

**ESTIMATING CHANGES IN THE
FEDERAL INDIVIDUAL INCOME TAX:
EXPLORING ELASTICITIES OF TAXABLE INCOME**

Prepared by the Staff
of the
JOINT COMMITTEE ON TAXATION



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INTRODUCTION

One of the responsibilities of the staff of the Joint Committee on Taxation (“Joint Committee staff”) is providing the Congress with estimates of the budgetary impacts of proposed tax legislation. Providing the Congress with the estimated revenue effect of proposed tax legislation starts with an economic analysis of the proposed legislation.

In providing conventional estimates, the Joint Committee staff (consistent with analysts at the Congressional Budget Office (“CBO”) and the Office of Tax Analysis of the U.S. Department of the Treasury) follows the long-standing scorekeeping convention that a proposal does not change total income. Within this modeling framework, the Joint Committee staff holds gross national product (“GNP”) fixed.¹ Even though GNP is held constant, shifts in economic activity across sectors and changes in timing of economic activity in response to proposed tax changes are included in the conventional estimates.

In response to changes in marginal income tax rates, behavioral changes such as new tax planning to reduce income subject to higher tax rates, tax avoidance transactions, and tax evasion are included in the estimates. For example, an increase in the ordinary income tax rate may result in an increased use of deferred compensation or an attempt to convert ordinary income into capital gain income. That is, taxpayers alter the timing and composition of the taxable income they report in response to changes in marginal tax rates. Economists refer to this behavioral response as the elasticity of taxable income. As part of the process of estimating the budgetary effects of proposed changes in the nation’s tax law, the Joint Committee staff applies a series of taxable income elasticities that vary by income groups. This approach is based on empirical research suggesting that taxable income elasticities are lower for lower-income taxpayers than for higher-income taxpayers. Consequently, the series of taxable income elasticities employed by the Joint Committee staff rises with income.

¹ Conventional estimates are measured relative to the CBO’s macroeconomic baseline forecast for the 10-year Federal budget period. Changing total income would change one of the macroeconomic aggregates in the Federal budget baseline. From the 108th Congress through the 113th Congress, House Rule XIII required the Joint Committee staff to provide macroeconomic analysis of legislation reported by the House Committee on Ways and Means. In a macroeconomic analysis, the Joint Committee staff projects how macroeconomic aggregates such as labor supply, total investment, total consumption, and total income may change as a result of the proposed legislation. The House of Representatives modified House Rule XIII for the 114th Congress. The present rule as modified requires, for certain legislation, the Joint Committee staff to report estimated changes in Federal receipts that result from changes in these macroeconomic aggregates. In addition, the Concurrent Resolution on the Budget for Fiscal Year 2016, S. Con. Res. 11, 114th Cong., sec. 3112, May 5, 2015 requires the Joint Committee staff to require similar estimates for legislation in both the House of Representatives and the Senate. For a summary of the macroeconomic models used by the Joint Committee staff, see Joint Committee on Taxation, *Summary of Economic Models and Estimating Practices of the Staff of the Joint Committee on Taxation* (JCX-46-11), September 19, 2011.

This document² describes research the Joint Committee staff has undertaken to study income bunching at so-called kink points in effective marginal tax rates of the individual income tax to improve the modeling of behavioral responses to changes in tax rates by analyzing elasticities of taxable income.³

² This document may be cited as follows: Joint Committee on Taxation, *Estimating Changes in the Federal Individual Income Tax: Exploring the Elasticity of Taxable Income* (JCX-2-17), January 23, 2017. This document is available on the Joint Committee on Taxation website at www.jct.gov.

³ 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, Bernard A. Schmitt, Joint Committee on Taxation, 502 Ford House Office Building, Washington, D.C. 20515-6453. The Joint Committee on Taxation staff presented a more detailed presentation of this research for comment at the National Tax Association's Annual Conference on Taxation held November 20, 2015.

I. WHAT IS THE “ELASTICITY OF TAXABLE INCOME”?

In general

The Joint Committee staff estimates the tax-revenue consequences of proposals to modify Federal tax laws. A proposal to reduce Federal individual income tax rates, for example, has both direct effects and indirect effects. Economists can identify these effects as leading to either an increase or a decrease in tax revenue. The direct effect of a tax rate reduction is to decrease tax revenue because income is now taxed at a lower rate. However, the direct effect does not account for possible changes in behavior. Lower tax rates might have indirect effects such as inducing individuals to earn more income, report more income, or shift income away from sources with higher tax rates. Behavioral responses involving changes in real economic activity – such as changes in labor supply – could have an effect on aggregate economic activity in addition to having a tax revenue effect. That is, the size of the national economy might change and tax revenues change. Behavioral responses consisting of changes in income classification or tax evasion, on the other hand, are typically thought to have a tax revenue consequence, but not an effect on aggregate economic activity. That is, tax revenues might change but the existing size of the national economy is unchanged.

Economists refer to the responsiveness of individual taxable income to marginal tax rates as the “elasticity of taxable income.” This elasticity measures the percentage change in taxable income caused by a one percent change in the marginal net-of-tax rate (the portion of one extra dollar of taxable income that remains after subtracting the additional tax liability). In general, economists have estimated the elasticity of taxable income to be positive. This means when tax rates fall (and after-tax incomes rise), taxpayers tend to report more income subject to tax. Conversely, when tax rates rise, taxpayers tend to report less income subject to tax.

Changes in tax rates alter taxable income for several main reasons, all of which are captured by the concept of elasticities of taxable income. First, taxpayers may adjust their work hours or effort in order to adjust their gross incomes. Second, taxpayers may alter their mix of compensation between taxable wages and nontaxable compensation. For example, employees may alter the amount they contribute to defined contribution pension plans with offsetting changes to currently taxable cash wages. Third, the economic incidence of a tax or subsidy is not necessarily borne by the party with the statutory obligation to pay the tax. For example, taxpayers’ employers may adjust wages to capture some portion of credits or absorb some portion of income taxes. Fourth, taxpayers may adjust their deductible costs and expenditures, for example by changing their charitable donations, to alter taxable income. Fifth, taxpayers may adjust the timing of income (or deductions) they report to the Internal Revenue Service (“IRS”), if they have the discretion to do so. For example, taxpayers generally have discretion over the timing of receipt of capital gains and losses. Sixth, taxpayers may alter investment portfolios, choosing to hold different percentages of assets that pay taxable interest, pay tax-exempt interest, pay dividends, or accrue capital gains. Seventh, taxpayers may adjust their compliance behavior, altering what they report to the IRS.

Past estimates of the elasticity of taxable income

Estimates vary regarding the exact values of elasticities of taxable income (plural because taxpayer responsiveness varies by income type, marital status, and many other characteristics). Early research studying the policy changes of the “Tax Reform Act of 1986”⁴ produced estimates of elasticities of taxable income that, when averaged across all types of taxpayers, exceeded 1.0.⁵ With this estimated value, a decrease in marginal tax rates from 30 percent to 23 percent, which increases the income net-of-tax rate by 10 percent (from 70 percent to 77 percent), causes roughly a 10-percent increase in taxable income. However, in a 2012 review of the literature, leading scholars argued “the best available estimates range from 0.12 to 0.40.”⁶ Consistent with these estimates one would expect somewhere between a one to four percent increase in taxable income when tax rates fall from 30 percent to 23 percent.

Using the bunching method to estimate the elasticity of taxable income

Most research that estimates elasticities of taxable income employs a “difference-in-difference” estimation technique. This technique, described in further detail in the following section, compares incomes before and after major tax reforms. In recent work, the Joint Committee staff explored an alternative approach to estimating taxable income elasticities, a “bunching” approach. The bunching method measures the extent to which taxpayers adjust taxable income to avoid brackets with higher tax rates. For example, a disproportionate number of taxpayers report taxable incomes near the income at which the statutory marginal tax rate increases from 15 percent to 25 percent. Economists refer to this income breakpoint in the rate schedule as a “kink” in the tax rate schedule.⁷ Intuitively, the number of taxpayers who locate at (or near) this kink may inform analysis regarding how responsive taxable income is to the change in tax rates from 15 percent to 25 percent. If taxable income is highly responsive to this change in tax rates, a large number of taxpayers will locate just below the kink. The result is excess mass, or “bunching,” in the income distribution at this point. On the other hand, if taxable income is fairly insensitive to tax rates, few taxpayers will adjust their incomes to locate

⁴ Pub L. No. 99-514.

