1040 Schedule A worksheet combined with an optional set of State and local sales tax look-up tables. For a given State, the tables' deduction amounts vary by income class and family size. The Joint Committee staff imputes State and local sales taxes based on the look-up tables and an adjustment derived from research into the actual distributions of claimed amounts by itemizing taxpayers, some of which claim an amount different than that in the tables.³⁵

The remaining deductions are simultaneously imputed to the 2019 taxpayers using extrapolation and statistical matching. Extrapolation of the tax year 2017 ITM data, the latest year prior to the changes made by the 2017 Act, to the economic conditions of tax year 2019 provides the Joint Committee staff with estimates of the correlations between taxpayers' characteristics and their expected itemized deductions for tax year 2019. Statistically matching the extrapolated-to-2019 taxpayers to the actual 2019 taxpayers and imputing itemized deductions from the match allows the Joint Committee staff to impute deductions in a manner that preserves underlying correlations. As with the MEPS and CES, the goal of the statistical match is to enhance the ITM taxpayer data with otherwise unobserved information. The preservation of the correlations

³⁴ The income concept for these statistics is the Joint Committee staff's measure of expanded income, defined and compared to other measures of income in Joint Committee on Taxation, *Overview of the Definition of Income Used by the Staff of the Joint Committee on Taxation in Distributional Analyses* (JCX-15-12), February 8, 2012, available at www.jct.gov.

³⁵ A few reasons explain why taxpayers may not claim the optional look-up table amounts, such as taxpayers reporting their actual expenses.

improves the accuracy of the ITM’s modeling of taxpayers’ behavior and revenue responses, particularly for proposals that include multiple, simultaneous changes.

In greater detail, the imputation process for the remaining deductions starts with the 2021 edition of the ITM based on tax year 2017 returns. For that model, itemized deductions are imputed as described in JCX-75-15. In general, potential itemized deductions in that edition of the ITM are derived from the values of the deductions claimed by itemizers, modified as needed to align the ITM data with established baselines and other benchmark data. For example, in the imputation of charitable donations, the Joint Committee staff scales the imputed frequency of non-itemizers’ donations, as well as their imputed donation amounts, so that when non-itemizers’ imputed giving is combined with itemizers’ reported donations, total charitable giving statistics match those found in industry research.³⁶ The standard ITM extrapolation process, as detailed in Part IV below, is used to transform these 2017 data to be representative of the economic conditions of 2019. The extrapolation process accounts for the growth rates from 2017 to 2019 of the hundreds of income and expense variables maintained for each taxpayer, as well as the compositional changes across the population of taxpayers, as measured by more than 100 demographic and economic outcome targets that establish a baseline for the extrapolated data. This process produces the dataset of taxpayers referred to as the “extrapolated taxpayers.”

The imputation process continues with a statistical match of the extrapolated taxpayers to the 2019 taxpayers. As with the MEPS and CES, the statistical match for itemized deductions requires the extrapolated and 2019 taxpayers to have some characteristics exactly in common, while other return characteristics are allowed to differ; the statistical matching algorithm minimizes the differences between the extrapolated and 2019 taxpayers along these latter characteristics. Taxpayers in both datasets are required to have the same filing status category, age group of the highest-earning taxpayer, number and age of dependents category, personal property tax category or region, and initial INSOLE file sample weight group. After the taxpayers from both datasets are classified into one of 385 unique combinations of these variables, referred to as bins, the 2019 taxpayers are statistically matched to the returns from the extrapolated data within each bin. The matching algorithm maximizes the similarity of matched returns’ specific characteristics within the categories listed above (filing status, primary taxpayer age, number of dependents by age group, and sample weight) as well as within-bin rank of several sources and measures of income (wages, unemployment income, Social Security benefits, distributions from retirement accounts, interest, dividends, capital gains, business income, farm income, income from Form 1040 Schedule E, total income, and AGI) and certain return characteristics (indicators for blind taxpayers and whether a return was professionally prepared). Post-match analysis of the matched taxpayers suggests a high degree of effectiveness of the procedure.³⁷

³⁶ Targets of charitable giving for the 2017 base year were derived from information provided by the Giving USA Foundation. See *Giving USA 2018: The Annual Report on Philanthropy for the Year 2017*, Giving USA Foundation, Chicago, IL, 2018.

³⁷ For example, among the evaluated measures of success, the distribution of differences in AGI between the matched taxpayers is appropriately centered at zero, with the median difference being less than 0.15 percent. Across all matches, more than 50 percent of matches have an absolute difference in AGI of less than 10 percent.

In general, the 2019 taxpayers' potential itemized deductions are imputed with the values from their matched extrapolated taxpayers. The aggregate totals and statistical distributions of the imputed deductions generally align with those of the deductions among the extrapolated taxpayers, with a few exceptions. For those imputed deductions with excess aggregate totals, the Joint Committee staff slightly revises the imputed values to reflect expected aggregate totals. For example, imputed real estate and personal property taxes are reduced by 11 percent and three percent respectively among non-itemizers to meet the totals of those taxes among the extrapolated taxpayers. Imputed cash and noncash charitable donations are reduced by nine percent overall. Further, cash, noncash, and carryover charitable donation amounts are reduced among non-itemizers in cases where they exceeded 60 percent of AGI to just the extent necessary to keep the rate of taxpayers meeting the 60 percent maximum at the same rate as that among the extrapolated taxpayers.

The Joint Committee staff makes further adjustments to the imputed potential itemized deductions for logical consistency with 2019 taxpayers' individual circumstances. For example, the imputed values of medical expenses for 2019 itemizers who did not report such expenses is capped at 7.49 percent of AGI, ensuring they would not otherwise have reported the imputed amounts with their itemized deductions. In the case of the deduction for gambling losses, the itemized deduction is separately estimated to ensure that only returns with gambling winnings have the potential to report gambling losses, in line with tax law. For that deduction, the Joint Committee staff estimates the probability that a taxpayer with gambling winnings would, if itemizing, report gambling losses. For the taxpayers identified as likely to report gambling losses, the Joint Committee staff assigns as the value of their gambling losses a proportion of their gambling winnings, with the proportion drawn from the distribution of reported losses over winnings among the extrapolated taxpayers.

The final step in the imputation of potential itemized deductions sets the value of some deduction amounts to zero in cases where the total value of the imputed deductions would otherwise exceed the standard deduction. This step preserves the taxpayers' decision to take the standard deduction rather than itemize under the assumption that the taxpayers' choice minimizes their tax liability. Specifically, the Joint Committee staff prioritizes the values of the imputed potential itemized deductions in the order of the bulleted list at the top of this subsection, such that any deduction that would cause total itemized deductions for the return to exceed the return's standard deduction is scaled back, and all subsequent deductions are reduced to zero.

E. Imputations for Items Subject to Limitations

Some Code provisions limit the eligibility of certain taxpayers or allowable amounts for certain deductions or credits. When neither a requirement nor incentive to report exists, taxpayers not eligible for such deductions or credits do not routinely report their expenditures that might otherwise be eligible. Some proposals modify the limitations applicable to these deductions or credits, necessitating that the Joint Committee staff model the effects of these limitations despite non-universal reporting.³⁸ To assess the revenue effects of such proposals using the ITM, the Joint Committee staff imputes information about potentially qualifying expenditures for taxpayers who do not report such information in the base tax return data file. Some imputations are made by linking taxpayers' information returns to their tax returns and using the reported information on the information return to augment the tax return, while others must be estimated using statistical methods and any available data. The discussion below provides a non-exhaustive overview of provisions of the Code for which the Joint Committee staff imputes information on expenditures that are limited under present law.³⁹

Tuition expenses. To be eligible for the deduction for qualified tuition expenses paid in 2019, a taxpayer needed to have a modified AGI below \$80,000 (\$160,000 for joint returns). The maximum deduction in 2019 was \$4,000. To identify both tuition expenses for taxpayers with incomes above the thresholds and tuition expenses in excess of the maximum deduction, the Joint Committee staff links and uses the information from Form 1098-T information returns for every taxpayer in the ITM sample.

