IMPACT OF THE 2017 TAX CUTS AND JOBS ACT ON HOUSEHOLD LABOR SUPPLY AND WELFARE ACROSS THE INCOME DISTRIBUTION

Julie L. Hotchkiss, Robert E. Moore, and Fernando Rios-Avila

This paper estimates the change in optimal labor supply and household welfare resulting from the Tax Cuts and Jobs Act (TCJA) of 2017. We estimate labor supply elasticities using the Current Population Survey to simulate changes in optimal labor supply and welfare among households with different characteristics under the new TCJA tax code. Married household members reduce optimal hours post-TCJA; optimal hours increase among singles, except at the very top of the income distribution. All households' welfare increased, on average, with gains disproportionately benefiting the wealthy, households with self-employment income or children, and most homeowners versus renters.

Keywords: family welfare, joint labor supply, microsimulation, Tax Cuts and Jobs Act, TCJA

JEL Codes: I30, H20, J22, D19

I. INTRODUCTION

On December 31, 2017, the Tax Cuts and Jobs Act (TCJA) became the most sweeping reform of the US tax code since the Economic Growth and Tax Relief Reconciliation Act took effect in 2001 and 2003. The centerpiece of the TCJA affecting most taxpayers was a reduction in marginal income tax rates. For example, the top tax rate fell from 39.6 to 37 percent. A larger standard deduction and expanded child tax credit replaced personal and dependent exemptions. The TCJA introduced new limits to itemized deductions and removed the phase-down of allowable

Julie L. Hotchkiss: Federal Reserve Bank of Atlanta, Atlanta, GA, USA; Georgia State University, Atlanta, GA, USA (Julie.L.Hotchkiss@atl.frb.org); Robert E. Moore: Georgia State University, Atlanta, GA, USA (rmoore@gsu.edu); Fernando Rios-Avila: Levy Economics Institute of Bard College, Annandale-on-Hudson, NY, USA (friosavi@levy.org)

Electronically published May 17, 2024

National Tax Journal, volume 77, number 2, June 2024.

 https://doi.org/10.1086/729747

deductions. The Alternative Minimum Tax rules were relaxed, making it binding on fewer taxpayers overall. In addition, certain personal income earned by small business owners, which was previously taxed at higher personal income tax rates, now qualified as "pass-through" income and, thus, became partially deductible, lowering the effective marginal tax rate for the self-employed.

This paper evaluates the impact of these tax changes on the welfare of married and single households across the income distribution. We go beyond merely estimating the impact on net income of these tax changes by specifying a household utility model that allows for identification of adjustments in joint optimal labor supply in response to tax rule changes. By simulating changes in optimal behavior for the same households, we can isolate changes that the tax reform alone would produce without being confounded by other demographic changes taking place over the time period. The microsimulation approach taken in this paper blends the advantages of two approaches often in conflict with one another when considering the impact of a policy change — comparative static versus structural analyses (see Chetty, 2009). The reduced-form, micro-level analysis in this paper allows for the transparency and heterogeneity afforded comparative static models, whereas the policy simulation allows for predictions about counterfactuals, which is the stalwart of more structural models.

A. Policy Details of the TCJA

One could argue that the most significant change in the post-TCJA tax regime is lower federal tax rates for all but two of the tax brackets. The marginal tax rates post-(pre-) TCJA are 10 (10), 12 (15), 22 (25), 24 (28), 32 (33), 35 (35), and 37 (39.6). Because the US tax system is highly nonlinear, many of the gains from the TCJA came from changes in the treatment of inframarginal income and tax credits, such as self-employment income, child tax credits, and changes in various deductions.[1] Specifically, the $4,150 personal and dependent exemption and the $1,000 child tax credit (phasing out as income increased) that existed pre-TCJA were replaced with zero personal exemption and a $2,000 child tax credit ($500 for other dependents). Moreover, these credits phase out at higher income levels than before.

Further, the TCJA roughly doubled the standard deduction, from $6,000 to $12,000 for single filers and from $13,000 to $24,000 for joint filers. As a result, more filers opt to take the standard deduction instead of itemizing deductions. However, for those who continued to itemize, the TCJA eliminated the phaseout of deductions as income increased, but it did introduce other limits to popular deductions, such as state and local property taxes and mortgage interest payments.

In addition, the TCJA introduced a new, complicated deduction for families with "pass-through" business income, which includes sole proprietorships, partnerships, limited liability companies, and S corporations (see Gale et al., 2018). This deduction

[1] Further details of the changes enacted through the TCJA can be found in Gale and Haldeman (2021). Also see TPC (2024).

varies depending on income and the type of business, phasing out at higher income levels. Using the Current Population Survey (CPS) and the TAXSIM tax simulator, Figure 1 illustrates how some of these more well-known features of the TCJA affected average marginal tax rates across the income distribution. Panels A–D correspond to married families with different characteristics and panel E corresponds to single men and women.

Panel A illustrates the overall decline in marginal tax rates, on average, for married families across rolling quintiles of the income distribution. Declines in tax rates

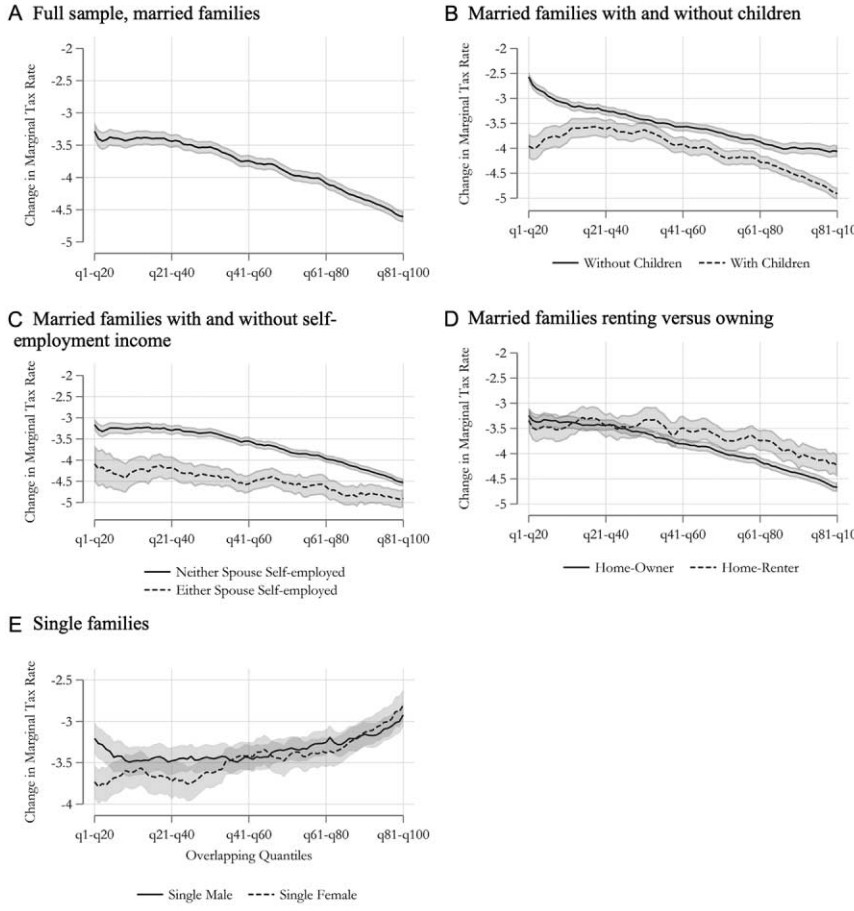


Figure 1. Post-TCJA minus pre-TCJA average marginal tax rates across the income distribution, rolling quintiles of married families with varying characteristics and for single families. (A) Full sample, married families. (B) Married families with and without children. (C) Married families with and without self-employment income. (D) Married families renting versus owning. (E) Single families. Authors' calculations from CPS data and TAXSIM tax calculator.

ranged from about 3.5 percent in the lowest end of the income distribution to more than 4.5 percent in the upper end of the distribution. The additional gains families with children experienced from an increase in the child tax credit can be seen in panel B, where families with children in the top of the income distribution experienced a nearly 5 percentage point decline in their marginal tax rates, on average. Panel C illustrates the contrast in gains between families with no self-employment income and families with at least some self-employment income. This results from the new treatment of pass-through income.

The TCJA significantly limited the deductions for state and local property taxes and mortgage interest payments previously enjoyed by many homeowners, suggesting that homeowners may not have fared as well as renters. However, panel D shows that comparisons of marginal tax rate changes between homeowners and renters are more nuanced — the average decline in marginal tax rates among renters exceeds the decline among homeowners in the lowest end of the income distribution, but homeowners enjoyed a larger decline across the mid- and higher-income ranges.

Panel E illustrates a couple of differences between married and single families. Overall, married families enjoyed, on average, larger declines in marginal tax rates. This may be because married families are more likely to have children and some self-employment income. And, while the decline in marginal tax rates among married families nearly monotonically increases with income, declines in average marginal tax rates are larger at the low end of the income distribution for single families. This likely reflects differences in inframarginal tax rates across the income distributions for single versus married families, or may simply be a function of the more restrictive sample of singles used for analysis here (described later).

B. Aggregate versus Individual Implications of the TCJA

Most of the analysis to date on the expected impact of the TCJA relates to the impact on aggregate domestic economic output or growth.[2] Gale and Haldeman (2021) find very little evidence of notable supply-side impacts of the TCJA and conclude that any gross domestic product (GDP) growth stemming from the TCJA is likely "vanishingly small." Kumar (2020) links a 1 percentage point higher growth of GDP and 0.3 percentage point faster job growth in 2018 to the implementation of the TCJA. Lieberknecht and Wieland (2019) contend that the long-run impact on GDP of about 2.5 percent will exceed the short-run impact of 2 percent. However, Barro and Furman (2018) report a much smaller estimate of the long-run impact of just 0.4 percent increase in GDP. Based on six-quarters of actual GDP growth, Furman (2019) stands by that initial lower projected estimate.