⁵ Martin S. Feldstein, “The Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1986 Tax Reform Act,” *Journal of Political Economy*, vol. 103, June 1995, pp. 551-572. However, other analysts have posited that the econometric method employed by Feldstein created an upward bias to his estimates. See for example, John F. Navratil, *Essays on the Impact of Marginal Tax Rate Reductions on the Reporting of Taxable Income on Individual Tax Returns*, unpublished doctoral dissertation, Harvard University, 1995. The most recent analysis to examine the Tax Reform Act of 1986 estimates an average elasticity of 0.86. See Caroline Weber, “Toward obtaining a consistent estimate of the elasticity of taxable income using difference-in-differences,” *Journal of Public Economics*, vol. 117, September 2014, pp. 90-103.

⁶ See Emmanuel Saez, Joel Slemrod, and Seth H. Giertz, “The elasticity of taxable income with respect to marginal tax rates: A critical review,” *Journal of Economic Literature*, vol. 50, no. 1, March 2012, pp. 3–50.

⁷ Mathematically and visually, marginal tax rates represent the slope of a graph measuring the taxpayer’s tax liability against income. Where the statutory marginal tax rate changes, or where an effective marginal tax rate changes, the abrupt change in the graph’s slope manifests in a kink in the graph.

near the kink and the number of taxpayers would be distributed more evenly around the income level corresponding to the kink.

Using data from tax returns filed from 1996 to 2014, the Joint Committee staff examined bunching patterns at kinks in the statutory individual income tax schedule as well as *effective* kinks created by tax credits and the phase-out of personal exemptions and itemized deductions. Effective kinks occur where statutory rates are constant but other features of the Internal Revenue Code (“Code”)⁸ create changes in effective marginal tax rates. For example, the earned income tax credit (“EITC”) creates a sharp kink at the end of its phase-in region for taxpayers with two qualifying children. As the EITC phases in, taxable income is subsidized at a 40 percent rate. At the beginning of the plateau region, the credit stops increasing, causing effective marginal tax rates to rise by 40 percentage points.⁹ The findings of the Joint Committee staff, and a discussion of how these findings relate to the previous literature and measures of taxable income elasticity, are the subject of the remainder of this document.

⁸ All Code section references herein are to the Internal Revenue Code of 1986, as amended, unless otherwise indicated.

⁹ Appendix Figures A-1 and A-2 depict kinks in statutory and effective marginal tax rate schedules.

II. OVERVIEW OF MODELING APPROACHES TO ESTIMATING THE ELASTICITY OF TAXABLE INCOME

Comparing estimating methodologies

There are several approaches researchers have used to estimate elasticities of taxable income. The most common approach involves comparing the incomes of taxpayers before and after a tax reform that changes marginal income tax rates. However, if researchers only studied taxpayers affected by the reform, the causal effect of the reform would be unclear, as incomes might have changed due to other causes as well.

Difference-in-differences methodology

To get around this problem, researchers compare the income changes of those taxpayers that were affected by the reform with the income changes of those taxpayers that were unaffected (or at least affected differently). The unaffected group is used as a control group, which helps to isolate the causal effect of the tax reform and hopefully eliminates potential biases from income trends unrelated to the tax change. The difference in reported taxable incomes before and after the policy change by those taxpayers affected by the policy change is compared to the difference in reported taxable incomes before and after the policy change by the control group of taxpayers. This method – known as “difference-in-differences” – captures sensitivity to changes in marginal tax rates over time. Researchers have found that the elasticity of taxable income measured using this method varies with the tax reform in question, with the preponderance of estimates ranging from 0.1 to 0.4.¹⁰

Instrumental variables methodology

Caution is needed, however, when interpreting difference-in-differences estimates of elasticities of taxable income. To identify a causal effect of marginal tax rates on taxable income, the difference-in-differences technique must control for the relationship between income and tax rates specified by the Code. However, because the Code provides that statutory marginal tax rates increase as taxable incomes increase, taxpayers with higher income generally face higher tax rates. Ignoring this statutory rate structure would lead researchers to erroneously conclude that higher marginal tax rates lead to higher taxable income. Recognizing this, researchers have tried to solve the problem using a technique called “instrumental variables,” which attempts to isolate the way taxpayers respond to changes in marginal tax rates.¹¹

¹⁰ See Emmanuel Saez, Joel Slemrod, and Seth H. Giertz, “The elasticity of taxable income with respect to marginal tax rates: A critical review,” *Journal of Economic Literature*, vol. 50, no. 1, March 2012, pp. 3–50.

¹¹ Typically, instruments are constructed by predicting current-year tax rates using prior-year income. This eliminates variation in tax rates due to changing brackets. As an example, see Jon Gruber and Emmanuel Saez, “The elasticity of taxable income: evidence and implications,” *Journal of Public Economics*, vol. 84, no. 1, April 2002, pp. 1–32.

However, recent work calls the reliability of the conventional instrumental variables technique into question, raising doubts about the validity of most elasticity estimates.¹²

Bunching methodology

Partly in response to this shortcoming, analysts have applied a new statistical technique based on the bunching concept to estimate elasticities of taxable income. This technique uses the observed income distribution to measure the extent to which people avoid being taxed in a higher tax bracket. By measuring this “bunching” at kinks in the tax schedule where tax rates increase, or effectively increase, the technique may capture sensitivity to changes in marginal tax rates within the tax schedule.¹³

The types of responses captured by bunching analyses are primarily short-run and include both real economic activity and reporting decisions. The former includes working more or fewer hours, pursuing additional or fewer self-employment income opportunities, and donating more or less to charity. The latter includes shifting income between adjacent years, shifting income from one tax base to another (for example, in the case of a shareholder-employee of an S corporation, treating labor income that would otherwise be wages subject to FICA tax as the shareholder’s distributive share that is not subject to FICA tax), and misreporting income. Longer-term responses to tax rates – such as education and career decisions – are not captured using bunching analyses. However, these responses are also largely absent from difference-in-differences analyses, which typically measure two- or three-year income changes.

Empirical analyses that have used the bunching methodology

The first study to measure bunching with respect to the Federal income tax used public-use tax data from 1960 to 2004.¹⁴ Substantial bunching was found only around the first EITC kink, which marks the end of the EITC phase-in, and the kink that occurs at the beginning of the statutory tax rate schedule (*i.e.* at \$0 of taxable income, where the next dollar of taxable income is taxed at a 10 percent rate). These two kinks yielded estimated elasticities of taxable income of approximately 0.10 to 0.33 and 0.11 to 0.26, respectively. In that study, all other kinks appeared to generate no bunching. These results yielded elasticity estimates statistically indistinguishable from zero. Closer examination of the bunching at the first EITC kink revealed that the majority of the bunching was attributable to taxpayers reporting income from self-employment. Removing taxpayers reporting self-employment income from the sample resulted in estimated

¹² See Caroline Weber, “Toward obtaining a consistent estimate of the elasticity of taxable income using difference-in-differences,” *Journal of Public Economics*, vol. 117, September 2014, pp. 90-103.

¹³ The bunching approach to estimating elasticities was developed by Emmanuel Saez, “Do Taxpayers Bunch at Kink Points?,” *American Economic Journal: Economic Policy*, vol. 2, no. 3, August 2010, pp. 180–212. For a detailed review of research on bunching behavior, including applications outside of the United States and outside of the tax context, see Henrik Kleven, “Bunching,” *Annual Review of Economics*, vol. 8, October 2016, pp. 435-464.