Interest on student loans. To be eligible for the deduction for interest paid on student loans in 2019, the taxpayer's modified AGI must have been less than \$85,000 (\$170,000 for joint returns). The maximum deduction in 2019 was \$2,500. To identify both student loan interest payments for taxpayers with incomes above the thresholds and student loan interest payments in excess of the maximum deduction, the Joint Committee staff links and uses information from Form 1098-E information returns for every taxpayer in the ITM sample. For tax years affected by President Biden's executive order in response to the COVID-19 coronavirus pandemic which waived the payment of student loans, the Joint Committee staff further imputes a reduction in qualified student loan interest expenses for a subset of taxpayers with student loan interest to reflect the interest-free environment of eligible Federal student loans.

IRA contributions. In general, for 2019, the total amount of individual retirement arrangement ("IRA") contributions, and the maximum potentially deductible amount of contributions, was limited for an individual to \$6,000 (\$7,000 if aged 50 or over). Single and

³⁸ In the development of the ITM's data, the items subject to limitations include those affected by temporary policies that exclude or limit expenditures for certain tax years. As with the itemized deductions discussed above, the 2017 Act created several tax year limitations for 2018 through 2025. Taxpayers in 2019, consistent with the tax law for that year, did not report expenditures for deductions or credits that were not available in that year, but available in 2026 and beyond. Because the ITM's base data in 2019 serves as the pre-extrapolation base data for all years in the budget period, the deductions and credits limited by the 2017 Act must be imputed for 2019 in the same manner as deductions and credits limited for other reasons.

³⁹ The Joint Committee staff imputes amounts to returns on a case-by-case basis when proposals by Members of Congress create the need for such information.

head-of-household taxpayers who were covered by an employer-sponsored retirement plan and who made contributions to a traditional IRA could deduct contributions up to the maximum only if their modified AGI did not exceed \$64,000. The modified AGI ceiling for deducting the maximum contribution for a married taxpayer with an employer-sponsored plan filing a joint return was \$103,000. If only one of the spouses filing a joint return was eligible for an employer-sponsored plan, the AGI ceiling for deducting the maximum contribution for the other spouse was \$193,000. For modified AGI beyond the ceiling, the maximum deductible contribution amount toward a traditional IRA phased out over the following \$10,000 range (except that the limit for a married person with an employer-sponsored plan filing a joint return phased out over a \$20,000 range). A person with neither an employer-sponsored retirement plan nor a spouse with an employer-sponsored plan could make a deductible contribution to a traditional IRA up to the maximum regardless of income.

The maximum amount of allowed contributions to a Roth IRA is the same as to a traditional IRA though the income ceilings for Roth IRA contributions, which apply without regard to participation in an employer-sponsored plan, were higher than those for a deductible traditional IRA. A single or head-of-household filer could fully contribute to a Roth IRA with a modified AGI up to \$122,000; the applicable modified AGI for filers of joint returns was \$193,000. The limit on Roth IRA contributions is phased out over a \$15,000 income range for single and heads-of-household returns, and \$10,000 for joint returns.

To analyze the revenue consequences of changing these contribution and deduction limitations, the Joint Committee staff predicts taxpayers' contribution amounts as if they were not subject to the present law limitations.⁴⁰ The process uses data from taxpayers' Forms 5498, *IRA Contribution Information*; reports of retirement program participation from Forms W-2; and the differential income ceilings between deductible traditional and Roth IRAs to estimate two-part models of IRA contributions and then impute two "desired" IRA contribution amounts. The first is a desired deductible IRA contribution amount and the second is a desired Roth IRA contribution amount. The ITM's tax calculators account for present law or a proposal's maximum allowed contributions relative to these desired contributions amounts when estimating revenue changes.

Moving expenses. For tax years 2018 through 2025, the 2017 Act limited the deduction for moving expenses to only military families. Under present law, beginning in 2026, all taxpayers will again be allowed to claim a deduction against their AGI for any qualified moving expenses incurred. Because the tax year 2019 base data does not report the moving expenses of non-military taxpayers, their expenses must be imputed for analysis of proposals which would change present law. To do so, the Joint Committee staff assumed that the moving expense deduction in 2019 would otherwise follow the same distribution as was observed in 2017. Specifically, the Joint Committee staff calculated the likelihood that a taxpayer would claim a moving expense deduction by earnings class, age class, and family status class (unmarried without dependents, unmarried with dependents, married without dependents, and married with dependents) and imputed an amount of moving expenses commensurate with that group's anticipated expenses.

⁴⁰ The imputation method for IRA contributions is discussed in additional detail in JCX-75-15.

Excess business losses. One provision of the 2017 Act was to limit the amount of business losses a taxpayer could use to offset other income sources. In 2019, the base year of the ITM data, the loss limitation was \$510,000 for joint filers and \$255,000 for all other filers. The excess business losses that would have otherwise been used to offset other income may be carried forward to future tax years as net operating losses. After the 2017 Act, further changes were made by the Coronavirus Aid, Relief, and Economic Security (“CARES”) Act of 2020, Pub. L. No. 116-36; the American Rescue Plan Act of 2021, Pub. L. No. 117-2; and the 2022 budget reconciliation act, Pub. L. No. 117-169, with the effect of extending the limitation for additional years in the budget period. The Joint Committee staff has developed an imputation to reflect the higher expected reporting of net operating loss carryforwards stemming from these limitations.

Requirement to itemize for certain “married filing separately” taxpayers. Taxpayers who file returns as “married filing separately” (“MFS”) are required to itemize deductions on their return if their spouse itemizes deductions. Under the changes enacted by the 2017 Act, millions of taxpayers, including MFS returns, chose to stop itemizing and instead claim the higher standard deduction available in tax year 2018 and subsequent years. Because the standard deduction will return to its previous, lower level in 2026, the Joint Committee staff expects the number of MFS taxpayers who choose to itemize, and thereby require their spouse to also itemize, will substantially increase in tax years 2026 and later relative to the number in the 2019. Using 2017 data, the Joint Committee staff estimated the likelihood that an MFS taxpayer would be required to itemize under the lower standard deduction. Based on that estimated likelihood, the Joint Committee staff then imputes a requirement to itemize to a subset of MFS taxpayers such that, starting in 2026, the percent of MFS taxpayers required to claim itemized deductions is approximately the same as observed in 2017.

F. Income Imputed for Inclusion in the Joint Committee Staff's Expanded Income Measure

For distributional analyses, the Joint Committee staff classifies taxpayers by an expanded income measure that includes certain income sources not reported on filed income tax returns or on information returns.⁴¹ In particular, the measure includes imputed amounts of workers' compensation, tax-favored employer and employee contributions to health and life insurance plans, the insurance value of Medicare benefits, and the incidence of the corporate tax on the taxpayer.

Workers' compensation. Imputed income attributable to workers' compensation is obtained from the statistical match to the MEPS described in Part III.C above. Taxpayers matched to MEPS respondents are assigned the MEPS respondents' amounts of workers' compensation income.