[2] The University of North Carolina Tax Center offers an aggregation of academic research on the subject of the impact of the TCJA. See Hoopes (n.d.).

The analysis in this paper focuses on the impact of the TCJA on expected changes in optimal household behavior and welfare.[3] As detailed by Li and Pomerleau (2018), most analysts expected that the TCJA tax cuts would disproportionately benefit the top end of the income distribution. Bhattarai et al. (2019) show that in addition to the unequal treatment of income by the TCJA, the reduction in capital tax rates has the effect of increasing the skill premium, compounding the TCJA's effect on increasing inequality (also see Zeida, 2022). This effect is exacerbated by the expected declines in individual charitable contributions resulting from more taxpayers choosing the standard deduction under the new tax rules (Brill and Choe, 2018).

Aggregate analyses often miss nuances at the individual/household level, such as how the policy response of one household member might affect the behavior of another. Using individual-level data for analysis in this paper allows for a greater degree of heterogeneity in response to the tax policy changes than can typically be incorporated into a structural aggregate model. While our methodology is quite different, Malkov (2021) also accounts for the changes in labor supply when assessing the impact of tax reforms on the welfare at the household level. In spite of the differences in his paper, such as (1) not considering nonworking husbands, (2) relying on elasticity estimates from the literature, and (3) focusing on aggregate estimates with limited heterogeneity, Malkov's results are remarkably similar to ours — finding an increasing welfare effect across the income distribution of married households. He estimates the ratio of the welfare gain in the 75th income percentile to the welfare gain in the 25th percentile to be 3.2 percent. Our estimate is 2.4 percent (comparing the gains in the 80th with the 20th percentiles).

In addition, Dobridge, Hsu, and Zabek (2023) report a positive link between larger tax cuts and larger increases in feeling financially secure. These subjective feelings were supported by observing fewer delinquencies, more new credit accounts, and higher credit balances post-TCJA.

This paper contributes to the existing literature by exploring the expected impact on optimal hours of work and household welfare across the income distribution for both married and single families. Making use of individual-level data, we assess how the welfare impact differs across family characteristics, such as the presence of children, self-employment income, and homeownership.

II. METHODOLOGY

Microsimulation is a methodology often applied to assess the impact of a specific policy change on welfare, and its application takes many forms (e.g., see Gustman, 1983; Blundell, 1992; Bahl et al., 1993; Blundell et al., 2000; Fiorio, 2008). The microsimulation strategy in this paper is most similar to Hotchkiss, Moore, and Rios-Avila (2012), which assesses the impact on family welfare of the 2001 US

[3] See Hanlon, Hoopes, and Slemrod (2018); Dowd, Giosa, and Willingham (2020); Gaertner, Lynch, and Vernon (2020); and Cohen and Viswanathan (2020) for research on the effect of the TCJA on firm behavior.

tax cut. Both papers take advantage of the theoretical framework of a standard joint family utility model that allows for estimation of the labor supply of multiple household members. By relying on a specific form of the utility function, we can estimate changes in utility from changes in net wages and nonlabor income, resulting in labor supply changes and, ultimately, changes in household welfare.

A. Family Utility Framework

We model household labor supply decisions in a neoclassical joint utility framework, referred to as the "unitary" model, because this framework provides a clear-cut expression of household welfare that allows for cross-wage effects on each member's labor supply decision.[4] Within this framework, a household maximizes a utility function that represents household welfare. Assuming, for simplicity, that there are at most two working members of the household (husband and wife), the household chooses levels of nonmarket time, such as leisure and household production, for each member and a joint consumption level to solve the following problem:[5]

$$\max_{(L_1,L_2,C)} U = U(L_1, L_2, C)$$
$$\textit{subject to } C = w_1h_1 + w_2h_2 + Y. \tag{1}$$

Define T as total time available for an individual; $L_1 = T - h_1$ will be referred to as the husband's nonmarket time, and $L_2 = T - h_2$ will be referred to as the wife's nonmarket time; h_1 is the labor supply of the husband; h_2 is the labor supply of the wife; C is total money income (or consumption with price equal to one); w_1 and w_2 are the husband's and wife's after-tax market wage, respectively; and Y is nonlabor income. L_1 and L_2 correspond to *all uses of nonmarket time*, including home production activities and leisure.[6]

We can express the solution to the maximization problem in Equation (1) in terms of the indirect utility function, which is solely a function of the wages and nonlabor income:

$$V(w_1, w_2, Y) = U\{\left[T - h_1^*(w_1, w_2, Y)\right], \left[T - h_2^*(w_1, w_2, Y)\right], \left[w_1h_1^*(w_1, w_2, Y) + w_2h_2^*(w_1, w_2, Y) + Y\right]\}, \tag{2}$$

[4] Blundell et al. (2007) find that both unitary models and models that account for intrahousehold decision-making (collective models) are consistent with their household labor supply model estimated in the United Kingdom (also see Moreau and Bargain, 2005; Immervoll et al., 2011).

[5] Of course, a single household will have only one leisure term, but the optimization problem is otherwise the same.

[6] Apps and Rees (2009) are highly critical of family utility models that do not include measures of household production, but even they acknowledge that not much can be done without the availability of richer data. Because the focus of the analysis in this paper is utility at the household level, the absence of home production activities is not crucial.

where $h_1^*(w_1, w_2, Y)$ and $h_2^*(w_1, w_2, Y)$ correspond to the optimal labor supply equations for the husband and wife, respectively.[7] By totally differentiating the indirect utility function, we can simulate the change in welfare that results from changes in optimal hours of work and consumption in response to changes in wages and nonlabor income:

$$dV = -U_1 dh_1^* - U_2 dh_2^* + U_3 dC^*, \tag{3}$$

where U_1 and U_2 are the household's marginal utility of the husband's and wife's nonmarket time, respectively, and U_3 is the household's marginal utility of consumption. This equation gives us the change in household welfare resulting from a change in marginal tax rates. Equation (3) shows that the change in welfare depends not only on the individual labor supply responses but also on the household's marginal evaluation of a change in nonmarket time and income.

B. Estimation of Utility Function Parameters and Labor Supply Elasticities

Simulating the impact on household welfare of a change in the tax code requires the estimation of labor supply functions for each household member, which depend on their own and each other's (in the case of married-couple households) wages and their combined nonlabor household income, as well as the changes in the probability of employment — that is, the probability of being at an interior solution on the budget constraint. If we could obtain labor supply elasticities for individual families, we could estimate full heterogeneous effects. However, this is not possible with cross-sectional data. Instead, to identify the heterogeneous effects across the income distribution, we estimate the utility function parameters separately across rolling income quintiles. Specifically, based on predicted household income, we allocate households to 100 groups of the same size. Using these subgroups, we define households belonging to groups 1–20, 2–21, and so on and so forth. What we normally consider the first quintile (first 20 percent of the population by income) would be represented by the 1–20 rolling quintile. This means we obtain a separate set of estimates for centile groups 1–20, 2–21, 3–22, . . . , and 81–100.

We use these parameters to calculate the expected change in optimal hours based on the implicit labor supply functions (for the representative family in each quintile), and the corresponding changes in welfare. Specifically, we calculate changes in hours and consumption as follows (expanding Equation (3)):

$$\begin{aligned} dV = &-U_1\left\{E\left[h_{1,\text{post}}^*(w_{1,\text{post}}, w_{2,\text{post}}, Y_{\text{post}}) - h_{1,\text{pre}}^*(w_{1,\text{pre}}, w_{2,\text{pre}}, Y_{\text{pre}})\right]\right\} \\ &- U_2\left\{E\left[h_{2,\text{post}}^*(w_{1,\text{post}}, w_{2,\text{post}}, Y_{\text{post}}) - h_{2,\text{pre}}^*(w_{1,\text{pre}}, w_{2,\text{pre}}, Y_{\text{pre}})\right]\right\} + U_3\left\{(w_{1,\text{post}}E\left[h_{1,\text{post}}^*(.)\right]\right. \\ &\left. + w_{2,\text{post}}E\left[h_{2,\text{post}}^*(.)\right] + Y_{\text{post}}) - (w_{1,\text{pre}}E\left[h_{1,\text{pre}}^*(.)\right] + w_{2,\text{pre}}E\left[h_{2,\text{pre}}^*(.)\right] + Y_{\text{pre}})\right\}, \end{aligned} \tag{3'}$$

[7] Details about the derivation of the labor supply functions can be found in the appendix (available online).

where $E[.]$ is the expected value calculated for the representative family in each rolling quintile, $h_k^*(k = 1, 2)$ are the optimal labor supply functions based on the utility maximization problem, and "pre" and "post" correspond to the tax regime pre-TCJA (actual) and post-TCJA (predicted), respectively.

Note that Equation (3') estimates the change in welfare (through changes in hours and consumption) holding *everything except the tax policy* constant, including marginal utilities. Given the comparative static nature of the analysis, the effects estimated here are all short-run effects (over some undefined period of time), and, hence, it is appropriate to hold marginal preferences constant at pre-TCJA levels.[8]

The estimation strategy closely follows that used by Hotchkiss, Moore, and Rios-Avila (2012) by estimating a nonlinear bivariate Tobit model that accommodates jointly determined household labor supply. The application in this paper improves upon Hotchkiss, Moore, and Rios-Avila (2012) by not relying on as many approximations for the microsimulation calculations (e.g., here we actually calculate pre- and post-hours and consumption), allowing for endogenous quintile location, and using predictive mean matching for wage imputations.