¹⁴ See Emmanuel Saez, “Do Taxpayers Bunch at Kink Points?” *American Economic Journal: Economic Policy*, vol. 2, no. 3, August 2010, pp. 180–212.

elasticities of taxable income at the first EITC kink between 0.0 and 0.03, and were not statistically distinguishable from an elasticity of taxable income of zero.

On the other hand, isolating returns reporting income from self-employment yielded elasticities between 0.75 and 1.10. There are several possible explanations for higher estimated elasticities with respect to income from self-employment. The self-employed have more leeway in their ability to set their hours of work. This suggests changes in the amount of labor supplied by these taxpayers, potentially altering aggregate economic activity. Similarly, as cash basis taxpayers, self-employed taxpayers may have the flexibility to defer or accelerate payment of deductible business expenses, thereby altering current year taxable income. Likewise, self-employed taxpayers may be able to defer or accelerate recognition of gross income from customers, another means of altering current year taxable income. These responses would likely not alter aggregate economic activity. Another possibility is that these taxpayers over- or under-reported their income. Unlike employer generated Forms W-2, there generally is not third-party reporting of the gross income or expenses of self-employed taxpayers (except in cases where Form 1099 reporting is required). In assessing these findings it is important to recognize that the data used for the study do not include post-audit information and cannot establish to what extent bunching by the self-employed is due to misreporting.

Two other studies have examined bunching patterns in the United States using data from the Social Security Administration and the IRS. One study focused on elderly taxpayers who are subject to the annual earnings test for Social Security income.¹⁵ The earnings test reduced current-year Social Security benefits for taxpayers who had not yet reached the Social Security Administration's "normal retirement age" when they earned more than a certain exempt amount. The earnings test effectively increased marginal tax rates on income earned in excess of the threshold which created a kink in the effective marginal tax rate. The study used records of wage earnings from the Social Security Administration covering a one-percent random sample of the population from 2001 to 2006. This study found that elderly taxpayers responded to the change in effective marginal tax rates caused by the earnings test. The response was not limited to the self-employed, and because wage earnings were reported by employers, the response suggests taxpayers made real adjustments in the labor market in response to the annual earnings test kink. The study also found that taxpayers did not immediately adjust earnings upon reaching normal retirement age; many continued to bunch at the kink for up to three years, despite the lack of any incentives to do so.

The second study examined the response of low- and middle-income taxpayers to the so-called saver's credit (Code sec. 25B).¹⁶ This credit – worth up to \$600 – subsidizes retirement savings for households below a certain income threshold. Incomes even one dollar above this threshold cause taxpayers who are saving for retirement to lose the saver's credit. On either side of the threshold, average tax rates are different, but effective marginal tax rates are the same.

¹⁵ See Alexander Gelber, Damon Jones, and Daniel Sacks, "Earnings Adjustment Frictions: Evidence from the Social Security Earnings Test," National Bureau of Economic Research, Working Paper No. 19491, last revised November 24, 2015, available at <http://www.nber.org/papers/w19491>.

¹⁶ See Shanthi Ramnath, "Taxpayers' Responses to Tax-based Incentives for Retirement Savings: Evidence from the Saver's Credit Notch," *Journal of Public Economics*, vol. 101, May 2013, pp. 77-93.

This type of threshold is referred to by economists as a “notch.” If the credit were instead phased out, it would have created a kink, changing effective *marginal* rates on either side of the kink. Instead, the credit creates a notch, in that exceeding the income threshold by \$1 results in an additional \$600 of tax liability – a strong incentive to bunch just below the threshold. Using public-use tax data from 2002 to 2006, the study finds that taxpayers responded to this incentive, adjusting incomes to stay below the notch. This response was concentrated among the self-employed, although wage earners were shown to be responsive as well.

III. RESEARCH DESIGN

Data source

To study income bunching at kink points in the tax schedule, the Joint Committee staff used data from the population of tax returns (*e.g.*, Form 1040 and its schedules) and information returns (*e.g.*, Form W-2) of individuals in the United States. All data are pre-audit and therefore reflect what taxpayers report when filing their original Federal income tax returns.

The main analysis employs the population of tax returns from 1996 to 2014 in the seven States with no income taxes: Alaska, Florida, Nevada, South Dakota, Texas, Washington, and Wyoming. These States were chosen to prevent State tax rate kinks and State EITC programs from biasing estimates. For high-income kinks (above \$75,000 in taxable income), the Joint Committee staff employs a sample from the population of tax returns consisting of 100 percent of tax returns in all States within \$3,500 greater or lesser than the kink. In addition, the Joint Committee staff analyzed several high-income kinks in State tax schedules, using all tax returns from 2003 to 2014 in California, Connecticut, and New Jersey in the neighborhood of the kink marking the beginning of each State's highest tax bracket.

Bunching at different types of kinks at various income levels

The Joint Committee staff analyzed bunching at all kinks in the statutory individual income tax rate schedule, as well as several kinks created by the phase-in or phase-out of tax credits and the phase-out of personal exemptions and itemized deductions. Specifically, the tax credits examined were the EITC, the Child Tax Credit (“CTC”), and the Making Work Pay Tax Credit (“MWPTC”). Most kinks studied can be seen in Figure A-1 in the Appendix. The figure displays the effective marginal tax rate schedule for a head of household taxpayer with two dependents in 2014.

Appendix Figure A-1 illustrates that the largest kinks in the tax schedule occur at low levels of income, and are due to the phase-in and phase-out of tax credits, not breakpoints in the statutory tax rate schedule. Not included in Figure A-1 are kinks created by the MWPTC, which was effective during 2009 and 2010 only. The MWPTC had a similar structure to the EITC and CTC, but with smaller kinks. The credit – \$400 for singles and \$800 for married couples – was phased-in at a rate of 6.2 percent, and phased-out at a rate of roughly two percent. The phase-in occurred up to \$6,451 in earned income for singles, and \$12,903 in earned income for married couples filing jointly.

Measuring bunching intensity

When measuring bunching intensity, the Joint Committee staff estimates a ratio called a “bunching coefficient.” In simple terms, the bunching coefficient is the number of taxpayers who change their behavior to bunch at a kink divided by the average number of taxpayers predicted to locate at that income level if tax rates did not change there. A necessary component of estimating both numbers is estimating the distribution of income in the neighborhood of the kink if the kink did not exist.

The Joint Committee staff predicts this counter-factual income distribution using the observed distribution of income near the kink, but not so close as to be affected by bunching. This involves separately examining the distribution of income between \$1,000 and \$3,500 away from the kink on each side, and separately projecting the observed distribution of income toward the kink. The bunching coefficient is a ratio: the numerator is the difference between the actual distribution and the projected distribution, and the denominator is the projection itself.

A bunching coefficient of one would suggest twice as many taxpayers located near the kink than expected, while zero would suggest that taxpayers take no actions to modify their taxable income in the presence of a kink. Positive bunching coefficients may suggest that taxpayers modify their taxable income to avoid having some portion of that income subject to tax at higher effective marginal tax rates. Similarly, holding the size of the marginal tax rate change at the kink constant, higher bunching coefficients would suggest a higher elasticity of taxable income.¹⁷

¹⁷ For further detail regarding the construction of bunching coefficients, see Jacob Mortenson, *Essays on Responses to Individual Income Taxation in the United States*, unpublished doctoral dissertation, Georgetown University, 2016, available at <https://repository.library.georgetown.edu/handle/10822/1040703>.

IV. SUMMARY OF RESEARCH FINDINGS

The central finding of the Joint Committee staff’s research is that taxpayers do not bunch at most kinks. These include kinks associated with the beginning of the tax bracket breakpoints of the four highest statutory tax rate brackets (*e.g.*, the breakpoints for the 28-, 33-, 35-, and 39.6-percent tax brackets in 2014) and top State income tax rate brackets. Similarly, kinks created by the personal exemption phase-out (“PEP”) and the itemized deduction phase-out (“Pease”) do not generate bunching.