Value of Medicare benefits. The insurance value of Medicare benefits is imputed using a two-step process. First, the Joint Committee staff imputes Medicare enrollment status and type to individuals on the ITM. Medicare enrollment type refers to the combination of Medicare programs or "parts" that enrollees participate in: Part A (hospital insurance), Part B (medical insurance), Part C (Medicare Advantage), and Part D (drug coverage). Second, the Joint Committee staff imputes the average dollar value of Medicare benefits of the individual programs, as estimated by CBO, to enrolled taxpayers less their expected premiums.

The ITM's targets for the number of Medicare enrollees for each program comes from the annual Medicare Trustees Report, as well as statistics provided by the Center for Medicare and Medicaid Services.⁴² All Medicare enrollees, with limited exceptions sufficiently rare to disregard for modeling purposes, participate in Part A.⁴³ Nearly all U.S. residents aged 65 and over have Part A, and approximately 86 percent of Part A enrollees are 65 and older. The remaining Part A enrollees are generally disabled individuals receiving Social Security disability insurance benefits. Medicare statistics detail the distribution of Medicare enrollees' further participation in Parts B, C, and D coverage, separately for the population aged 65 and older, and the population younger than 65. The Medicare enrollment information in the ITM data is imputed to reflect these distributions.

The imputation of Medicare status and enrollment type relies on both the statistical match to the MEPS described in Part III.C above and linear probability models. After the statistical match is completed, individuals in the tax return data are assigned the Medicare participation status and type of their matched MEPS respondents. Using only these imputed values from the

⁴¹ For more information on the expanded income definition used by the Joint Committee staff, see Joint Committee on Taxation, *Overview of the Definition of Income Used by the Staff of the Joint Committee on Taxation in Distributional Analyses* (JCX-15-12), February 8, 2012, and Joint Committee on Taxation, *Modeling the Distribution of Taxes on Business Income* (JCX-14-13), October 16, 2013, available at www.jct.gov.

⁴² See www.cms.gov/data-research for Medicare program statistics and the Trustees Reports and supplemental data.

⁴³ Part C Medicare Advantage enrollees have coverage under Parts A and B (and often Part D) administered by a private health insurance provider rather than directly, but are still considered participants under Parts A, B, and D, as appropriate.

statistical match, the program enrollment totals for Medicare in the weighted ITM data deviate from the actual totals for a few reasons. First, the sampling frames of the two datasets are distinct: the MEPS samples only the U.S. civilian, non-institutionalized population, which is a subset of the U.S. resident population represented by the tax return data, as augmented with imputations for the nonfiling population. Second, self-reported insurance coverage, even in the MEPS data, can be misreported by survey respondents. The misreporting leads to differing totals given by the survey's responses, weighted for the population, and the Medicare Trustees Report. Finally, the statistical matching algorithm employed in the ITM/MEPS match is, on a matched person-to-person basis, intrinsically imperfect. The matching algorithm attempts to preserve correlations between taxpayer characteristics, such as age and income, with a taxpayer's Medicare enrollment type, though no statistical technique can perfectly predict the true enrollment status for each taxpayer in the sample. Instead, statistical matching improves the imputation's distributional characteristics across the sample compared to more random assignment.

What is a linear probability model?

A linear probability model is a statistical model used to study the relationship between an outcome variable, such as the result of an individual's decision, and several explanatory variables that are predictors of the outcome. Like the logit and probit regression equations discussed in JCX-75-15, the outcome or dependent variable is typically binary in nature, such as "yes" or "no," "participate" or "do not participate," and "retire" or "do not retire." The explanatory or independent variables are generally characteristics of the individual decision-maker that influence or are correlated with the outcome of the decision. The "linear" aspect of a linear probability model is an assumption that each explanatory variable has a constant, additive effect on the probability of the outcome, which nevertheless permits flexible models of the decision. Once a linear probability model is estimated using a sample of many individuals' decisions and their explanatory variables, the model generates a predicted probability of an affirmative outcome (e.g., "yes," "participate," or "retire") for each individual in the sample. Once estimated, the linear probability model can also be used to estimate predicted probabilities for individuals not in the estimating sample ("out of sample"). The Joint Committee staff often uses the predicted probabilities to rank individuals as "more likely" or "less likely" to make a particular choice.

To impute additional participation in each of Medicare Parts B, C, and D when the statistical match imputed too few enrollees, or to reduce enrollment when the statistical match over-prescribed enrollment, the Joint Committee staff estimates a linear probability model to rank taxpayers by predicted likelihood of their participation in each program. The taxpayer characteristics used to predict program participation are drawn from the MEPS variables of the matched ITM/MEPS data and include age, marital status, income and its components, self-

employment status, health status, and medical and prescription drug expenditures and out of pocket costs.⁴⁴ After the model is estimated, taxpayers are ranked from highest predicted probability of participation to lowest predicted probability of participation. To impute additional enrollees, taxpayers who are matched to a non-participating MEPS respondent but who have the highest predicted probabilities of participation are imputed as Medicare enrollees until the actual total number of enrollees is met. When too many enrollees are created by the match, the taxpayers who are matched to MEPS enrollees but who have the lowest predicted probabilities of participation are imputed as non-participants until only the targeted number of enrollees remains.

After taxpayers' Medicare enrollment status and type are imputed, the Joint Committee staff imputes the dollar value of Medicare benefits. Each year CBO provides estimates of the average value of recipients' benefits for the Medicare Part A, B, and D programs for each year in the Congressional budget period. The value of Medicare Part C, which includes the benefits under Parts A, B, and often D, is the sum of those programs' values, as appropriate. All Medicare enrollees are imputed the same benefit amount regardless of health status and health care utilization. However, Medicare Part B and Part D enrollees are required to pay a premium for participating in these programs that increases with income. The Center for Medicare and Medicaid Services provides estimates of the standard premium amounts for both Part B and Part D for most years in the Congressional budget period.⁴⁵ The Joint Committee staff follows Medicare's formulas and calculates each taxpayer's premium amount.⁴⁶ Part C enrollees' premiums are assigned using the Part B and Part D premiums and data from the Kaiser Family Foundation about characteristics of Medicare Advantage plans.⁴⁷ The imputed value of Medicare benefits included in expanded income is net of these premium amounts.

Employer contributions to life insurance. In general, employers can provide their employees with an annual life insurance policy of up to \$50,000, the premium for which can be excluded from income. The ITM's imputation for employer contributions to life insurance policies relies on information in the Bureau of Labor Statistics' Employer Costs and Employee Compensation news releases,⁴⁸ employer information linked to taxpayers' Forms W-2, and Federal group life insurance rates for taxpayers based on their age and wages.⁴⁹

⁴⁴ The Joint Committee staff additionally includes polynomials and interactions of some of these variables.

⁴⁵ Estimates for the last two years of the budget period are not available. The Joint Committee staff imputes the premium amounts for these years by extrapolating from the last available premium amount and using a medical-cost inflation adjustment.

⁴⁶ Certain Medicaid and other low-income Medicare enrollees may be eligible for a low-income subsidy to offset the premium requirement. At present the ITM does not account for this subsidy.

⁴⁷ The Kaiser Family Foundation's full report, "Medicare Advantage in 2022: Premiums, Out-of-Pocket Limits, Cost Sharing, Supplemental Benefits, Prior Authorization, and Star Ratings," is available at www.kff.org/medicare/issue-brief/medicare-advantage-in-2022-premiums-out-of-pocket-limits-cost-sharing-supplemental-benefits-prior-authorization-and-star-ratings.