To obtain estimates of the pieces of the change in utility in Equation (3'), we specify a quadratic form of the utility function, following previous work (e.g., Ransom, 1987; Hotchkiss, Kassis, and Moore, 1997; Heim, 2009; Hotchkiss, Moore, and Rios-Avila, 2012). The quadratic function has the advantage of being a flexible functional form and can be thought of as a second-order approximation to an arbitrary utility function; what little we may lose in accuracy, we gain in generalizability. An additional advantage of this functional form is that it produces analytical closed-form solutions for both the husband's and wife's labor supply equations. Details of this modeling choice, including caveats and discussion of implications, as well as the specific closed-form solutions for the labor supply equations are available in the appendix.

To impute unobserved wages for nonworkers, we follow a methodology known as predictive mean matching (see Little, 1988; Morris, White, and Royston, 2014). We first estimate Heckman selection models to predict selectivity-corrected pretax wages for all workers and nonworkers in the sample. Next, we use these predicted wages to randomly assign to each nonworker the observed after-tax wage (both before and after the TCJA) from the worker that is closest based on the Heckman predicted wage.[9] We impute wages separately for nonworking wives and husbands,

[8] One might wonder why we simply don't appeal to the envelope theorem to approximate the total change in utility. Approximating total change in utility by the envelope theorem aggregates the impact the policy change has on income, behavior, and preferences, which means we would not be able to identify the impacts separately. In addition, we base our assumption that preferences don't change quickly (in the short run) on work by Hotchkiss (2022), who shows that changes in labor supply elasticities, even across generations, are very small. If preferences change more quickly than we assume, then the magnitude of our estimates of the short-run change in utility would be biased downward. But, again, only by a very small amount.

[9] To investigate the robustness of the matching process, we generated alternative wage predictions by adding some randomness using the variance of the prediction error (see Morris, White, and Royston, 2014); there was no appreciable difference in the estimated parameters.

using a nonlinear bivariate Tobit (the appendix contains additional details). To account for heterogeneity in preferences across households (see Keane and Wasi, 2016; Deaton, 2018), we estimate a different set of parameters for each overlapping income quintile of households. This results in 81 samples for which we estimate changes in hours, consumption, and welfare.

Because a household's position in the income distribution is likely endogenous to a household's labor supply decision, households are assigned to a centile group based on their predicted income from a fully nonparametric model. We estimate the nonparametric model of total income per week as a function of each household member's age, education, race, metropolitan city status, and region of residence. Households are assigned to a quintile group based on their predicted household income from this model.[10]

III. DATA

We use the CPS, which the US Bureau of Labor Statistics administers each month to roughly 60,000 households.[11] The CPS contains detailed demographic, earnings, and nonlabor income data. Households are interviewed for four consecutive months, not interviewed for eight months, and then interviewed again for four months, allowing households, families, and individuals to be matched across survey months if they remain in the same physical location. In survey months four and eight (outgoing rotation groups), members of the household are asked more detailed questions about their labor market experience, such as wages and hours of work.[12]

We use the CPS outgoing rotation groups in March, April, May, and June from 2015 to 2017, prior to the implementation of the TCJA, to construct the samples for which the family labor supply model is estimated. We combine as many months as possible across three years to construct a large enough data set to meet the demands of the estimation strategy. We match each household to their March supplement survey (the CPS Annual Social and Economic Supplement, or ASEC) to gather nonlabor income.[13] Note that no data post-TCJA are used in this analysis. The microsimulation strategy depends on everything, except the tax change, being held constant, including the data (families) from which elasticities are estimated.

Our data include only households with members between 25 and 64 years of age and, from the married sample, we exclude households with unmarried couples or

[10] Because education may be endogenous to income, we have repeated the analysis here excluding education as a predictor without any appreciable difference in results (results available upon request). Further details of predicting household income quintile are found in the appendix.

[11] We obtain the CPS data set from the Integrated Public Use Microdata Series (IPUMS) (see Flood et al., 2015).

[12] Because of the CPS survey structure, about 27 percent of observations in the household sample are observed twice. This means that our standard errors may be slightly understated.

[13] We use the IPUMS CPS data that perform the matching of the monthly samples to the ASEC; the success rate of matching across months ranges from 93 to 100 percent (see Flood and Pacas, 2017).

same-sex adults/partner couples.[14] From both married and single samples, we exclude households in which members (both in the case of married households) are students or in the military, those with children older than 18, those that contain extended adult family members, and households with employed children. In addition, we exclude married households in which both members are retired.

Furthermore, we "trim" the data to eliminate outliers that cause difficulties in estimating the simultaneous nonlinear labor supply functions. About 6 percent (2,567) of the married sample is eliminated based on the following restrictions: nonpositive after-tax weekly household income, negative nonlabor income, negative earnings, or negative after-tax income. The only statistically significant difference between the original and trimmed samples of married couples is that the wife's wage is slightly lower in the estimation sample.

In addition to these restrictions, we also exclude single men and women with negative tax rates; an additional 19 percent of the original sample of singles is excluded for this reason.[15] Because of this additional exclusion, the samples of singles are statistically significantly more likely to be working, not have a disability, be more educated, own a home, and have fewer children than we would expect among the population more generally. Comparisons between the pretrimmed and final estimating samples for both married and single households are found in the appendix. Trimming has no appreciable impact on the means of the married household sample; however, several variables in the trimmed samples of singles, especially women, are statistically significantly different from the untrimmed sample. The difficulty in constructing representative samples of single households will remain a caveat throughout the paper.

A. Calculating Tax Rates Using TAXSIM

We use the National Bureau of Economic Research TAXSIM tax calculator to calculate the marginal tax rate on earnings and total tax liability for any year of interest. The calculator is a powerful tool, as it allows us to incorporate all of the discrete changes in the tax regime numerically without having to specify them analytically in the simulation exercise. For example, we need not model the individual

[14] In same-sex partnered households, it is unclear how to assign the "husband" and "wife" labels; we plan to explore the feasibility of including same-sex couple households in the future. We estimate these comprise roughly 0.8 percent of all households in the United States in 2018. Same-sex households are identified in the CPS using the expanded relationship variable of "spouse" and "unmarried partner," and then relying on the reported sex of the householder and their partner/spouse.

[15] A negative marginal tax returned by TAXSIM in many cases is legitimate and can be interpreted as something like the Earned Income Tax Credit. We do not exclude any married families for having a negative tax rate. Retaining households with negative tax rates in the single samples, however, prevented the maximum likelihood from converging.

self-employed versus wage-earner choice to calculate the appropriate tax treatment, only to indicate the source of earnings for the calculator.

Specifically, we take a household from the pre-TCJA period (2015–2017) and calculate their marginal tax rate and total tax liability for the relevant TAXSIM year they are observed. We then use these families to estimate labor supply elasticities. Using those elasticities and the change in net wages predicted using the 2018 (post-TCJA) TAXSIM calculator, we then simulate the change in hours and utility. Again, these calculations are made using the characteristics (demographics, wages, total income, etc.) for the average pre-TCJA family in each rolling income quintile.

Table A1 (Tables A1–A6 are available online) lists the data elements accepted by the calculator and what we include along with sources.[16] If the CPS does not have the necessary information, we use estimates by quintile and region of the country from the Consumer Expenditure Survey.

B. Sample Means by Quintiles

Table 1 contains means across married households in each (predicted) quintile, along with their average estimated marginal tax rates before and after the TCJA. The sample includes roughly 40,000 households, split evenly across quintiles. The employment rate, education, wages, and nonlabor income are all increasing for both men and women across the quintiles. Table 1 shows that real net wages are higher for both men and women overall and within each quintile post-TCJA relative to pre-TCJA. Overall, net wages for men increased from $20.80 to $22.01 and for women increased from $16.71 to $17.65; overall, the average marginal tax rate pre-TCJA was 19 percent versus 15 percent post-TCJA. The smaller post-TCJA within-quintile virtual nonlabor income also reflects lower tax rates.[17] On average, federal marginal tax rates declined by 3.8 percentage points (from 18.9 to 15.1 percent) from the pre- to post-TCJA tax regime, with a larger decline, on average, going to households in the higher quintiles.[18]

Table 2 provides sample means separately by household self-employed status, for those with and without children, and for renters and homeowners. Seventy-nine percent of households do not have any self-employment income. Among self-employed families, 75 (41) percent of husbands (wives) are self-employed, and both spouses are self-employed in only 2.5 percent of households (not shown).

[16] "TAXSIM Related Files at the NBER," National Bureau of Economic Research, http://www.nber.org/~taxsim/; see also Feenberg and Coutts (1993). In addition to detailed income from the CPS data, we also include information on property tax and CPS imputed capital gains and capital losses. All married households are classified as if they were declaring taxes jointly and the main earner is identified as that with the highest total earned income.

[17] Virtual income corresponds to the vertical intercept of the budget constraint at zero hours. This intercept is lower at lower tax rates.

[18] As can be seen in Figure 1, the differences between pre- and post-marginal tax rates across the income distribution are statistically significant.