Figure 1 displays counts of tax units by income amount (*i.e.* an income distribution) centered on each of the four statutory tax rate kinks. Figure 1 combines all the tax filing units from 1996 through 2014 that reported taxable income within \$3,500 of one of the four high statutory tax rate kinks in one graph.¹⁸ To accomplish this, Figure 1 reports income as the difference between income reported by the taxpayer and the statutory kink point for that taxpayer’s filing status for the tax year. The \$0 taxable income amount on the horizontal axis represents the kink point. Married taxpayers filing a joint return in 1998 who reported taxable income of \$157,950 (kink between the 31- and 36-percent brackets for 1998 was \$155,950) and a single taxpayer who reported taxable income of \$130,100 (kink at \$128,100) are both recorded as having income relative to the kink of \$2,000. Negative income indicates tax units report income below the kink and positive income indicates tax units report income above the kink. The vertical axis is the number of tax filing units at each income level. The data in the figure are pooled for each of the top four statutory rate kinks in each of the 19 years from 1996 to 2014. In 2014, for example, the data include tax returns near the kinks created by the beginning of the 28-, 33-, 35-, and 39.6-percent tax brackets.¹⁹ If there were substantial bunching at any of these kinks, it would be visible by a spike in the count of tax filing units at \$0 of taxable income. Figure 1 suggests a smooth decline in the number of taxpayers reporting higher incomes as income increases (from left to right). The only group that generated bunching coefficients statistically different from zero was married-filing-separately taxpayers at the third statutory kink. This kink marked the beginning of tax brackets ranging from 25 to 28 percent between 1996 and 2014. However, while the bunching coefficients were positive, and statistically different from zero (often exceeding 1.0), they generated elasticities that were approximately zero. All other tax unit types (married filing jointly, head of household, or single), at all high-income tax kinks, generated bunching coefficients that were statistically indistinguishable from zero.

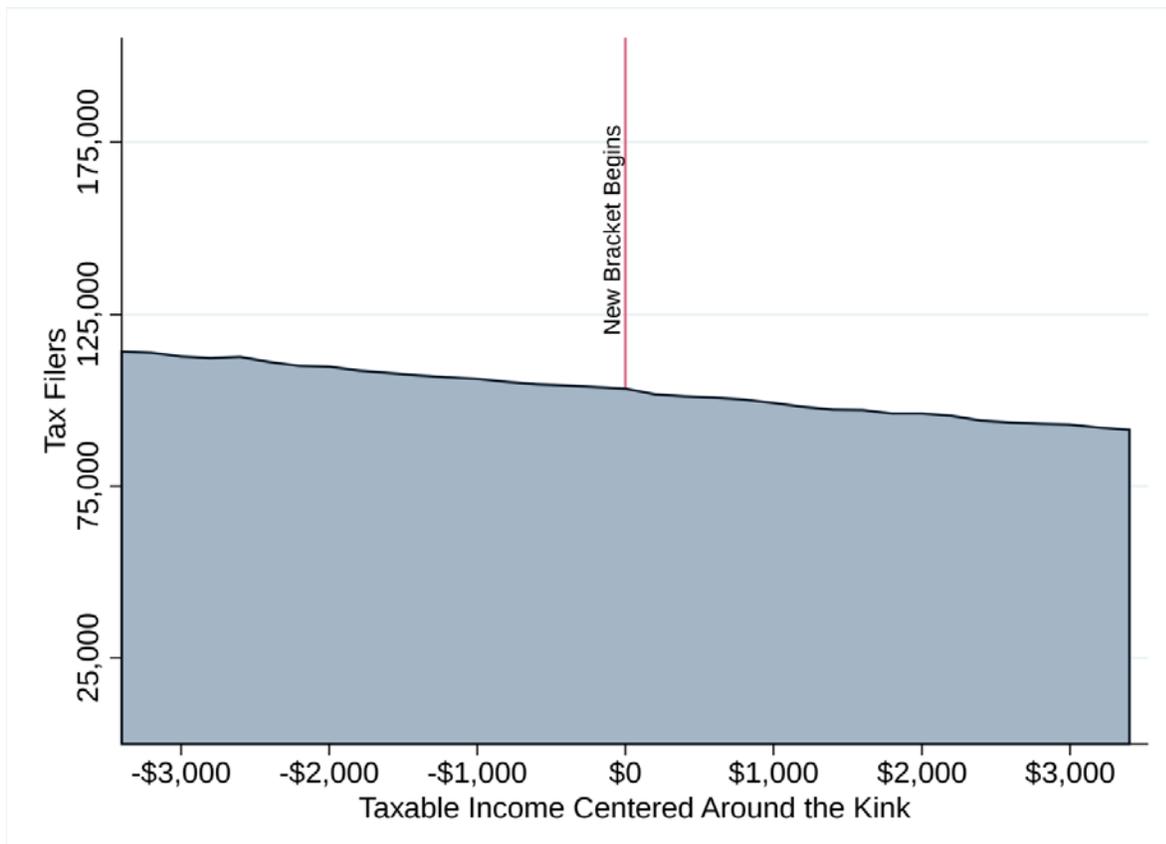
The lack of bunching at most kinks might suggest that most taxpayers are unresponsive to changes in tax rates, and the elasticity of taxable income for these groups is approximately zero. However, a few caveats are in order when interpreting this result. First, many kinks represent

¹⁸ Figure 1 groups these different tax filing units together for convenience of presentation. If the distribution of tax filing units at each of these kinks were graphed separately, similar figures would emerge.

¹⁹ The 39.6-percent bracket, and thus the highest-income statutory kink, was a feature of the Code from 1996 to 2000, and was reinstated in 2013. For other years, Figure 1 includes incomes centered around the remaining three high-income statutory kinks.

small changes in tax rates. Taxpayer response to small changes in tax rates may not be predictive of taxpayer responses to large changes in tax rates. Second, if annual taxable incomes contain a component that is not easily predicted, such as end-of-year bonuses, taxpayers will be unable to target kink points precisely regardless of whether they respond more generally to changes in tax rates. Third, the bunching approach only captures short-run responses of current-year income to current-year tax rates. Long-run decisions such as human capital investment (*e.g.*, earning a new degree) or switching careers may be affected by current tax rates, and therefore may represent channels through which taxable income responds to tax rates. However, these responses are not reflected in bunching measures.²⁰ Fourth, bunching measures are unlikely to capture large, discrete economic decisions, such as the decision to work full- or part-time.

Figure 1.—Taxable Income Centered On High Income Kinks (1996-2014)



Note: Taxable incomes are displayed for taxpayers within \$3,500 of the four kinks marking the beginning of the top four tax brackets in a given year from 1996 to 2014. These tax rates range from 25 percent to 39.6 percent, depending on the year. Taxable incomes have been normalized relative to the kink to which the income is closest. Positive numbers reflect income above the kink and negative numbers reflect income below the kink. The sample is the population of individual taxpayers near these kinks from 1996 to 2014, excluding widows and widowers. The data are pre-audit and therefore do not reflect adjustments made by the IRS after taxpayers have filed their original Federal income tax returns.