⁴⁸ The Bureau of Labor Statistics provides an archive of its news releases for quarterly estimates of the Employer Costs for Employee Compensation at www.bls.gov/bls/news-release/ecec.htm.

⁴⁹ Details on the imputation of employer contributions to life insurance are further discussed in JCX-75-15.

Excludable contributions to employer-sponsored health plans. Information on employees receiving employer-sponsored health insurance coverage is obtained through the combination of several data sources. Form 1095-C provides coverage information from applicable large employers. Form 1095-B provides coverage information from insurance companies. Codes on Form 1095-B indicate whether the insurance is through an employer-sponsored plan or some other type of plan. Form W-2 provides some cost information for health-related benefits that employees receive. Separate codes on Form W-2 are used to distinguish between contributions to Health Savings Accounts (“HSAs”) and to employer-sponsored health insurance programs. Information reported on Form 8889 indicates whether a taxpayer received employer contributions to an HSA. CBO provides the Joint Committee staff with estimates of the number of policies holders of employer-sponsored health plans, as well as coverage from non-group health plans, for each year in the budget period. Incorporating these estimates into the ITM’s baseline ensures the Joint Committee staff’s estimates align with those of CBO.

Employer-sponsored health insurance premiums typically consist of two parts: the amount the employer directly contributes towards the health insurance premium, and the amount the employee contributes to the premium through a payroll deduction. For most active employees, the entire premium is excluded from income and payroll tax bases.⁵⁰ Using custom tabulations from the Agency for Healthcare Research and Quality,⁵¹ the Joint Committee staff converts employer-sponsored insurance premiums into three parts: the excludable amount paid by the employer, the excludable amount paid by the employee, and the includible amount paid by the employee (or former employee). The excludable amounts are included in the Joint Committee staff’s expanded income measure.

Employee contributions to excludable flexible spending accounts (“FSAs”) are not reported on any employer or employee information or tax return.⁵² Estimates of the number of FSA participants and total account contributions draw from the Joint Committee staff’s analysis of the MEPS, results of the Bureau of Labor Statistics’ National Compensation Survey,⁵³ and other sources. The MEPS data provide an estimate of the distribution of individuals’ annual account contributions. The imputation of individual taxpayers’ participation and contributions to FSAs, targeting the national total number of participants and contributions, parallels the imputation for Medicare participation described above, relying on both the statistical match of the MEPS data

⁵⁰ In certain instances, the employee’s contribution is not excluded. Included contributions are typical for taxpayers with continuation of health coverage after separation from employment, often referred to as “COBRA coverage,” and retiree health coverage.

⁵¹ At the request of the Joint Committee, the staff of the Agency for Healthcare Research and Quality provides custom tabulations of health insurance premium characteristics for employer-sponsored health insurance plans. These tabulations are derived from the Insurance Component of the Medical Expenditure Panel Survey, an annual survey of employers regarding health insurance offerings. The confidentiality requirements of the sampling frames for the Insurance Component limit disclosure of the underlying data.

⁵² Employer contributions to employees’ FSAs are reported on Form W-2 as part of employer-sponsored health insurance program costs.

⁵³ The Bureau of Labor Statistics provides information about the Employee Benefits Survey component of its National Compensation Survey, including an Annual Summary on Benefit Coverage with linked data tables, at www.bls.gov/ebs.

and a linear probability model. The taxpayers statistically matched to MEPS respondents with FSA contributions are assigned the contribution amounts of the matched respondents. To impute additional FSA participation among the sampled taxpayers, and thereby represent national participation levels, a linear probability model is estimated to determine which taxpayers, among those matched to non-participating MEPS respondents, are predicted most likely to participate; those predicted mostly likely are assigned FSA participation until the sample is representative of national participation. Finally, for taxpayers imputed as FSA participants, the Joint Committee staff imputes annual contributions to reflect the distribution observed in the MEPS data: most individuals report “round” amounts of annual contributions (*e.g.*, \$500, \$1,000, \$1,200) or the maximum amount (\$2,700 in 2019), with the remaining individuals reporting other amounts up to the maximum. The distribution of the contributions for these taxpayers is scaled so that, when evaluated together, the distribution of contributions for all taxpayers with an FSA aligns with that observed in the MEPS and yields the national total of all contributions.

The Joint Committee staff created an additional imputation affecting HSAs and FSAs in response to changes made by the CARES Act. Prior to the changes, only prescribed medicines and drugs qualified as medical expenses eligible for taxpayer reimbursement from HSAs and FSAs. The CARES Act expanded the definition of medical expenses to include certain over-the-counter medicines and medical supplies, including menstrual products. While expenditures for these additional items is reflected in the recent rounds of MEPS and National Compensation Survey data, the 2019 base data for the 2023 edition of the ITM precedes this change in law and therefore does not initially reflect the CARES Act changes. Accordingly, the Joint Committee staff imputes additional contributions to HSAs and FSAs to reflect increased contributions made by taxpayers using their accounts to purchase such goods following the CARES Act changes.

Incidence of corporate income taxes and taxes on passthrough business income. Because the Joint Committee staff’s concept of individuals’ expanded income is a current-year, pre-tax and transfer income concept, expressed in nominal dollars, taxpayer income is adjusted to account for the incidence, or economic burden, of business income taxation.⁵⁴ In the absence of business income taxes, businesses’ capital owners would receive higher incomes and their wage earners would receive higher wages. Therefore, the pre-tax and transfer income concept suggests an increase in the taxpayers’ income relative to the amount shown on their tax returns by the amount of business income taxes that are effectively borne by individuals. Expanded income is thus adjusted to reflect the Joint Committee staff’s incidence analysis with respect to business income of corporations, passthrough entities (*e.g.*, partnerships and S corporations), and sole proprietorships.

Corporate business owners’ and wage earners’ incomes are reported on their income tax returns after corporate income taxes have affected those incomes. The Joint Committee staff modifies the reported after-tax incomes to reflect pre-tax amounts to calculate expanded income using the historical incidence of corporate income taxes on owners and wage earners. Because passthrough owners report passthrough income on their individual tax returns and then pay the associated tax with their personal income taxes, their tax treatment would align with a pre-tax and

⁵⁴ The imputations for the incidence of corporate taxes and taxes on the income of businesses organized as passthrough entities are further described in Joint Committee on Taxation, *Modeling the Distribution of Taxes on Business Income* (JCX-14-13), October 16, 2013, available at www.jct.gov.

transfer income concept if the tax burden were borne entirely by the passthrough owner. However, the Joint Committee staff estimates that five percent of the passthrough tax is borne by workers rather than owners, meaning the income reported by passthrough owners on their individual tax returns exceeds their income under a pre-tax and transfer concept. Thus, taxes attributable to business activities of passthrough entities are accounted for in expanded income by reducing the expanded income of passthrough owners by five percent of the amount of taxes attributable to their passthrough entities and increasing the expanded income of workers by that same amount. The same is true for income received by owners of sole proprietorships.