Table 1

Sample Means for Married Households, Combined 2015–2017 CPS Observations

	Full Sample	Q1	Q2	Q3	Q4	Q5
Number of married households	39,986	7,998	7,997	7,997	7,997	7,997
Husband average characteristics						
Working = 1 (%)	91.1	82.9	89.7	92.3	94.5	96.2
Self-employed = 1 (%)	13.0	10.4	12.3	14.5	13.3	14.4
Net real wage pre-TCJA (w1) ($)	20.80	14.37	17.21	20.00	23.55	28.88
Net real wage post-TCJA ($)	22.01	15.05	18.08	21.09	24.99	30.85
Hours (h1), if working	43.4	41.0	43.4	43.6	43.9	44.8
Age	45.1	44.7	44.6	45.8	44.2	46.3
Disability = 1 (%)	6.2	10.6	7.7	6.4	3.8	2.5
Race						
White (%)	75.4	51.6	75.1	82.2	85.2	83.0
Black (%)	6.6	12.2	7.9	5.8	3.8	3.3
Hispanic (%)	11.2	29.5	11.9	6.5	4.2	3.9
Other (%)	6.8	6.6	5.2	5.5	6.8	9.8
Education						
Less than high school (%)	7.3	32.3	3.1	0.9	0.0	0.0
High school (%)	27.4	52.4	53.3	25.3	5.7	0.5
Some college (%)	26.1	13.6	36.4	48.7	25.7	6.2
College (%)	24.4	1.7	6.0	21.2	48.1	44.8
Grad school (%)	14.8	0.0	1.1	3.9	20.5	48.5
Wife average characteristics						
Working = 1 (%)	76.5	60.3	75.9	80.9	81.5	83.9
Self-employed = 1 (%)	7.0	4.5	6.2	7.8	7.5	9.2
Net real wage pre-TCJA (w2) ($)	16.71	11.44	13.63	16.08	19.27	23.12
Net real wage post-TCJA ($)	17.65	11.96	14.25	16.94	20.41	24.70
Hours (h2), if working	37.2	35.6	36.9	37.4	37.3	38.2
Age	43.1	42.2	42.8	43.9	42.3	44.4
Disability = 1 (%)	5.4	9.7	7.0	5.1	3.3	2.1
Race						
White (%)	75.1	52.3	75.6	81.3	84.3	81.9
Black (%)	5.8	11.0	6.9	4.9	3.3	3.1
Hispanic (%)	11.3	29.0	11.4	7.1	4.8	4.1
Other (%)	7.8	7.8	6.2	6.7	7.6	10.9
Education						
Less than high school (%)	5.9	27.1	2.0	0.6	0.0	0.0
High school (%)	23.1	51.7	44.2	16.0	2.9	0.4
Some college (%)	27.5	18.5	43.2	49.7	22.1	4.2
College (%)	27.2	2.8	9.5	28.7	53.8	41.5
Grad school (%)	16.3	0.0	1.1	5.0	21.2	53.9

Table 1 (Continued) Sample Means for Married Households, Combined 2015–2017 CPS Observations

	Full Sample	Q1	Q2	Q3	Q4	Q5
Household average characteristics						
Net real weekly nonlabor (virtual) income pre-TCJA (Y) ($)	361.61	249.47	297.12	346.77	408.62	506.07
Net real weekly nonlabor (virtual) income post-TCJA (Y) ($)	353.45	243.98	290.40	338.21	397.25	497.44
Number of children 0–5	0.34	0.38	0.31	0.29	0.39	0.33
Number of children 6–12	0.51	0.55	0.48	0.44	0.44	0.64
Number of children 13–18	0.24	0.22	0.24	0.24	0.22	0.30
Homeownership	0.76	0.57	0.72	0.81	0.89	0.87
Federal marginal tax rate						
Pre-TCJA (%)	18.9	11.6	16.7	19.3	21.7	25.1
Post-TCJA (%)	15.1	8.3	13.3	15.6	17.6	20.5
State marginal tax rate						
Pre-TCJA (%)	4.03	2.95	3.75	4.15	4.46	4.83
Post-TCJA (%)	4.02	2.96	3.73	4.13	4.46	4.81

Note: Wages include those assigned to nonworkers through the predictive mean matching methodology described in the text. Post-TCJA values for wages and nonlabor income are the observed values in the sample period (2015–2017) evaluated at post-TCJA tax rates. Virtual nonlabor income is the intersection of the budget constraint if the person's budget constraint segment were extended to the vertical axis at zero hours.

As expected, households with at least one spouse self-employed or with children enjoyed an even larger decline in tax rates than households with no self-employment or with no children. In addition, homeowners overall experienced a slightly larger decline in the marginal tax rate than renters, although, as seen in Figure 1, these additional gains were not experienced uniformly across the income distribution.

Table A4 contains the sample means for the roughly 10,000 single men and just under 11,000 single women used for analysis.

IV. RESULTS

All parameters of the utility function are allowed to vary across rolling income quintiles. This means we obtain a separate set of estimates for centiles 1–20, 2–21, 3–22, . . . , and 81–100. There are 81 different sets of parameter estimates for each of the married household, single men, and single women samples.

Table 2

Sample Means for Full Sample of Married Households by Work Status and Children

	Neither Spouse Self-Employed	Either Spouse Self-Employed	Without Children	With Children	Homeowners	Renters
Number of married households	33,029	6,957	18,359	21,627	30,347	9,639
Husband average characteristics						
Working = 1 (%)	89.6	98.4	85.9	95.6	91.4	90.4
Self-employed = 1 (%)	0.0	74.7	13.6	12.5	14.1	9.5
Net real wage pre-TCJA (w1) ($)	20.25	23.44	20.70	20.89	21.88	17.41
Net real wage post-TCJA ($)	21.38	25.01	21.80	22.19	23.19	18.29
Hours (h1), if working	43.1	44.5	42.8	43.8	43.9	41.9
Age	44.7	47.3	50.0	41.0	46.8	40.0
Disability = 1 (%)	6.7	3.9	9.3	3.6	5.9	7.3
Race						
White (%)	74.1	81.9	81.3	70.4	81.5	56.2
Black (%)	7.1	4.3	6.6	6.6	4.9	12.0
Hispanic (%)	11.8	8.6	7.0	14.8	7.9	21.5
Other (%)	7.1	5.2	5.1	8.2	5.7	10.3
Education						
Less than high school (%)	7.5	6.0	6.3	8.1	5.0	14.3
High school (%)	27.6	26.3	30.0	25.2	26.3	30.9
Some college (%)	26.1	26.3	27.4	25.1	26.4	25.3
College (%)	24.0	25.9	22.8	25.7	26.3	18.3
Grad school (%)	14.7	15.5	13.5	15.9	16.0	11.2

Wife average characteristics						
Working = 1 (%)	74.7	85.1	76.9	76.1	78.2	71.1
Self-employed = 1 (%)	0.0	40.5	7.1	7.0	7.8	4.8
Net real wage pre-TCJA (w2) ($)	16.39	18.21	16.44	16.93	17.46	14.33
Net real wage post-TCJA ($)	17.29	19.36	17.31	17.95	18.48	15.04
Hours (h2), if working	37.6	35.5	38.3	36.2	37.3	36.8
Age	42.7	45.1	48.4	38.7	44.8	37.8
Disability = 1 (%)	5.7	4.0	8.4	2.9	5.1	6.5
Race						
White (%)	73.8	81.1	80.2	70.7	80.8	57.1
Black (%)	6.3	3.6	6.0	5.7	4.4	10.3
Hispanic (%)	11.8	8.9	7.3	14.6	8.1	21.1
Other (%)	8.2	6.3	6.6	8.9	6.7	11.5
Education						
Less than high school (%)	6.2	4.4	4.9	6.8	3.9	12.2
High school (%)	23.6	20.7	27.4	19.3	21.8	26.9
Some college (%)	27.5	27.7	28.1	27.0	27.2	28.4
College (%)	26.6	30.1	25.5	28.8	29.3	20.9
Grad school (%)	16.1	17.1	14.0	18.1	17.7	11.6
Household average characteristics						
Net real weekly nonlabor (virtual) income pre-TCJA (Y) ($)	351.48	409.71	372.49	352.37	387.45	280.25
Net real weekly nonlabor (virtual) income post-TCJA (Y) ($)	343.10	402.63	361.49	346.63	379.42	271.70
Number of children 0–5	0.35	0.30	0	0.63	0.31	0.42
Number of children 6–12	0.50	0.53	0	0.94	0.49	0.56
Number of children 13–18	0.24	0.28	0	0.45	0.26	0.21

Table 2 (Continued) Sample Means for Full Sample of Married Households by Work Status and Children

	Neither Spouse Self-Employed	Either Spouse Self-Employed	Without Children	With Children	Homeowners	Renters
Homeownership	0.75	0.82	0.78	0.74	1.00	0
Federal marginal tax rate						
pre-TCJA (%)	18.6	20.1	18.0	19.6	20.2	14.8
post-TCJA (%)	15.0	15.6	14.6	15.5	16.3	11.3
State marginal tax rate						
pre-TCJA (%)	3.99	4.19	3.93	4.11	4.17	3.60
post-TCJA (%)	3.99	4.17	3.89	4.13	4.14	3.62

Note: Wages include those assigned to nonworkers through the predictive mean matching methodology described in the text. Post-TCJA values for wages and nonlabor income are the observed values in the sample period (2015–2017) evaluated at post-TCJA tax rates. Virtual nonlabor income is the intersection of the budget constraint if the person's budget constraint segment were extended to the vertical axis at zero hours.

A. Utility Function Parameter Estimates and Labor Supply Elasticities

Section A.5 contains parameters from estimating the nonlinear Tobit likelihood function for both married and single households. The parameter estimates are consistent with expectations regarding the determinants of labor supply. Labor supply elasticities, marginal utilities, and changes in hours and consumption reported in Table 3 reflect married family parameter estimates evaluated at the average family characteristics in each separate quintile. The change in welfare resulting from these changes in hours and consumption is then calculated using Equation (3'). Dividing the change in welfare by the marginal utility of income yields the dollar-equivalent welfare change.[19] Elasticities reported in Table 3 account for both the intensive and extensive changes in hours of work.