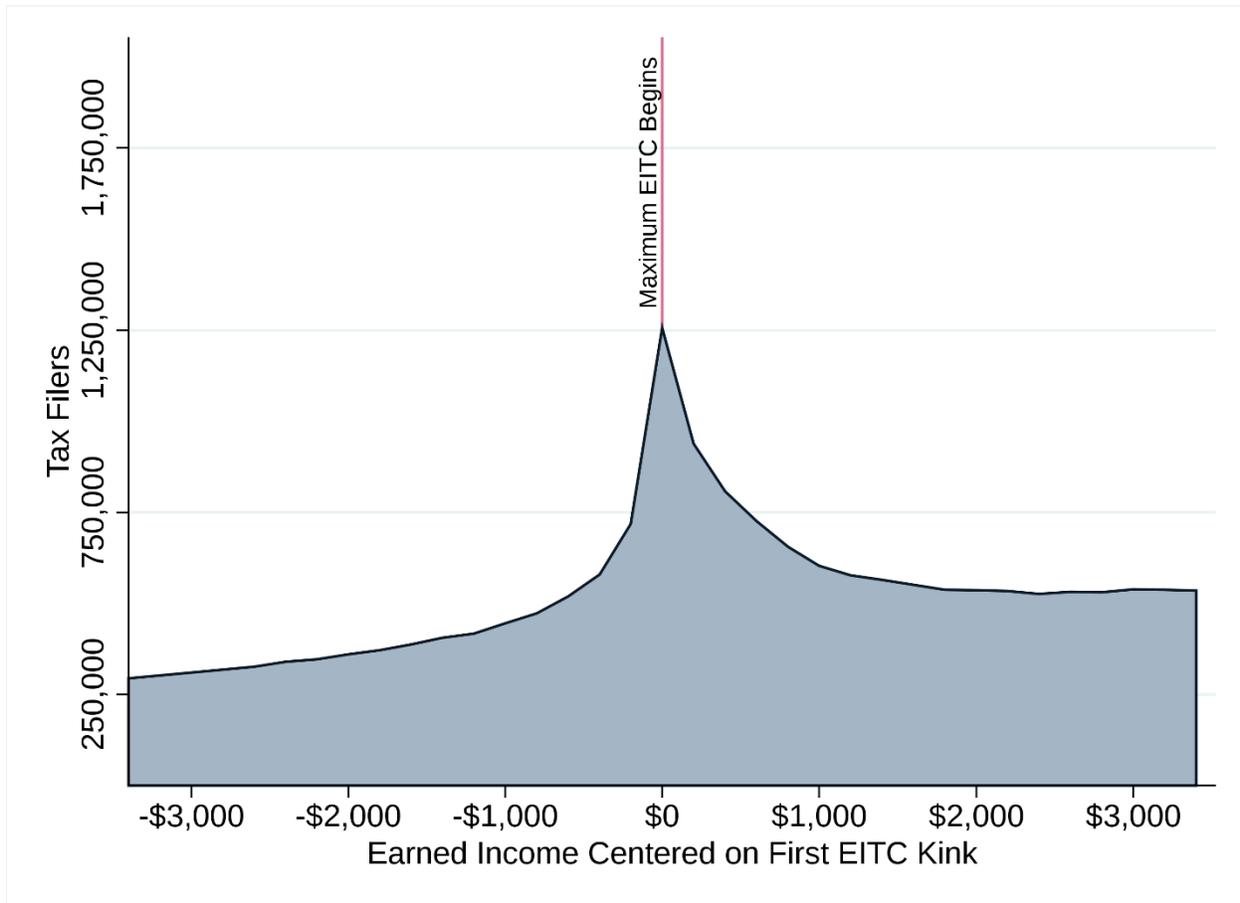
²⁰ Long-run responses are also not captured by the difference-in-differences approach.

Not all kinks see an absence of bunching, however. The Joint Committee staff found responsiveness at several low- and middle-income kinks, particularly at kinks associated with refundable tax credits such as the EITC and the additional child tax credit (“ACTC”). Consistent with prior research, the strongest response occurred at the first EITC kink, which marks the beginning of the EITC’s plateau region. This is one of the largest kinks in the effective marginal tax schedule, with effective marginal tax rates changing by 45 percentage points for some taxpayers (see Figure A-1 in the Appendix.). Figure 2 displays bunching at this kink from 1996 to 2014, indicating strong behavioral responses in reported taxable income to the incentives created by the EITC. These bunching patterns translate to large estimates of the elasticity of taxable income, though bunching patterns vary substantially by filing status.

Bunching near the first EITC kink was primarily limited to taxpayers with children. Childless taxpayers, who are eligible for a much smaller EITC (and thus subject to a smaller kink), displayed little or no bunching, with bunching coefficients and elasticities rarely distinguishable from zero.

Consistent with previous research, the self-employed were more responsive than wage earners. For example, restricting the analysis to the most recent years in the sample period, the Joint Committee staff estimated the average bunching coefficient for self-employed taxpayers at the first EITC kink from 2010 to 2014 to be approximately 22 for head-of-household filers and approximately nine for married filing jointly filers. These estimates correspond with an average elasticity of taxable income in this time period of approximately 0.5 for head-of-household filers and 0.25 for married filing jointly filers. For taxpayers with income solely from wages, the Joint Committee staff estimated average bunching coefficients at the first EITC kink from 2010 to 2014 to be approximately two for head-of household filers and approximately one for married filing jointly filers. These estimates correspond with an average elasticity of taxable income in this time period of approximately 0.05 for head-of-household filers and approximately zero for married filing jointly filers.

**Figure 2.—Income Centered on the First EITC Kink
Households with Children
(1996-2014)**



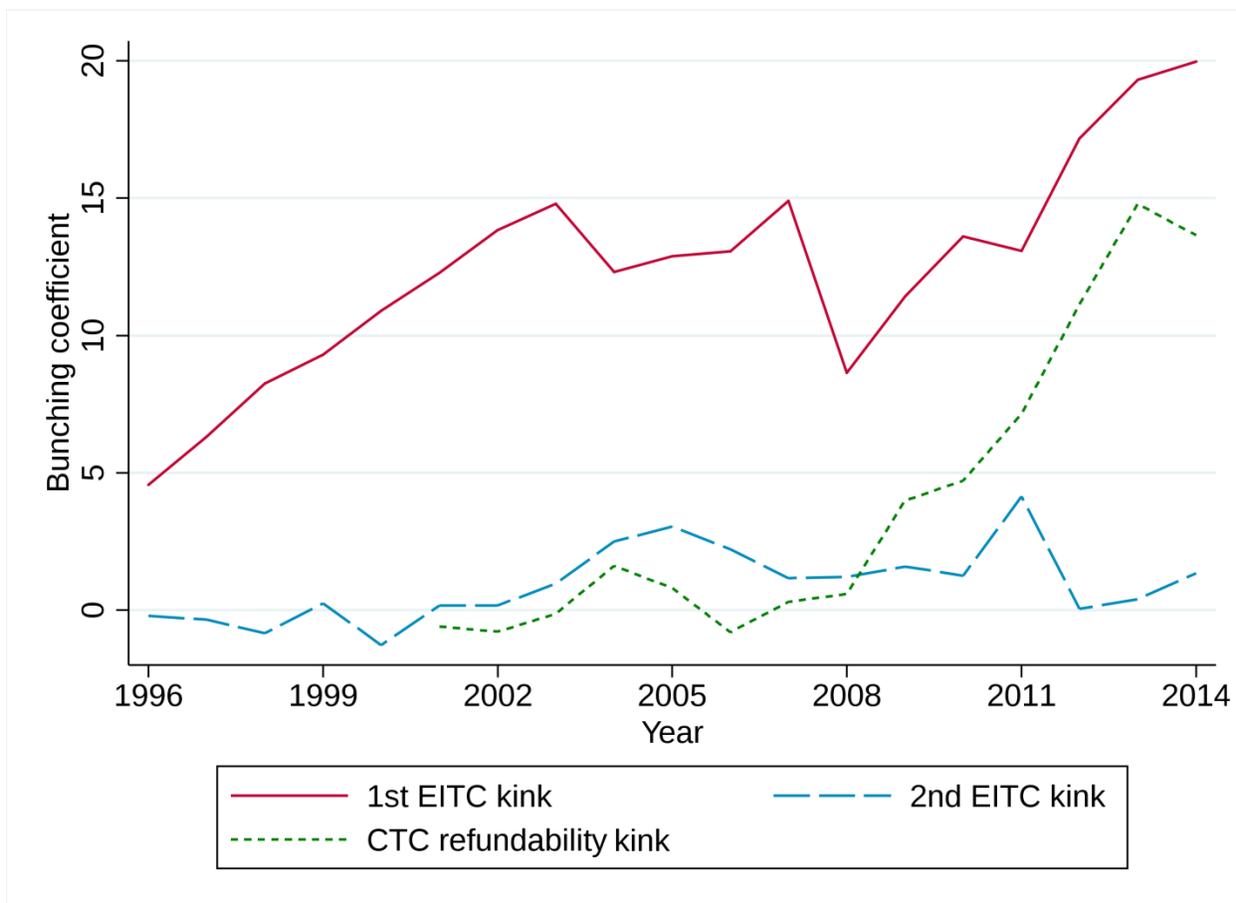
Note: Earned incomes are displayed for taxpayers within \$3,500 of the first EITC kink. Taxable incomes have been normalized relative to the kink, such that positive numbers reflect income above the kink and negative numbers reflect income below the kink. The sample is the population of individual taxpayers in the seven States with no State income taxes from 1996 to 2014, excluding widows and widowers. The data are pre-audit and therefore do not reflect adjustments made by the IRS after taxpayers have filed their original Federal income tax returns.