G. Additional Imputations Related to Health Insurance

Exchange premiums and Exchange participation. Under certain circumstances, a taxpayer may claim an advance premium tax credit (“APTC”) by purchasing health insurance on a qualified health insurance Exchange.⁵⁵ APTC amounts are paid directly to the insurer on behalf of the taxpayer to cover a portion of the taxpayer’s monthly premium amounts. Taxpayers who received an APTC or who are eligible for a premium tax credit (“PTC”) are required to complete Form 8962, *Premium Tax Credit (PTC)*. Form 8962 reconciles any difference between the APTC received by the taxpayer and the final amount of the PTC the taxpayer is eligible to receive. If the APTC is less than the PTC, the taxpayer claims the difference as a refundable credit. If the APTC is more than the PTC, the excess, subject to limitations, is reported as an additional tax liability. Much of the information required on Form 8962 is provided to the taxpayer on Form 1095-A, *Health Insurance Marketplace Statement*, an information return furnished to all individuals who enroll in qualified health insurance through an Exchange.

While Form 8962 provides the necessary details on calculating a PTC, it does not provide health insurance coverage information for family members who arrange coverage through an Exchange. Here, the Joint Committee staff uses information reported on Forms 1095-A. In addition, in cases where a taxpayer receives an APTC, but fails to file a Form 8962, the Joint Committee staff uses Form 1095-A information to reconstruct the amounts that should have been reported on Form 8962.

Despite Form 1095-A and Form 8962 reporting, the ITM’s counts of people with Exchange coverage are less than the totals reported by the Department of Health and Human Services. To match the ITM’s counts of Exchange coverage to the administrative totals, the Joint Committee staff estimates a linear probability model to rank taxpayers according to their predicted probability of having Exchange coverage and then imputes coverage to additional taxpayers. In the linear probability model, a taxpayer’s predicted probability of Exchange coverage is estimated as a function of several characteristics, including family structure, age, income and its sources, tax liability, receipt of certain tax credits, and State of residence. After estimation, all taxpayers with at least one month of uninsurance are ranked according to their predicted probability of having Exchange coverage. Those with the highest predicted probability are assigned Exchange coverage for any uninsured months until the ITM count of full-time equivalent Exchange coverage months matches administrative totals. This assignment is performed in descending order of the age-family structure groups for which the ITM has the largest undercount of Exchange coverage relative to the administrative totals.

For the taxpayers with imputed Exchange coverage, certain aspects of their coverage remain missing and require further imputation for completeness. Specifically, values for their

⁵⁵ An Exchange or Marketplace is a Federal or State service that helps consumers and small businesses compare and enroll in health insurance plans available within their State. Only health insurance coverage purchased within an Exchange qualifies for the premium tax credit. State Exchanges, such as Covered California and Your Health Idaho, are operated by the States they serve. The Federal Department of Health and Human Services operates Health Insurance Marketplace® as an Exchange for consumers and small businesses in those States that did not establish their own Exchanges. See www.healthcare.gov/glossary/exchange for additional information.

monthly premiums, the premiums for the second-lowest cost Silver plan,⁵⁶ and the taxpayers' APTC are required. The Joint Committee staff assigns these values using a "hot deck" imputation method. The hot deck method copies the exact values of a similar taxpayer who has Exchange coverage and imputes the copied values to the taxpayer with the missing values. The similar, Exchange-covered taxpayer who provides the imputed values is selected at random from the same group as the imputed taxpayer, based on age, family structure, income as a share of the Federal poverty line, and months of coverage. The hot deck procedure assumes that taxpayers imputed to have Exchange coverage are distributionally similar to the sample of taxpayers that have Exchange coverage in the ITM data, and which are being used to assign Exchange coverage.

Modified adjusted gross income at Exchange signup. When aligning the ITM's base data with CBO estimates of taxpayers' health insurance coverage through the Exchange, or analyzing proposals which change taxpayers' claims for the APTC, the Joint Committee staff needs the family size and modified adjusted gross income ("MAGI") amount that taxpayers provide the Exchange when signing up for such coverage. This information is not directly reported to the IRS nor is the information reported on Form 8962 and Form 1095-A sufficient to infer both numbers. Assuming the taxpayers knew what their family size would be for the tax year, however, the Joint Committee staff can generally determine the MAGI amount reported to the Exchange at sign-up using formulas enacted when establishing the APTC. This method provides an accurate imputation of MAGI when the size of the family reported by the taxpayer at Exchange signup is the same as that at the time of tax filing (*e.g.*, did not change during the tax year due to births, deaths, divorces, and marriages), and the Exchange coverage selected by the taxpayer has premiums greater than the taxpayer's maximum allowable APTC (*i.e.*, the taxpayer's out-of-pocket share of annual premiums is larger than zero).

Dependent income in MAGI. Taxpayers who purchase qualifying health insurance from an Exchange may be eligible to claim the PTC. The amount of the PTC depends on the taxpayer's MAGI, which is reported on Form 8962. As described above, for taxpayers not filing Form 8962, MAGI can generally be determined from amounts already included in the ITM's data with one important exception: taxpayers with dependents who are required to file income tax returns. Taxpayers must include their dependent children's AGI, untaxed Social Security benefits, and tax-exempt interest in MAGI, though only for dependent children who are required to file a tax return. The tax returns included in the INSOLE sample generally do not include the tax returns of the taxpayers claimed as dependents on the tax returns in the INSOLE sample.

SOI uses the IRS master data file of individual tax returns to provide additional data on dependent filers' tax returns, allowing the Joint Committee staff to include dependent income in calculations of MAGI. After creating the INSOLE file, SOI gathers the Social Security numbers of all dependents claimed in the file and then searches the master data file to see if any of those dependents filed their own return. The result is a data file containing the return information, including sources of income needed for recreating MAGI, of INSOLE taxpayers' dependents.

⁵⁶ Health insurance plans sold on the Exchange are categorized as "Bronze," "Silver," "Gold," or "Platinum," based on the increasing percentage of healthcare costs borne by the insurance company for a typical population. Additional descriptions and comparisons of the categories is available at www.healthcare.gov/choose-a-plan/plans-categories.

The Joint Committee staff links the dependents' information to the filers' tax information to determine the appropriate MAGI.

Group and non-group health insurance coverage by self-employed taxpayers. Self-employed taxpayers who do not have access to employer-sponsored insurance are generally allowed to claim a deduction against AGI for purchasing health insurance. Most self-employed taxpayers who take advantage of this deduction purchase non-group health insurance. Some self-employed taxpayers, however, are nevertheless able to purchase health insurance under a group plan. A common example is of business owners who participate in the same group health plan that they arrange for their employees. Using health insurance coverage information reported on Forms 1095-B and 1095-C, the Joint Committee staff determines whether taxpayers with the self-employed deduction purchased a non-group insurance policy or a group insurance policy. In addition, the Joint Committee staff uses coverage information from Forms 1095-B and 1095-C to split the deduction into the amounts used to purchase single coverage plans and family coverage plans.

H. Other Imputations to the ITM

The ITM contains an assortment of other imputations, some of which are briefly summarized here.

Roth retirement savings. Participants in an employer-sponsored retirement savings plan (e.g., a Code section 401(k) plan) may make after-tax or “Roth” contributions to the plan. Any Roth funds in the plan, including any earnings on contributions to the plan, generally may be distributed tax-free. Although the ability to make Roth contributions to tax-deferred accounts was enacted several years ago, evidence suggests the adoption of Roth section 401(k) accounts is accelerating. For the purposes of modeling Roth contributions on the ITM, the Joint Committee staff selectively recharacterizes a subset of taxpayers’ traditional section 401(k) contributions as Roth section 401(k) contributions, thereby reflecting the forecasts of growth in Roth section 401(k) accounts over the budget period. In addition, the Joint Committee staff imputes an associated reduction in taxable retirement plan distributions, with increasing reductions over the budget period.