The simulated change in welfare is only reliable if our estimates of labor supply elasticities are reliable. Figure 2 puts our estimated labor supply elasticities for both married and single households into the context of the existing literature. Note that married women's own-wage elasticities are positive and higher (in absolute value) than married men's elasticities, indicating that women's labor supply is more responsive to wage changes. Consequently, the estimated negative cross-wage elasticity for husbands indicates that households view husbands' nonmarket time as a substitute for their wives' nonmarket time. However, the wives' negative cross-elasticity, along with the husband's negative own-wage elasticity, indicates that households view wives' nonmarket time as complementary with their husbands'. Cross-wage elasticities for husbands and wives correspond to households in which both members are working. We estimate negative and small income elasticities for both men and women.

Own-wage elasticities for single men and women are both positive and are on the high side of those found in the literature. Income elasticities are again negative, but the labor supply of single men is more responsive than that of married men to changes in their nonlabor income, whereas single and married women exhibit very similar responsiveness. The bottom line from these estimates is that the simulations are based on labor supply elasticities consistent with those estimated by others.

The estimation of a Tobit-type model means that the total elasticities are essentially the sum of the intensive and extensive margin elasticities. Figure 3 shows that the extensive margin elasticity plays a larger role in the total labor supply response estimated for wives than for husbands, which is not unexpected given the findings of Eissa, Kleven, and Kreiner (2008). On average, across the income distribution, the extensive margin accounts for 30 percent of the total own-wage elasticity for wives and only 5 percent of the total own-wage elasticity for husbands.

[19] Note that this calculation is different from equivalent (or compensating) variation, which would ask the question of how much income we would have to take away from the household to "compensate" them for the increase in utility that comes from a reduction in the price of leisure. Here we are merely monetizing the change in utility.

Table 3

Estimated Elasticities, Marginal Utilities, and Changes in Hours, Consumption, and Welfare for Married Households

	Full Sample	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
Husband						
Own-wage elasticity	0.003	−0.010	0.024**	0.008	−0.019***	−0.027***
	(0.004)	(0.013)	(0.010)	(0.008)	(0.006)	(0.005)
Cross-wage elasticity	−0.027***	−0.037***	−0.045***	−0.043***	−0.035***	−0.043***
	(0.002)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)
Income elasticity	−0.025***	−0.071***	−0.043***	−0.029	−0.023***	−0.023
	(0.001)	(0.008)	(0.004)	(0.021)	(0.005)	(4.661)
Wife						
Own-wage elasticity	0.043***	0.023**	0.083***	0.056***	0.048***	0.059***
	(0.007)	(0.010)	(0.015)	(0.012)	(0.013)	(0.011)
Cross-wage elasticity	−0.080***	−0.085***	−0.103***	−0.099***	−0.108***	−0.113***
	(0.004)	(0.014)	(0.011)	(0.010)	(0.010)	(0.010)
Income elasticity	−0.038***	−0.053***	−0.050***	−0.040***	−0.044***	−0.042***
	(0.002)	(0.009)	(0.006)	(0.006)	(0.008)	(0.007)
Marginal utilities, with respect to						
Husband's nonmarket time	2.692***	3.517***	5.285***	3.665***	1.835***	1.546***
	(0.228)	(0.721)	(0.669)	(0.548)	(0.380)	(0.286)
Wife's nonmarket time	3.682***	17.424***	6.139***	3.886***	1.867***	1.397***
	(0.436)	(3.871)	(0.958)	(0.675)	(0.407)	(0.245)
Income	0.121***	0.150***	0.287***	0.170***	0.071***	0.050***
	(0.012)	(0.051)	(0.041)	(0.028)	(0.016)	(0.009)

Changes						
Δ in husband hours/week	−0.054***	−0.071***	−0.022	−0.056***	−0.111***	−0.185***
	(0.008)	(0.019)	(0.018)	(0.017)	(0.016)	(0.018)
Δ in wife hours/week	−0.062***	−0.055***	−0.017	−0.044**	−0.074***	−0.094***
	(0.010)	(0.013)	(0.020)	(0.021)	(0.023)	(0.027)
Δ in real consumption ($/week)	62.393***	24.970***	41.791***	56.285***	74.293***	113.070***
	(0.419)	(0.507)	(0.640)	(0.763)	(0.932)	(1.249)
Total Δ in utility ($ equivalent/ week)	65.469***	33.060***	42.556***	58.513***	79.072***	121.418***
	(0.300)	(3.348)	(0.361)	(0.412)	(0.494)	(0.752)
dV direct consumption effect	66.670***	26.527***	43.085***	59.508***	80.420***	124.633***
	(0.171)	(0.214)	(0.265)	(0.322)	(0.394)	(0.503)
dV indirect consumption effect	−4.240***	−1.704***	−1.526***	−3.259***	−5.909***	−11.163***
	(0.283)	(0.341)	(0.429)	(0.512)	(0.636)	(0.903)
dV hours effect	3.076***	8.089***	0.764	2.228***	4.779***	8.348***
	(0.443)	(3.677)	(0.584)	(0.666)	(0.914)	(1.279)
As share of total income before taxes	3.291***	3.239***	2.825***	3.081***	3.342***	3.847***
	(0.015)	(0.328)	(0.024)	(0.022)	(0.021)	(0.024)
Total income before taxes ($)	1,989.52	1,020.58	1,506.25	1,899.24	2,365.78	3,155.88

Note: Table reflects estimates for the average household in each quintile. Statistical significance levels are calculated via the delta method. Asterisks denote significance at the 1% (***) and 5% (**) levels. Uncompensated wage elasticities are reported (see Blau and Kahn, 2007).

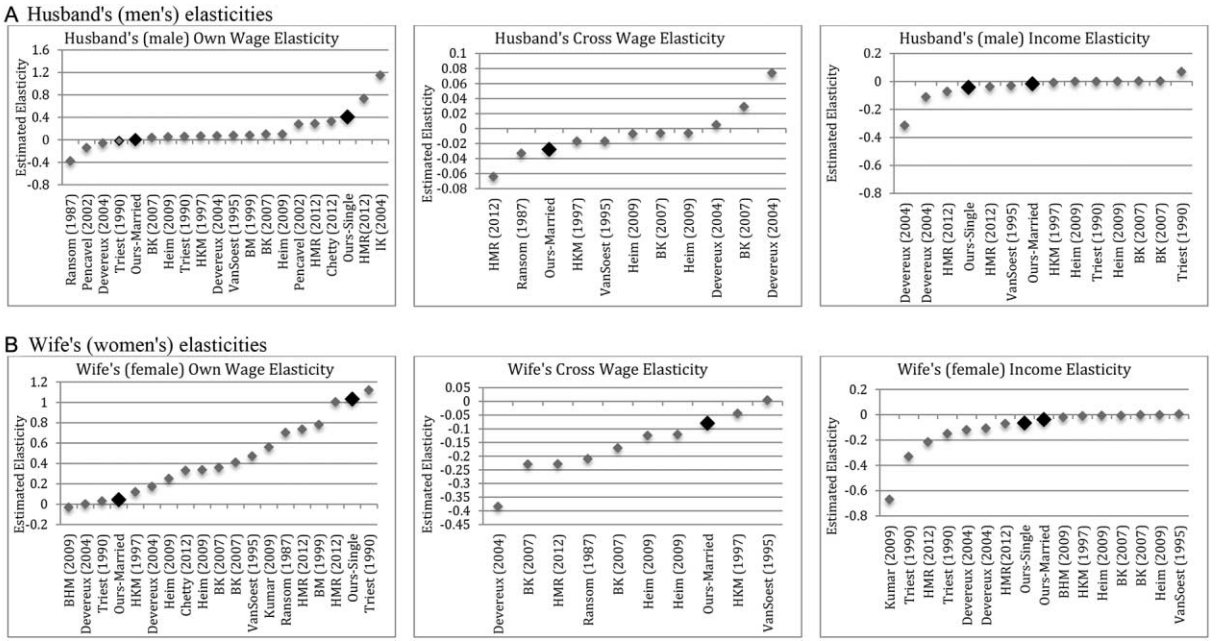


Figure 2. Comparison of labor supply elasticity estimates with the literature. (A) Husband's (men's) elasticities. (B) Wife's (women's) elasticities. Sources of literature estimates are Ransom (1987); Triest (1990); van Soest (1995); Hotchkiss, Kassis, and Moore (HKM) (1997); Blundell and Macurdy (1999); Pencavel (2002); Devereux (2004); Imai and Keane (2004); Blau and Kahn (BK) (2007); Bishop, Heim, and Mihaly (BHM) (2009); Heim (2009); Kumar (2009); Chetty (2012); Hotchkiss, Moore, and Rios-Avila (HMR) (2012). Also see Keane (2011) and McClelland and Mok (2012). Dark points reflect elasticities estimated in this paper for married and single families.

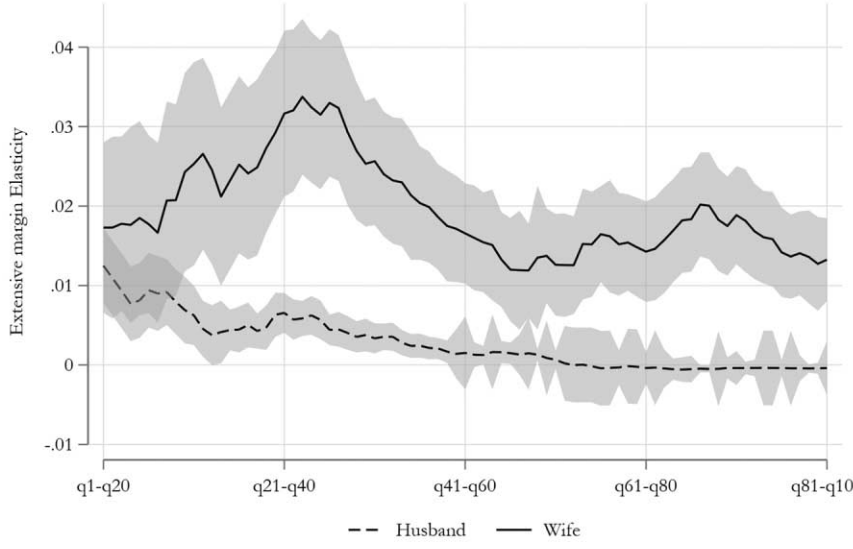


Figure 3. Extensive margin own-wage elasticities for husbands and wives. Lines represent average responsiveness, for each rolling quintile, of husbands' and wives' participation decisions to own-wage changes. Shaded area reflects 95 percent confidence intervals; standard errors for the husband estimates are censored due to problems with numerical stability.