The Joint Committee staff found bunching patterns generally to be increasing over time. While the first EITC kink saw bunching in all years of the sample, other low-income kinks did not see responsiveness emerge until the mid-2000s. This period saw the rise of bunching at the second EITC kink, marking the end of the earned income tax credit’s plateau region. Similarly, bunching emerged at the income amount where the CTC becomes fully refundable. These kinks change effective marginal tax rates by approximately 20 percentage points and 15 percentage points, respectively.²¹ Figure 3 displays the variation in bunching intensity – measured by

²¹ In 2014, the first EITC kink generated effective marginal tax rate changes of 7.65, 34, 40, and 45 percentage points for tax filing units with zero, one, two, and three or more qualifying dependents, respectively. The effective marginal tax rate changes associated with the second EITC kink were 7.65 percentage points for those without any qualifying dependents, roughly 16 percentage points for those with one dependent, and roughly 21

bunching coefficients – over time for these two kinks as well as the first EITC kink. Bunching coefficients of zero indicate no responsiveness to a given kink, while a bunching coefficient of five indicates that six times as many tax units are located near the kink than predicted.

**Figure 3.—Bunching Intensity Associated with the First EITC Kink
Second EITC Kink, and the CTC Refundability Kink
Single Taxpayers with Two Children
(1996-2014)**



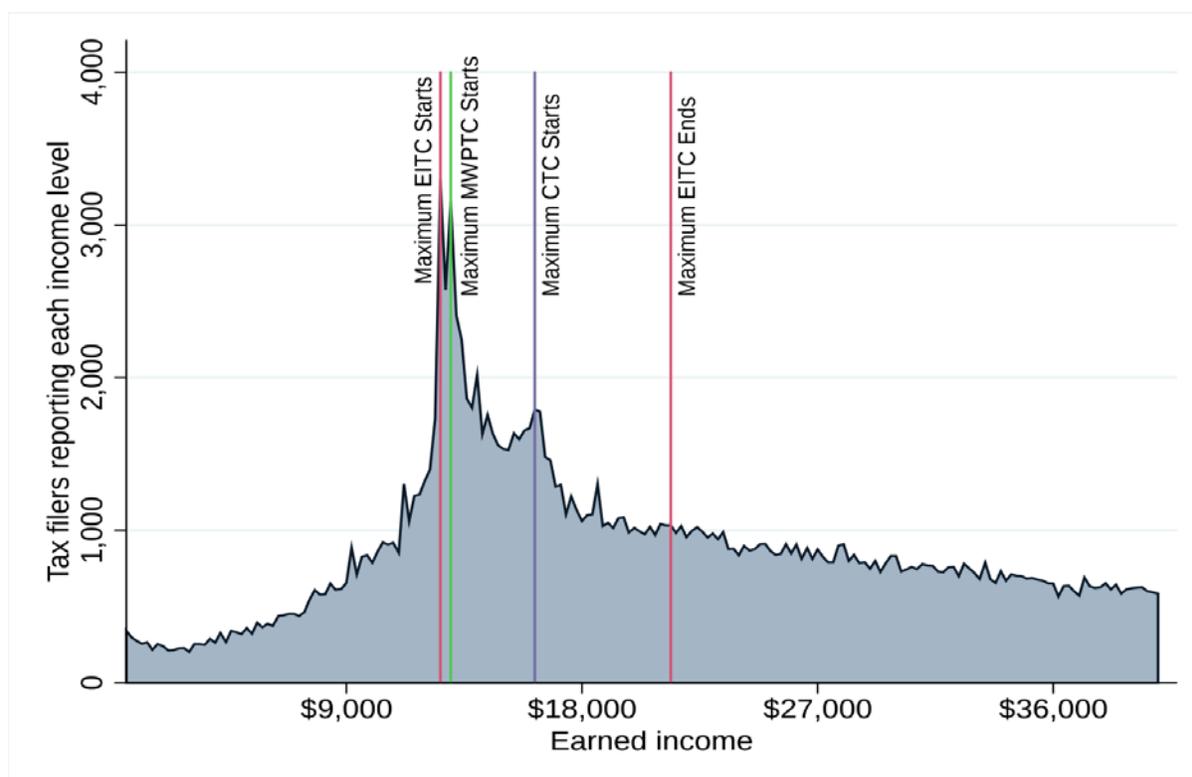
Note: Bunching coefficients, which are statistical measures of bunching intensity, are displayed for single taxpayers with two qualifying children. For the EITC results, the sample is the population of EITC-eligible taxpayers in the seven States with no State income taxes from 1996 to 2014 who file as heads of household and claim two qualifying children. For the CTC results, the sample is the universe of taxpayers from 1996 to 2014 who file as heads of household and claim two qualifying children. For all results, the data are pre-audit and therefore do not reflect adjustments made by the IRS after taxpayers have filed their original Federal income tax returns.

The Joint Committee staff also found responsiveness by married filers to the temporary MWPTC available in 2009 and 2010. Figure 4 displays responsiveness to the kink at the end of the credit’s phase-in region (approximately 6.2 percentage points) for self-employed, married

percentage points for those with two and three or more dependents. The CTC refundability kink generated effective marginal tax rate changes of 15 percentage points for tax units with qualifying dependents.

joint filers with two children in 2010. The kink was located close to the first EITC kink for many taxpayers, but the distribution of income shows clear bunching distinct from the bunching at the first EITC kink and the CTC refundability kink.

Figure 4.—Bunching Intensity Associated with the First EITC Kink, Second EITC Kink, MWPTC Kink, and the CTC Refundability Kink Married, Self-Employed Taxpayers with Two Children (2014)



Note: Earned incomes are displayed for taxpayers with incomes between \$600 and \$40,000. The sample is the population of taxpayers in the seven States with no State income taxes who filed as married filing jointly, claim two qualifying children, and had positive self-employment income in 2014. The vertical axis is the count of taxpayers within a given \$100-wide income bin. The data are pre-audit and therefore do not reflect adjustments made by the IRS after taxpayers have filed their original Federal income tax returns.

Finally, Joint Committee staff found statistically significant bunching at three statutory kinks: the beginning of the statutory tax schedule, the second statutory rate kink, and the third statutory rate kink. However, bunching is substantially less pronounced than that associated with the EITC, CTC, and MWPTC kinks. This is partly because most of the statutory tax rate kinks are smaller than those associated with refundable tax credits; however the second statutory tax rate breakpoint involves a 10-percentage point increase: from 15 percent to 25 percent. The data reveal statistically significant bunching at this kink in all years of the sample, but the corresponding estimated elasticities of taxable income range between 0.00 and 0.06. The data reveal less bunching at the beginning of the statutory schedule, where the 10 percent bracket begins. As mentioned earlier, the third statutory rate kink, where rates increase from 25 percent

to 28 percent in 2014, also generates little bunching, concentrated only among married taxpayers filing separately.