Dependent care expenses. Many employers offer a cafeteria plan⁵⁷ under which an employee may contribute pre-tax earnings to a flexible spending account specifically established for qualified dependent care expenses. Such contributions are reported on Form W-2, and the cap on contributions per return is generally \$5,000. In addition, taxpayers with qualified dependent care expenses may qualify for a credit worth 20 percent to 35 percent of their expenses, limited to \$3,000 of expenses for taxpayers with one qualifying dependent or \$6,000 for taxpayers with two or more qualifying dependents. These limits are reduced by any taxpayer contributions to their dependent care flexible spending accounts.

Some taxpayers with dependent care benefits under a cafeteria plan do not file Form 2441, *Child and Dependent Care Expenses*, with their return. The presumption is that the contributions to the cafeteria plan fully cover any dependent care expenses up to the cap on contributions. The Joint Committee staff imputes the otherwise unobserved pieces of information necessary to calculate a dependent care credit as if the taxpayer did not have access to a cafeteria plan. In particular, the imputations include the number of qualifying children and the amount of qualifying dependent care expenses.

Reported wages. In general, a successful linking of all Forms W-2 to taxpayers occurs when the sum of the wages, salaries, and tips reported on the Forms W-2 for a return’s taxpayers equals the reported total of wages received on their Form 1040. Not all taxpayers in the ITM’s data have successful Form W-2 linkages: wages on Form 1040 may exceed or trail wages reported across Forms W-2. For such cases, the Joint Committee staff has developed an imputation procedure to reconcile wages between Forms W-2 and the tax return, as well as assign excess or

⁵⁷ A cafeteria plan is a benefit arrangement offered to employees that employers establish under the requirements of Code section 125. The arrangement provides employees the opportunity to receive certain benefits on a pre-tax basis and commonly includes employees’ premium payments for employer-sponsored health insurance plans, contributions to flexible spending accounts for medical and dependent care expenses, and adoption assistance.

missing wage amounts across spouses on joint returns.⁵⁸ In addition, the Joint Committee staff imputes deferred compensation amounts and retirement plan participation in cases where Form W-2 wages are less than those on Form 1040. These imputations are based on the probability a missing Form W-2 would have shown a value for deferred compensation or a positive indicator for a retirement plan.

Identification of military personnel. Some proposals require the Joint Committee staff to identify taxpayers on the ITM who are members of the armed services. Service members are divided into active-duty personnel and National Guard/reservists. Using data provided by the Department of Defense, the Joint Committee staff reviews the payor identification numbers on taxpayers' Forms W-2 to identify individuals as members of the armed services and whether the member is active-duty or not.

Nonresident children. The ITM's base data include both tax returns that report a U.S. address and tax returns filed by U.S. taxpayers residing overseas. The number of children between the ages of nine and 16 supporting a claim for the child tax credit on domestically filed tax returns exceeds the U.S. resident population of that same age cohort. The Joint Committee staff estimates the excess to be 0.6 million children. While some taxpayers legitimately file claims based on children not living in the United States, some of the gap is likely due to non-compliant reporting. To address the difference, the Joint Committee staff imputes a residency status for children reported on domestically filed returns, indicating whether the child represents a nonresident, regardless of the reason. The probability of imputation as a nonresident varies with the child's taxpayer identification number as an ITIN or SSN. After the imputation, the ITM's data represents the final U.S. resident population total for this cohort.

Identification of institutionalized residents. Nursing home residents and incarcerated individuals are included in the U.S. resident population but are frequently outside the scope of national surveys, as with the MEPS and CES. The inclusion of these taxpayers in the ITM data is an important factor when comparing the ITM's population to non-tax data sources. For policy analysis, the Joint Committee staff accounts for the particular relationships these taxpayers have to the tax system: for example, nursing home residents frequently file tax returns reporting retirement income and make use of several retirement and age-related tax benefits; in contrast, most people living in prisons do not file tax returns as they generally do not face an income-based filing requirement and are ineligible for or do not make use of various tax benefits. For example, prisoners generally receive their health care through the prison system and therefore do not make use of tax preferences related to health care. The Joint Committee staff imputes incarceration status and nursing home residency status to reflect administrative totals of these institutionalized populations on the ITM. Incarceration status is imputed based on sex, age, marital status, filing status, and income. Nursing home residency status is imputed using age, filing status, income, and receipt of disability benefits, among the (imputed) non-incarcerated population.

⁵⁸ The imputation procedure for reconciling and allocating excess and missing Forms W-2 relative to Form 1040-wages is detailed in JCX-75-15.

IV. PROJECTING DATA FOR THE BUDGET PERIOD

Congress generally uses the prospective 10 years as its budget period for assessing the fiscal impacts of proposed changes to the Code. To produce accurate estimates of those impacts, the ITM's data must be statistically representative of the microeconomic and macroeconomic conditions throughout that budget period. The Joint Committee staff uses extrapolation to transform the ITM's taxpayer data, a representative sample of filers and nonfilers in the base year, into a hypothetical sample representative of taxpayers in each of the years after the base year. The process of extrapolation adjusts both the dollar values reported on individual taxpayers' returns and the taxpayers' sample weights so that, in aggregate, the hypothetical sample is consistent with CBO's economic and demographic forecasts for each year. For the 2023 edition of the ITM, which uses the 2019 base year data, the extrapolated data runs from years 2020 through 2033.

Development of the budget period's baseline forecasts

Under Congressional budget rules, the Joint Committee staff's analysis conforms with CBO's forecasts of economic and demographic baselines for each year in the budget period. CBO annually produces and provides to the Joint Committee staff forecasted annual values of more than 300 macroeconomic and tax-related values for each year in the budget period. For example, CBO's forecasts include the Bureau of Economic Analysis's National Income and Product Accounts variables and projections of individual income tax and payroll tax receipts for each year in the budget period. Several CBO-forecasted variables serve as direct inputs in the ITM, including the year-by-year estimates of the consumer price index, the chained consumer price index, and the annual Social Security earnings cap. For example, the chained consumer price index directly informs the growth for tax bracket thresholds after the 2017 Act. The Joint Committee staff generates conforming annual growth rates and targets for key variables on the ITM using CBO's forecasts as underlying economic assumptions. CBO separately provides a range of demographic and health related data, such as estimates of the U.S. population by age, the number of individuals in the United States receiving employer-provided healthcare benefits, and the number of health insurance policy holders, by detailed insurance type.

Beyond the totals provided by the baseline forecasts, the goals of the extrapolation process include matching forecasted aggregate totals for various sources of income, as well as matching estimated totals of wages, dividends, and capital gains by income class. The Joint Committee staff has devoted a considerable amount of time and resources to develop models that can explain, in a statistical sense, the changes in these underlying distributions of income and its components. In 2012, the Joint Committee staff engaged in a major effort to re-examine the methodology used to estimate expected changes in the distributions of these income sources. This effort resulted in the development of econometric equations that predict the share of each income source within several modified total income classes.⁵⁹ Previous years' INSOLE files provide the data used for estimating these classes' modified total income shares and trends.

⁵⁹ The Joint Committee staff uses a modified total income measure rather than AGI for analysis of income shares because the modified income measure is a more consistent measure of income over time than AGI. See JCX-75-15 for a discussion of the need for a consistent income measure, its components and differences from AGI, and its implementation in the extrapolation process.