B. Welfare Impact across the Income Distribution of Married Households

1. All Married Households

Figure 4 illustrates the estimated changes in hours (panel A), consumption (panel B), and welfare (panel C) resulting from the TCJA tax reform for the average household in each rolling quintile. As net wages rise (from lower tax rates), the price of non-market time increases, and each hour of work also generates more income, producing conflicting substitution and income effects. Declining hours, as seen in panel A, indicate that the income effect is dominating the substitution effect for both husbands and wives, especially at the top end of the income distribution. However, the impact of the tax reform on hours of work is small; among the highest quintile, average hours decline by about 11 minutes per week for husbands and six minutes for wives. While some anticipated that the TCJA would increase labor supply, primarily as a result of new labor market entrants at the low end of the income distribution (Page et al., 2017), panel A suggests otherwise.

Note that in spite of the small absolute changes in hours, the contribution of hours to the change in total welfare varies across the distribution (see Table 3). Change in hours contributes an average of 25 percent of the total change in utility among households in the lowest quintile, whereas the contribution at the upper end amounts to only 7 percent of the total utility change. While this relatively small

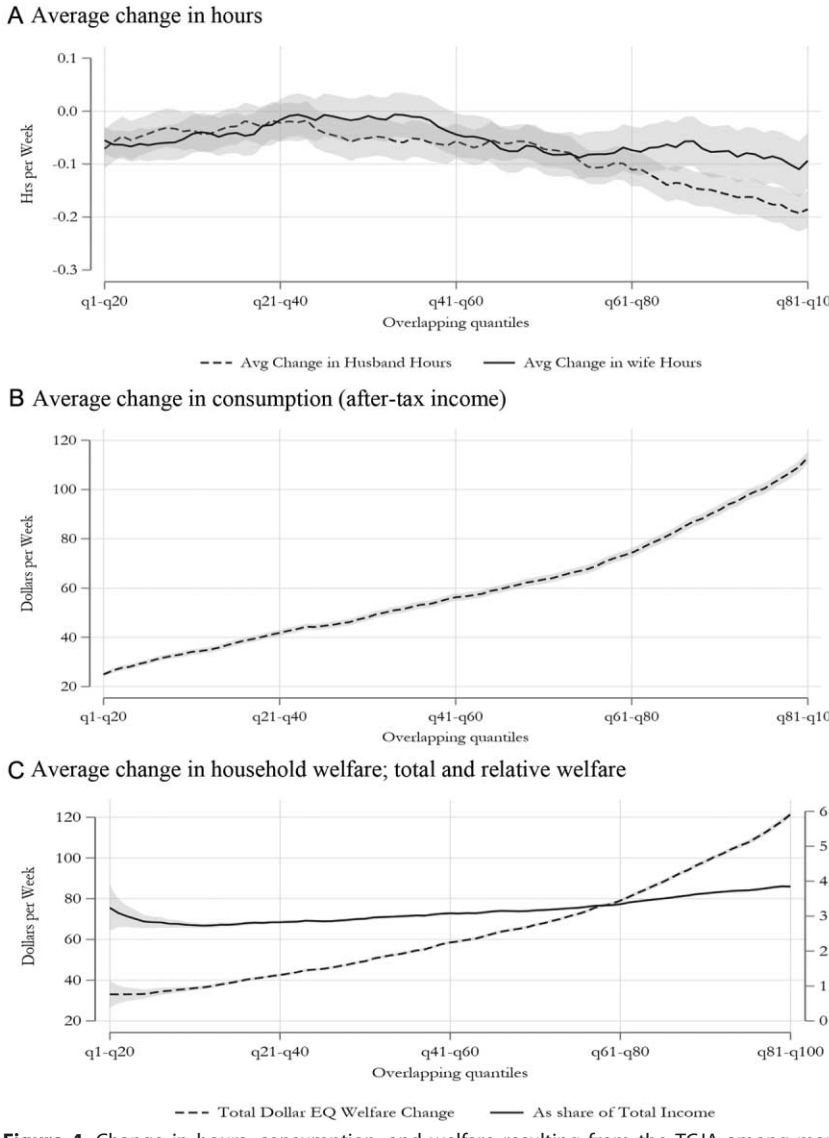


Figure 4. Change in hours, consumption, and welfare resulting from the TCJA among married households. (A) Average change in hours. (B) Average change in consumption (after-tax income). (C) Average change in household welfare; total and relative welfare. Lines represent average, for each rolling quintile, difference between pre- and post-TCJA hours of work, total consumption, and welfare for married households. Panel (C) reflects change in total welfare and change in welfare relative to pre-TCJA total income. Shaded areas reflect 95 percent confidence intervals; for calculation of the standard error, total income is held fixed.

contribution of change in hours to change in total utility is unsurprising (see Bierbrauer, Boyer, and Peichl, 2021), these differences in contributions across the income distribution offer additional insight about the importance of allowing for heterogeneity for policy assessment.

Panel B indicates that lost earnings from the small decline in hours was not enough to offset the higher income generated by lower tax rates for both wages and nonlabor income. The higher consumption is nearly monotonically rising across the income distribution. Not surprisingly, with the increase in nonmarket time and the increase in consumption, the TCJA produced higher average welfare for all households across the income distribution (see dashed line in panel C), with higher-income households benefiting more than lower-income households.

Panel C plots the dollar-equivalent total welfare change, accounting for changes in both hours and consumption. The average family in the lowest rolling quintile gained $37 per week from the TCJA, whereas the average family in the highest quintile gained $119 per week. Dividing the total welfare gain by after-tax, pre-TCJA income, however, flattens the total welfare gains considerably (solid line in panel C), with relative gains ranging from 3.2 (lowest quintile) to 3.8 percent (highest quintile); while all households are better off under the new tax regime, welfare gains are still slightly larger in the top half of the income distribution.[20]

2. Differential Impacts across Household Types

Figure 5 and Table 4 illustrate the heterogeneous impacts of some of the different provisions of the TCJA. Note that new parameter estimates are not generated separately for families with these different characteristics but reflect the estimates calculated using the average characteristics by family type in each quintile.[21]

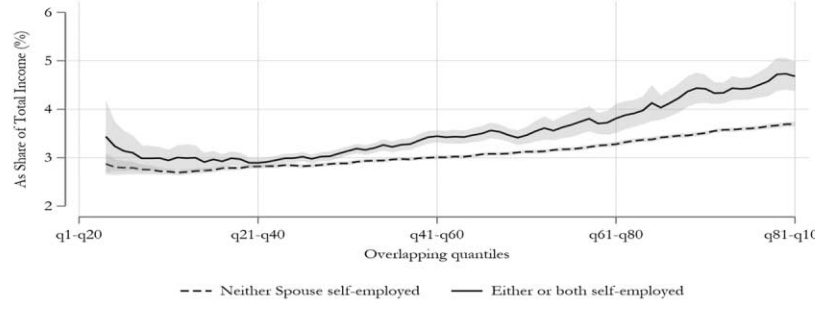
Panel A illustrates the larger gains experienced by households with some self-employment income, relative to households in which neither spouse is self-employed. The greatest difference in gains is concentrated in the upper half of the income distribution. This is not unexpected because the value of the post-TCJA lower tax rates on self-employment income increases with income.

The benefit of the expanded child tax credit of the TCJA is clear when comparing the relative welfare gains among households with children with their childless counterparts in panel B of Figure 5. Note that the additional benefit to households with children is more uniformly distributed across the income distribution because, unlike the presence of self-employment income, there is more similarity in the number of children across income.

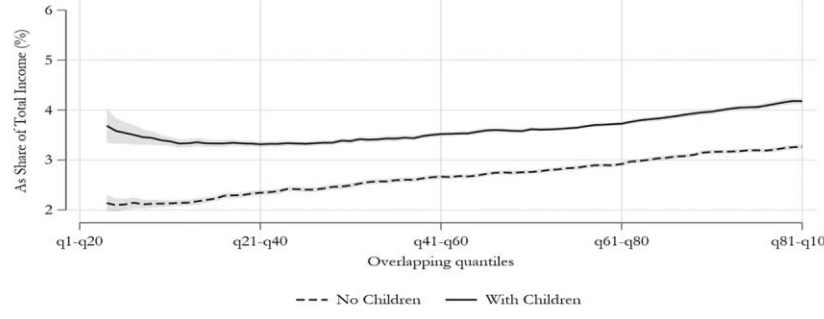
[20] Despite using a very different methodology, Malkov (2021) derives the same pattern and magnitude of results for welfare gains from the TCJA across the income distribution.

[21] Note that we also do not redefine income quintiles within the sample of households with different characteristics; households retain their income quintile assigned while part of the full sample.