V. DISCUSSION OF IMPLICATIONS FOR JOINT COMMITTEE REVENUE ESTIMATES

The Joint Committee staff is cautious when interpreting the elasticity of taxable income estimates generated by the bunching method. The evidence shows that large kinks associated with tax credits at lower incomes cause strong bunching, suggesting large elasticities of taxable income for low-income taxpayers, especially those with self-employment income. The evidence also shows that small kinks associated with the statutory schedule and phase-outs of itemized deductions and personal exemptions do not cause significant bunching, suggesting elasticities of approximately zero for higher-income taxpayers. However, both of these tentative conclusions are subject to several important caveats.

The strong bunching associated with low-income kinks may not yield elasticities that are reliable for revenue estimation purposes for at least two reasons. First, the elasticities are estimated using the response of taxable income to within-year changes in the marginal tax rate inherent to the structure of the tax schedule. This responsiveness may not be predictive of changes in the tax rate over time. Second, the elasticities may partially reflect attempted noncompliance. To the extent that such noncompliance is detected by the IRS, it will not affect revenues collected, and thus the elasticities measured may overstate behavioral responsiveness that matter for revenue estimation. More research is needed to establish whether low-income bunching responses reflect reporting decisions or real adjustments of labor supply. However, if this estimated bunching represents real adjustments of labor supply, it would be inappropriate to use the results as part of Joint Committee staff conventional revenue estimates which hold baseline economic aggregates, such as labor supply, constant.

Similarly, the lack of bunching associated with higher-income kinks does not imply that revenue estimates should use zero elasticities for this group. Higher-income kinks are small, representing no more than a five-percentage point change in marginal tax rates. Thus, a lack of bunching need not imply that taxpayers are insensitive to tax rates. These same taxpayers might adjust their incomes in response to larger changes in tax rates. Because the elasticities are estimated using the response of taxable income to within-year changes in the marginal tax rate inherent to the prevailing structure of the tax schedule, if a high-income taxpayer were to accelerate income into the current year because of an increase in the individual income tax rate schedule for the next year, the taxpayer's reported change in taxable income would not be estimated as bunching behavior. Further, taxpayers may be adjusting their incomes in ways that are not captured by the bunching approach. For example, if taxpayers can only adjust their incomes in large, discrete ways, they may not be able to bunch precisely at kinks. The Joint Committee staff analysis reported here, which looks for bunching within \$3,500 of a kink, would not reflect larger dollar responses. In any of these situations, an elasticity of zero would be inappropriate for modeling the behavior of high-income taxpayers.

Finally, while bunching responses have first order effects on tax revenue, if bunching is achieved through pure reporting phenomena, the effects on aggregate economic activity are negligible. However, to the extent bunching is achieved through changes in labor supply – for example, individuals working more to maximize the EITC – there may be macroeconomic consequences. Similarly, individuals bunching at a statutory kink by investing in long-term capital assets instead of holding assets generating taxable interest income could also have

macroeconomic effects. The Joint Committee staff uses existing elasticity of taxable income analysis as part of its conventional revenue analysis of proposed changes in tax law. The Joint Committee staff does take into account changes in labor supply and saving and investment decisions that may result from tax policy changes as part of its macroeconomic analyses.²²

Bearing these caveats in mind, the bunching approach remains a useful tool for understanding taxpayer behavior. The fact that bunching patterns have emerged at new locations suggests taxpayers may be improving their knowledge about the tax schedule. Moreover, bunching responses have emerged among a new group: wage earners claiming low-income tax credits. The changing nature of responsiveness suggests bunching research should be ongoing, as different groups of taxpayers may begin bunching at other kinks in future years.

²² For a summary of the macroeconomic models used by the Joint Committee staff, see: Joint Committee on Taxation, *Summary of Economic Models and Estimating Practices of the Staff of the Joint Committee on Taxation* (JCX-46-11), September 19, 2011; Joint Committee on Taxation, *Testimony of the Staff of the Joint Committee on Taxation Before the House Committee on Ways and Means Regarding Economic Modeling* (JCX-48-11), September 21, 2011; and Joint Committee on Taxation, *Macroeconomic Analysis at the Joint Committee on Taxation and the Mechanics of Its Implementation* (JCX-3-15), January 26, 2015.

APPENDIX

This appendix provides an example of the effective marginal tax rate schedule faced by an individual taxpayer. Effective marginal tax rates differ from statutory marginal tax rates – the marginal tax rate brackets explicitly specified in statute – in that they incorporate the phase-in and phase-out regions of credits, deductions, and exemptions. Figure A-1 displays an effective marginal tax rate schedule for a head of household filer with two dependents who earns less than \$100,000 of adjusted gross income in 2014. Figure A-2 is the analogous schedule for the household when earning between \$100,000 and \$460,000 of adjusted gross income. Table A.1, below, identifies the sources and height of each kink in Figures A.1 and A.2 and provides an identifying reference number for the figures.

Two patterns are apparent in these figures. First, effective marginal tax rates are not strictly increasing in income. The marginal tax rate faced by this household when near a taxable income level of \$35,000 – where the household is in the phase-out region of the EITC, is paying Federal Insurance Contributions Act (“FICA”) taxes,²³ and is subject to the 15 percent marginal income tax rate bracket – exceeds 40 percent and is higher than the household’s effective marginal tax rate at any other income level. Second, the kinks in the effective marginal tax rate schedule are much larger (and closer together) at the bottom of the income distribution than at the top.

Both of these figures assume the household has only wage income, claims the EITC and CTC when eligible, takes \$10,000 in itemized deductions, and lives in a State with no income tax regime. This figure would look different for different household types, numbers of dependents, income compositions, deductions, and States of residence. In particular, many of the large increases and decreases in effective marginal tax rates at the bottom of the distribution would disappear for childless households, or for those failing to claim the EITC or CTC.

**Table A.1—Identification of Effective Marginal Tax Rate Kinks
(2014, Head of Household Filer with Two Dependents)**

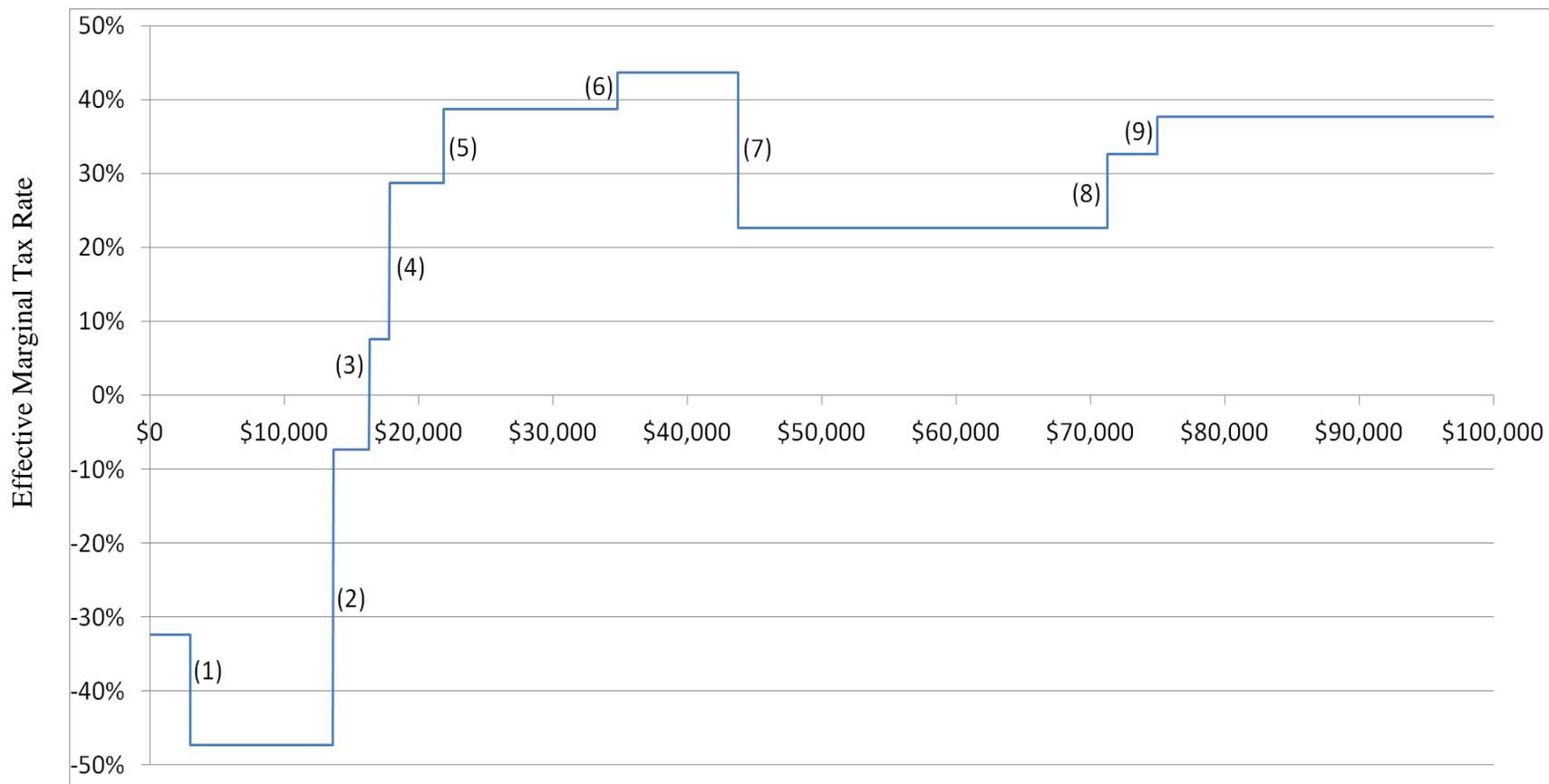
Kink	Description	Size
(1)	Beginning of the CTC phase-in	15 percentage points
(2)	End of EITC phase-in	40 percentage points