Extrapolation of the base year data for each year in the budget period

The Joint Committee staff performs the process of extrapolating the base year data to represent future years in two steps. In the first step, each of the nominal dollar values in the taxpayers' base year data is adjusted by the expected average per-capita growth of that variable. For example, if average dividend income is expected to grow by two percent annually under the CBO forecast, then each return's dividend income value is adjusted upward by two percent annually. In total, the Joint Committee staff has developed more than 30 distinct growth factors for the many income sources and deductions in the ITM data. Growth factors are generally applied uniformly to all taxpayers in the base data with the exception of wage growth. Based on the historical growth in wages over time, the Joint Committee staff estimates that the rate of growth of wage income for taxpayers with low wages is frequently different from that of taxpayers with high wages. As a result, separate growth factors are estimated for and applied to different wage classes.

While the first step in the extrapolation process aligns individual taxpayer's circumstances with expected future dollar values, the second step adjusts the sample weights of taxpayers so that, when reweighted, the sample's characteristics on the whole match the forecasted annual values of baseline variables. Here, the Joint Committee staff employs a non-linear optimization algorithm.⁶⁰ The algorithm's objective is to modify the original INSOLE sample weights as little as possible while ensuring the totals in the extrapolated sample equal the forecast totals for the baseline variables. For example, in extrapolating from the base year ITM data to a year with a forecasted weaker economy, the sample weights on taxpayers with high wages or capital gains might be reduced, while weights on taxpayers with unemployment insurance might be increased. The Joint Committee staff attempts to match the forecasted values of more than 100 economic and demographic baseline variables for each year after the base year, through the end of the budget period.

The forecasted values of baseline variables that the Joint Committee staff matches through this extrapolation process for the ITM include demographic variables, the number of taxpayers with certain tax return characteristics, and the total dollar value of certain amounts. These estimated future values are generally not specific components of the CBO baseline economic forecast, but instead values of baseline variables in the ITM that are consistent with CBO's economic forecasts. The specific baseline variables matched through this extrapolation process include

- the U.S. resident population, by detailed age cohort;
- the number of taxpayers, by filing status;
- the number of filers claiming the additional standard deduction for taxpayers aged 65 and older;
- the number of dependents claimed on a return;
- the number of children that qualify for a child tax credit;

⁶⁰ Specific details of the non-linear optimization algorithm are discussed in JCX-75-15, with the complete estimating equations provided in the Appendix therein.

- the number of taxpayers claiming an earned income tax credit, by number of children;
- the number of taxpayers claiming a dependent care credit;
- the number of itemizers claiming a mortgage interest expense deduction;
- the dollar value of home mortgage interest expenses claimed by itemizers;
- the number of taxpayers with unemployment compensation;
- the dollar value of positive capital gains included in AGI, by detailed income classes of taxpayers;
- the number of taxpayers with a capital loss included in AGI;
- the number of taxpayers with a student loan interest deduction;
- the number of taxpayers with an HSA plan;
- the number of single and family employer-sponsored health insurance policy holders under age 65;
- the number of non-group health insurance policy holders under age 65;
- the number of Exchange health insurance enrollees, by income class;
- the dollar value of wages, by detailed income classes of taxpayers;
- the dollar value of dividends, by detailed income classes of taxpayers;
- the dollar value of qualified dividends;⁶¹
- the dollar value of interest income;
- the dollar value of Social Security and Tier I Railroad Retirement benefits received;
- the dollar value of business income and business losses by sole proprietors;
- the dollar value of business income and business losses reported on Schedule E;
- the dollar value of IRA deductions, by age class;
- the dollar value of taxable IRA distributions, by age class; and
- the dollar value of charitable giving, by itemizers and non-itemizers.

⁶¹ Qualified dividends are those dividends that are taxed at lower tax rates than ordinary income.

V. THE ITM'S TAX CALCULATORS

The tax calculators are comprehensive computer programs that read and process the ITM's taxpayer data and generate a detailed characterization of the Federal individual tax system. One calculator calculates baseline Federal individual income tax liabilities. A second calculator calculates liabilities under a proposed law. In addition, the ITM contains two corresponding calculators for fiduciary taxpayers. Each calculator takes the information from each taxpayer in the base data file and, using a set of tax parameters, calculates that taxpayer's Federal individual income tax liability under the appropriate tax plan. The tax calculators also compute the values of several intermediate variables that are relevant to determining final tax liability. Broadly, the tax calculators replicate the steps found on Form 1040 (or Form 1041) and the accompanying forms, schedules, and worksheets. The tax calculator that calculates baseline Federal income tax liabilities under present law, economic expectations, and budgetary scorekeeping rules, provides the revenue baseline against which estimated changes in liabilities are reported to Members of Congress as revenue estimates of proposed legislation.

These tax calculators are the starting point for the analysis of taxpayer behavioral changes in response to a proposed change to tax law. Under the assumption that taxpayers will choose the combination of deductions and credits that minimize their Federal tax liability, the tax calculators also choose those tax options that minimize liability. For example, for each taxpayer, the calculators determine the total allowed itemized deductions and the applicable standard deduction, computes liability for the taxpayer under both options, and assigns that taxpayer the option that minimizes final liability. That optimal choice for a taxpayer may not be the greater of these two deductions. For example, because of the alternative minimum tax, in some circumstances, a taxpayer will be better off claiming itemized deductions instead of the standard deduction, even though the taxpayer's total itemized deductions are less than the standard deduction amount. As another example, some taxpayers with tuition expenses for higher education can use those expenses for either an adjustment to AGI or for an education tax credit, but not both. The tax calculators choose the method that produces the lowest tax liability.

The tax calculators can trace through most of the interactions between income sources and the various provisions of the Code. The calculators properly calculate credit and deduction amounts according to any applicable phase-in and phase-out rules. However, the calculators have limitations. For example, the calculators do not automatically capture changes to depreciation rules, changes to rules affecting intertemporal variables such as carry-forwards, changes to information reporting requirements, changes to rules about withholding, or changes to rules about estimated tax payments. The Joint Committee staff computes the effects of such changes using additional procedures "off-model," outside of the framework of the ITM, as discussed in Part VI below.

Pre-data processing

Before any of the taxpayer records are read, the ITM first computes or determines the values for the tax rate schedules and the many other tax parameters used by the calculators. The ITM contains over 250 tax parameters. In line with present tax law, for example, individual income tax rate brackets, as well as many other parameters, are adjusted for inflation. Further, many tax parameters change from year to year to reflect the phase-in and phase-out rules of tax

law. The Joint Committee staff sets the parameters according to the rules specified in the Code, and in the case of indexed parameters, consistent with the CBO inflation forecast.

VI. USING THE ITM TO ESTIMATE THE REVENUE EFFECTS OF PROPOSED CHANGES IN TAX POLICY

A typical analysis comparing Federal tax revenues under a proposal to those under present law begins with the Joint Committee staff modifying the ITM's tax calculators to reflect the tax system under the proposal. The modifications may range from a single change, such as increasing the maximum amount of some deductible expense, to many, simultaneous, and complex variations across all aspects of tax policy. In the case of a proposal with multiple provisions modifying present law, each provision will often be sequentially "stacked." For the Joint Committee staff to analyze the first provision of the proposal, the ITM would be programmed to model present law in the baseline tax calculator, and, in the second calculator, present law as modified by the first provision. The ITM would model the tax system as if this first provision was the only change to present law. To determine the additional effects of the second provision of the proposal, the baseline calculator would model present law as modified by the first provision while the second calculator would model present law as modified by both the first and second provisions. As modeled, the second provision is considered "stacked" after the first and the effects attributed to this second provision are conditional on the changes made by the first provision. This process may be repeated until all provisions are included.