A Households with some self-employment income versus households with no self-employment income; relative welfare change



B Households with children versus households with no children; relative welfare change



C Households renting their home versus households owning their home; relative welfare change

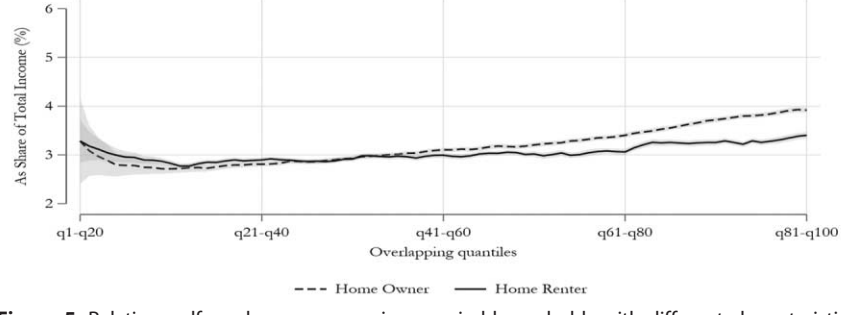


Figure 5. Relative welfare change, comparing married households with different characteristics. (A) Households with some self-employment income versus households with no self-employment income. (B) Households with children versus households with no children. (C) Households renting their home versus households owning their home. Relative welfare change is the total dollar-equivalent welfare change divided by after-tax pre-TCJA income. Lines represent the average difference between pre- and post-TCJA welfare relative to pre-TCJA total income for different family characteristics, for each rolling quintile. Shaded areas reflect 95 percent confidence intervals; for calculation of the standard error, total income is held fixed.

Because homeowners faced additional limits on their deductions for state and local property taxes and mortgage interest payments as a result of the TCJA, we might have expected renters to experience larger gains in welfare, all else equal (e.g., see Ambrose et al., 2022). However, we see in panel C of Figure 5 that homeowners concentrated at the high end of the income distribution gained slightly more additional relative welfare, and renters gained slightly more at the lowest end. In addition to having higher income (controlled for in the graph), perhaps this advantage of high-income homeowners comes from additional inframarginal changes from the TCJA. For example, high-income homeowners may benefit, relative to high-income renters, because of the ability to tap into home equity to support self-employment activity (homeowners have a higher tendency to be self-employed than renters; see Table 2).

3. Sensitivity to Labor Supply Elasticities

To determine how sensitive our results are to different labor supply elasticities, we calculated the change in total welfare for the full sample of married families, using the second-highest and second-lowest values for each of the different elasticities found in the literature (see Figure 2). Our welfare estimates are robust to using other data or methodologies found in the literature (details are found in the appendix). While still small, the greatest variation is found with differences in married women's own-wage elasticity, which is not surprising given the significant variation in estimating methodologies and assumptions used in the literature for estimating married women's wage elasticities (see Mroz, 1987).

C. Single Households

Figure 6 shows the main results for single men and women; panel A shows changes in optimal hours, panel B shows changes in total welfare, and panel C shows changes in relative welfare, as a function of pre-TCJA net income. All of the tables pertaining to single households are found in the appendix.

Results for single and married households differ in two notable ways.[22] The first difference is that optimal hours among single men and women increased post-TCJA, by slightly more than one minute per week on average among all single men and by slightly more than three minutes per week among all single women, on average. This suggests that, unlike among married households, the substitution effect from the tax cut dominated the income effect. Only in the very upper tail of the income distribution did hours decline slightly for single men and women.

The second difference is that while total welfare gains increased with income (panel B), the relative welfare gains (panel C) are estimated to be more uniform

[22] Some of the differences between married and single households discussed in this section may be the consequence of restricting single households to those with positive tax rates.

Table 4

Average Elasticities, Marginal Utilities, and Changes in Hours, Consumption, and Welfare, by Household Characteristics for Married Households

	Neither Spouse Self-Employed	Either Spouse Self-Employed	Without Children	With Children	Homeowner	Home Renter
Husband						
Own-wage elasticity	0.006	−0.010**	0.012***	−0.005	0.000	0.011***
	(0.004)	(0.005)	(0.004)	(0.005)	(2.115)	(0.004)
Cross-wage elasticity	−0.027***	−0.028***	−0.029***	−0.025***	−0.029***	−0.022***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
Income elasticity	−0.024***	−0.028***	−0.028***	−0.022***	−0.027***	−0.018***
	(0.002)	(0.014)	(0.003)	(0.002)	(0.002)	(0.002)
Wife						
Own-wage elasticity	0.045***	0.033***	0.047***	0.039***	0.040***	0.053***
	(0.008)	(0.006)	(0.008)	(0.007)	(0.007)	(0.008)
Cross-wage elasticity	−0.079***	−0.088***	−0.072***	−0.088***	−0.085***	−0.066***
	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)
Income elasticity	−0.038***	−0.043***	−0.040***	−0.037***	−0.041***	−0.030***
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Marginal utilities, with respect to						
Husband's nonmarket time	1.856***	6.660***	3.093***	2.352***	3.181***	1.155***
	(0.228)	(0.232)	(0.244)	(0.236)	(0.232)	(0.231)
Wife's nonmarket time	3.521***	4.450***	3.776***	3.603***	3.884***	3.047***
	(0.414)	(0.549)	(0.444)	(0.439)	(0.466)	(0.353)
Income	0.126***	0.100***	0.127***	0.117***	0.114***	0.143***
	(0.012)	(0.011)	(0.012)	(0.012)	(0.012)	(0.014)

Changes						
Δ in husband hours/week	−0.046***	−0.095***	−0.028***	−0.077***	−0.067***	−0.015***
	(0.008)	(0.009)	(0.007)	(0.009)	(0.009)	(0.007)
Δ in wife hours/week	−0.055***	−0.095***	−0.031***	−0.088***	−0.074***	−0.022***
	(0.010)	(0.011)	(0.010)	(0.011)	(0.011)	(0.009)
Δ in real consumption ($/week)	59.494***	76.156***	51.993***	71.221***	67.902***	45.048***
	(0.380)	(0.684)	(0.376)	(0.473)	(0.470)	(0.274)
Total Δ in utility ($ equivalent/ week)	61.699***	86.737***	53.589***	75.477***	72.273***	45.639***
	(0.256)	(1.018)	(0.258)	(0.356)	(0.363)	(0.196)
dV direct consumption effect	62.527***	86.339***	54.646***	76.877***	73.027***	46.655***
	(0.155)	(0.279)	(0.187)	(0.215)	(0.193)	(0.129)
dV indirect consumption effect	−3.065***	−9.822***	−2.637***	−5.602***	−5.037***	−1.732***
	(0.267)	(0.422)	(0.246)	(0.324)	(0.318)	(0.186)
dV hours effect	2.205***	10.581***	1.596***	4.256***	4.371***	0.591***
	(0.366)	(1.250)	(0.387)	(0.491)	(0.567)	(0.211)
As share of total income before taxes	3.220***	3.708***	2.723***	3.759***	3.357***	3.092***
	(0.013)	(0.044)	(0.013)	(0.018)	(0.017)	(0.013)
Total income before taxes ($)	1,915.87	2,339.21	1,967.92	2,007.86	2,152.61	1,476.05

Note: Table reflects estimates for the average household in each quintile. Statistical significance levels are calculated via the delta method. Asterisks denote significance at the 1% (***) and 5% (**) levels. Uncompensated wage elasticities are reported (see Blau and Kahn, 2007).

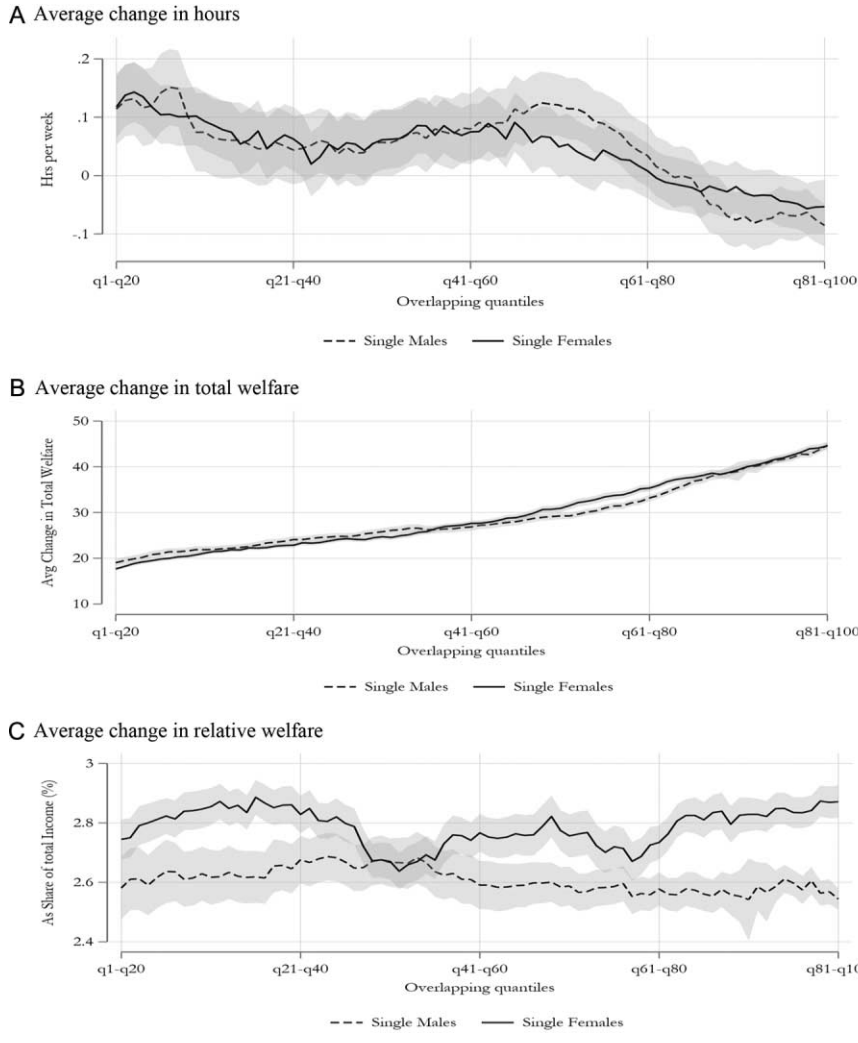


Figure 6. Change in hours and welfare for single households. (A) Average change in hours. (B) Average change in total welfare. (C) Average change in relative welfare. Lines represent average difference between pre- and post-TCJA hours of work, welfare, and welfare relative to pre-TCJA total income for single households, for each rolling quintile. Shaded areas reflect 95 percent confidence intervals; for calculation of the standard error, total income is held fixed.

across the income distribution for singles than for married families. The dollar-equivalent total welfare gains (not shown) among single men ranged from just under $20 per week in the lowest quintile to slightly under $30 per week in the highest quintile. Single women's gains ranged from about $18 per week to $45 per week. Relative to total income, the gains averaged about 2.5 percent among single men

and 2.8 percent among single women. These gains are both lower than the 3–4 percent range of relative welfare gains among married families.