²³ As part of the financing for Social Security and Medicare benefits, a tax is imposed on the wages of an individual received with respect to his or her employment under FICA. See Chapter 21 (secs. 3101-3128) of the Code. The FICA tax has two components - the old-age, survivors, and disability insurance (“OASDI”) component (also known as Social Security taxes), and the hospital insurance (“HI”) component (also known as Medicare taxes). Different tax rates apply to each component.

Kink	Description	Size
(3)	End of CTC phase-in	15 percentage points
(4)	Beginning of the EITC phase-out	21 percentage points
(5)	Beginning of the first statutory bracket	10 percentage points
(6)	Beginning of the second statutory bracket	5 percentage points
(7)	End of EITC phase-out	21.06 percentage points
(8)	Beginning of the third statutory bracket	10 percentage points
(9)	Beginning of CTC phase-out	5 percentage points
(10)	FICA Social Security tax ends	6.2 percentage points
(11)	CTC is fully phased out	5 percentage points
(12)	Beginning of the fourth statutory bracket	3 percentage points
(13)	Additional Medicare Tax begins	0.9 percentage points
(14)	Beginning of the fifth statutory bracket	5 percentage points
(15)	Phase-outs of personal exemptions (PEP) and itemized deductions (Pease) begin	3.52 percentage points
(16)	Phase-out of itemized deductions (Pease) ends	0.99 percentage points
(17)	Phase-out of personal exemptions (PEP) ends	2.53 percentage points

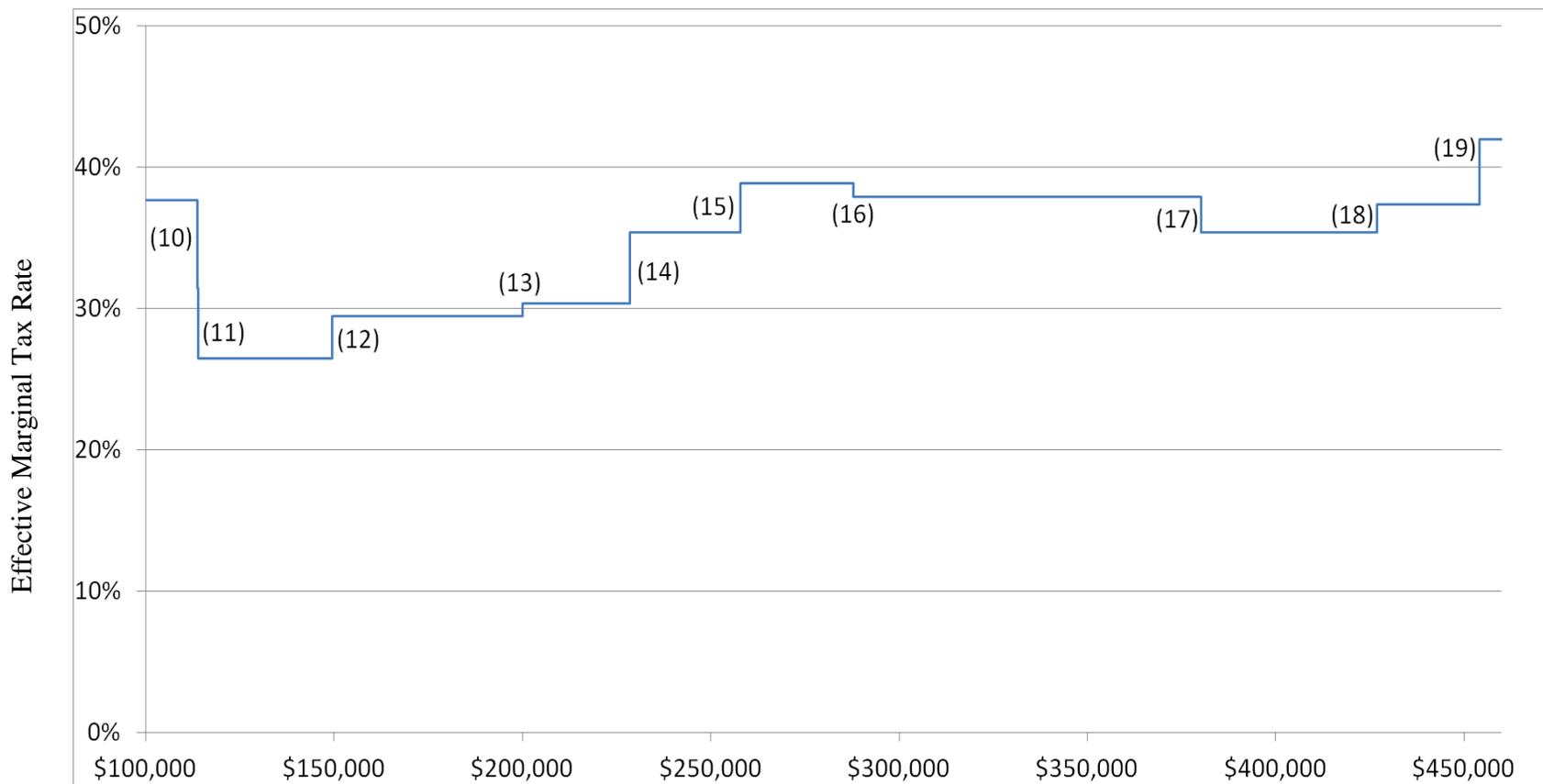
Kink	Description	Size
(18)	Beginning of the sixth statutory bracket	2 percentage points
(19)	Beginning of the seventh statutory bracket	4.6 percentage points

Figure A-1.—Effective Marginal Tax Rates: \$0 to \$100,000



Note: The effective tax schedule is depicted for a head-of-household filer with two dependents in 2014. The vertical axis is the effective marginal tax rate, and the horizontal axis is adjusted gross income. See text for the specific assumptions underlying this figure.

Figure A-2.—Effective Marginal Tax Rates: \$100,000 to \$460,000



Note: The effective tax schedule is depicted for a head-of-household filer with two dependents in 2014. The vertical axis is the effective marginal tax rate, and the horizontal axis is adjusted gross income. See text for the specific assumptions underlying this figure.