With detailed tax calculators processing extensive taxpayer data, a single use of the ITM produces hundreds of individual and aggregate values available to the Joint Committee staff for analysis of present and proposed tax law. While changes to expected Federal tax revenues under a proposal are a frequent primary outcome of interest, the Joint Committee staff may be asked to provide additional context using the ITM's output. In particular, the Joint Committee staff regularly produces distribution tables that present how different groups of taxpayers would be affected by a proposal. These distribution tables typically show the average tax rate of taxpayers within various income groups and how much of a total change to Federal revenues is attributable to those taxpayers. The numerous calculations and values produced by the ITM allow comparisons across any number of dimensions, from filing status and family size to age groups, receipt of specific types or sources of income, and ranges of total deductions.

The Joint Committee staff considers taxpayers' behavioral responses in all economic analyses of proposed changes to the tax laws. Some behavioral responses are mechanical, involving relatively straightforward optimization decisions, such as the choice between taking the standard deduction and itemizing deductions. This choice is primarily mathematical and easily programmed into the ITM's tax calculators. In contrast, the tax calculators generally do not model behavioral responses of taxpayers to less-mechanical changes, when behavioral responses may depend on unobserved taxpayer characteristics or preferences. For example, the ITM does not estimate taxpayers' changes in charitable giving due to changes in tax rates or income, or the occurrence of natural disasters. When not explicitly captured within the ITM's programming, such behavioral effects are accounted for "off-model." Behavioral responses can nevertheless be incorporated into the ITM using additional computer and statistical programming. For example, the ITM can be programmed to capture expected changes of capital gains realizations in response to changes to the marginal tax rate on capital gains. Because the tax calculators in the ITM are complex, however, adding behavioral response equations within the ITM may slow down its operation, or make it more difficult to error-check simulations. In some cases, the added information to be gained by assigning behavioral responses specifically to each affected taxpayer within the ITM, rather than treat all such individuals uniformly, outweighs these disadvantages.

One determinant of whether such responses are incorporated within the ITM's tax calculators is the level of detail given by empirical research relating to taxpayer behavior. The Joint Committee staff uses experience and research to determine the best method for modeling taxpayer behavioral responses within specific economic analyses.

As a practical matter, the Joint Committee staff must regularly overcome the limitation that the ITM's tax calculators can only simulate the effects of proposed tax changes using the data they already have. That is, the calculators use taxpayer information reported on filed tax returns, reported on linked information returns, or information created through imputations. Making any further information available within the ITM requires additional data linkages or imputations. For example, when reporting charitable giving, taxpayers do not distinguish their giving to different types of organizations. The existing information is insufficient to evaluate a proposal to enhance or limit the tax preference for charitable giving to a specific class of organizations, such as pandemic relief organizations. With reliable research or survey data on the recipients of charitable giving, the Joint Committee staff could develop an imputation of giving by type of organization. The tax calculators could then be enhanced to incorporate the imputed giving by type and thereby begin an analysis on-model. Without the additional data provided by research or surveys, the Joint Committee staff may estimate the impact of such a proposal off-model. Even for off-model analysis, the ITM nevertheless serves as a resource: the ITM can be used to estimate effective marginal tax rates for those taxpayers affected by the proposal. The Joint Committee staff would then use these tax rates in the off-model calculations of the budgetary effects of proposed changes to the tax system. Whether on-model or off-model, the Joint Committee staff uses the ITM's data and tax calculators, as well as additional data and methods, to understand the effects of taxpayer behavior.

The Joint Committee staff's previous publication describing the ITM, JCX-75-15, provides several examples of how the ITM's capacity to both identify taxpayers who are potentially affected by a proposed change in tax law and calculate their effective marginal tax rates enables the Joint Committee staff to evaluate other potential behavioral responses in economic analyses and revenue estimates.

Distributional analysis

As described above, a typical Joint Committee staff distributional table reports average tax rates by income class. As described elsewhere,⁶² economic incidence assumptions drawn from the economics research literature are applied to the revenue estimates of proposed changes to individual income, payroll, corporate income, and excise taxes to compute a total Federal tax liability for each taxpayer on the ITM. The Joint Committee staff uses the ITM to compute the average tax rate by income class for these analyses.⁶³ Recently, the Joint Committee staff revised the income classes used to present the distributional analyses.⁶⁴ These revised classes better

⁶² Joint Committee on Taxation, *Modeling the Distribution of Taxes on Business Income* (JCX-14-13), October 16, 2013.

⁶³ Part III.F, above, explains the imputations made to the ITM to facilitate computation of the expanded income measure.

⁶⁴ In the recent distributional analyses, the income classes are zero to less than \$15,000; \$15,000 to less than \$30,000; \$30,000 to less than \$40,000; \$40,000 to less than \$50,000; \$50,000 to less than \$60,000; \$60,000 to less

present results across the distribution of households after accounting for the impact of inflation and real growth on income.

Macroeconomic analysis

The Joint Committee staff uses data produced by the ITM to inform its macroeconomic analysis of tax legislation. As explained in more detail in other Joint Committee staff publications,⁶⁵ macroeconomic analyses of proposed tax legislation start with the completed microeconomic analyses of the proposal using the Joint Committee staff’s conventional on- and off-model methods. The ITM is further used to calculate various input parameters for the macroeconomic models that analyze the macroeconomic effects of tax proposals. An important group of these parameters within the macroeconomic models includes effective marginal tax rates, which are used in some behavioral equations, and average tax rates, which are used in some budget constraints. For example, the effective marginal tax rates on income from capital are included in investors’ cost-of-capital equations, which affect the total level of investment. Effective marginal tax rates on wages are included in households’ labor supply equations and therefore affect labor force participation and work hours. Average tax rates are used to calculate tax liabilities for each the various types of taxable income received by taxpayer agents within the models.

The estimated input parameters are derived from taxpayer-level analysis of the proposed changes. Effective marginal tax rates and average tax rates for each of wages, interest, rents, dividends, capital gains, sole proprietors’ income, and collectively all other individual income sources are first computed on the ITM for each taxpayer. These rates are then aggregated to align with taxpayer groups specific to each macroeconomic model using a weighted average, weighting the individual taxpayers’ rates by their income. For example, in one model, the tax treatment of a given income source can be parameterized by a single, economy-wide effective marginal tax rate and average tax rate, whereas in another model these tax rates are targeted to a large number of different income groups. As needed, the ITM also allows for the estimation of these parameters for groups of taxpayers with specific characteristics. For example, the Joint Committee staff may use the ITM to differentiate effective marginal tax rates for taxpayers with and without children, which may inform an analysis of a legislative proposal to substantially change the tax treatment of working parents. The taxpayer-level calculations within the ITM thus permit a high degree of specificity for estimating parameters used within the Joint Committee staff’s macroeconomic models.

than \$80,000; \$80,000 to less than \$100,000; \$100,000 to less than \$150,000; \$150,000 to less than \$200,000; \$200,000 to less than \$500,000; \$500,000 to less than \$1,000,000; and \$1,000,000 or more.

⁶⁵ See Joint Committee on Taxation, *Macroeconomic Analysis at the Joint Committee on Taxation and the Mechanics of Its Implementation* (JCX-3-15), January 26, 2015; Joint Committee on Taxation, *Overview of Joint Committee Macroeconomic Modeling* (JCX-33-18), April 23, 2018; and Rachel Moore and Brandon Pecoraro, “Macroeconomic Implications of Modeling the Internal Revenue Code in a Heterogeneous-Agent Framework,” *Economic Modelling*, Volume 87, April 2020, pp. 72-91.