D. Welfare Gain versus Revenue Lost

In this section, we compare welfare gains with the change in total tax liability of each household as a result of the TCJA. In other words, we assess how much each household's welfare gain *costs* in terms of lost tax revenue. To make this comparison, we use the TAXSIM software to calculate the pre- and post-TCJA tax liabilities (allowing for behavior changes) for the average family in each rolling quintile. We then compare that change in liability (revenue loss) with the dollar-equivalent welfare gain calculated earlier for the average family in the same quintile. Figure 7 shows the ratio of average welfare gain to tax revenue lost by rolling income quintile. Overall, on average, the annual dollar-equivalent per household welfare gain is calculated to be $3,295, whereas the total federal and state revenue lost, on average, per household, is $3,433 — the welfare gain is only roughly 96 percent of the revenue lost.

Welfare gains are smaller than the revenue lost except for those in the lowest quintiles of the income distribution. This is likely because the amount of revenue lost from lower-income families is much smaller than the amount of revenue lost from higher-income families, yet, like wealthier families, lower-income families enjoy notable welfare gains. Note that the welfare estimates do not account for

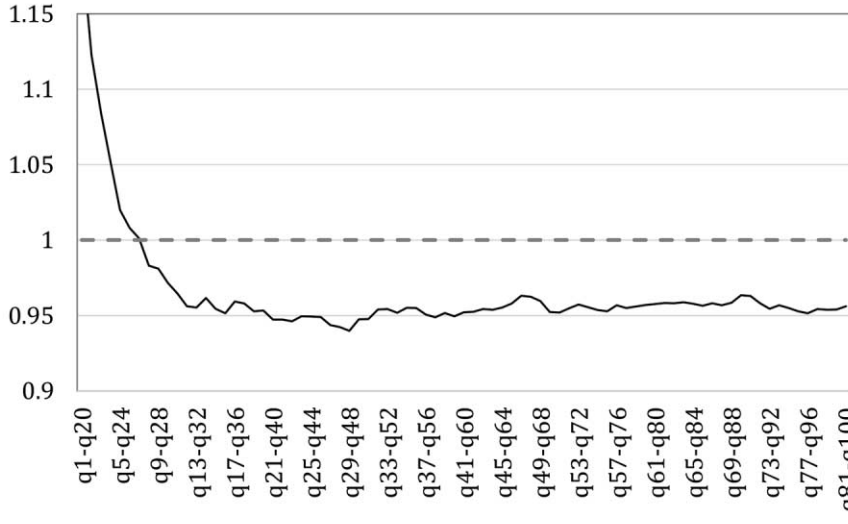


Figure 7. Household dollar-equivalent welfare gain divided by loss of federal and state revenue by income quintile; married families. Graph reflects the ratio of average welfare gain to tax revenue lost by the average married family in each rolling income quintile. Revenue lost reflects change in total tax liability calculated for each household using the TAXSIM software pre- and post-TCJA.

the potential changes in public services that might result from lost revenue. This means that the estimated welfare gains at the lowest end of the income distributions, in particular, may be overstated.

Pre-TCJA projections of lost individual income tax revenues from the TCJA were on the order of 1.7 percent (Sammartino, Stallworth, and Weiner, 2018). If this was, indeed, the revenue loss experienced, then our estimates of dollar-equivalent welfare gains of 3–4 percent of pre-TCJA income would imply the TCJA "paid" for itself (through gained welfare). However, more recent evidence indicates that actual revenue loss from individual income taxes was 5.4 percent *lower than projected* (Gale, 2020). This means actual losses in individual tax revenues resulting from the TCJA were more on the order of 7 percent (1.7 + 5.4) — more than the 3–4 percent welfare gains estimated here. Again, while Figure 7 does not reflect an actual accounting exercise, its conclusions indicate that for most of the families in this analysis, the TCJA was an "expensive" tax reform.[23]

V. CONCLUSIONS AND POLICY IMPLICATIONS

The analysis in this paper of the welfare impact of the TCJA of 2017 finds that households, on average along the income distribution, are better off under the tax environment post-TCJA than before. The dollar-equivalent welfare of married households increased by an average of $37 per week among the lowest percentile of households, and by an average of $119 per week among the top percentile. These welfare gains translate into 3 percent and 4 percent, respectively, of total weekly income (before taxes). The bottom line is that the welfare gains resulting from the TCJA are increasing monotonically with income for both married and single families, and the gains are relatively flat as a share of total income. These results are consistent with Bierbrauer, Boyer, and Peichl (2021), who find that the benefits of most US tax reforms (including the TCJA) are monotonically increasing in income.

While the comparison looks quite different across income quintiles, married households with self-employment income or children enjoyed an average of about 40 percent higher gain in dollar-equivalent welfare than households without self-employment income or children. Importantly, some of this higher welfare gain can be traced to greater reductions in optimal labor supply, especially at the high end of the income distribution; one outcome of the TCJA was to buy leisure for the wealthy. In addition, despite new limits on deductions for state and local property taxes and mortgage interest deductions, we show that, except in the lowest end

[23] Also note that the comparison in Figure 7 is not an accounting of the deadweight loss/gain from the TCJA. Rather it compares the estimated revenue lost per (average quintile) family with the dollarization of the welfare gained by that family. Figure 7 simply illustrates that the dollar value of that gain is not quite as much as the dollar value of the lower taxes paid.

of the income distribution, homeowners experience a greater gain in welfare than renters.

Overall, optimal labor supply is lower among married households but higher among single households post-TCJA, relative to before, implying that the income effect from rising net wages dominated for married household members but that the substitution effect dominated among singles. Note, however, that the impact on hours for members of all household types is quite small — an average of five (one) minutes per week for married (single) men and an average of three minutes per week for both married and single women. Married men in the top quintile of households enjoyed the largest decline in hours of work of about 11 minutes per week. These comparisons of married and single household results are made with the caveat that the single household samples are less representative of their population than the sample of married households.

We also illustrate that, except at the lowest end of the income distribution, the dollar value of gained welfare is less than the estimated loss in tax revenue under the TCJA tax regime. While generalizable only to the families in this analysis, this comparison suggests that the TCJA cost more than it was worth even though all households, on average, gained from lower tax rates and other provisions of the tax change that resulted in greater private consumption.

Most of the provisions of the TCJA benefiting individual taxpayers are set to expire in 2025 (Joint Committee on Taxation, 2018), which is expected to claw back the welfare gains estimated in this paper. There are two primary ways that the welfare loss of the repeal of the TCJA is not expected to be symmetric to the welfare gained from its introduction: (1) the composition of the population will be different and (2) preferences may change. Ongoing trends in couples having fewer children and increasing educational attainment are expected to make labor supply less responsive to changes in tax rates. These demographic changes suggest that the labor supply response will be even smaller than that reported here, all else equal. In addition, Hotchkiss (2022) finds that the labor supply of younger generations is slightly less responsive to wages than older generations, suggesting less of a labor supply response. Because the results reported here indicate that change in labor supply is likely to be less important than changes in overall consumption, the higher tax rates will take back nearly all of the TCJA-generated welfare gains through a reduction in consumption. This, combined with the retention of most of the corporate tax provisions, will likely result in greater inequality (Nallareddy, Rouen, and Serrato, 2018).

The authors employed a very similar methodology to evaluate the welfare impact on married families of the 2001 US tax cut (Hotchkiss, Moore, and Rios-Avila, 2012). That tax reform had several similarities to the TCJA, such as reductions in marginal tax rates across the board and expansion of the child tax credit. However, one of the most notable differences was greater relief at the low end of the income distribution from the 2001 tax reform through the introduction of a new lower tax rate and an expanded Earned Income Tax Credit. These differences led

to the greatest welfare impacts at both the high *and* low ends of the income distribution, with the welfare gains as a share of pretax income being much larger in the lowest deciles. This comparison of two analyses using similar methodology illustrates that, by and large, two of the most recent overhauls of the US tax system increased welfare the most among wealthier families, which is consistent with Bierbrauer, Boyer, and Peichl (2021), who find that the benefits of most US tax reforms (including the TCJA) have been monotonically increasing with income.

ACKNOWLEDGMENTS AND DISCLAIMERS

The views expressed here are not necessarily those of the Federal Reserve Bank of Atlanta or the Federal Reserve System. We would like to express appreciation for comments and suggestions from Melissa R. Banzhaf, Nathan Blascak, Jun Cai, Bradley Heim, Peter Hinrichs, Anil Kumar, Egor Malkov, Peter Orazem, M. Melinda Pitts, Todd Sørensen, Yichen Su, and Tom Waters, and research assistance from Sarah Akyena and Nicardo McInnis. The authors declare that they have no relevant or material financial interests or conflicts that relate to the research in this paper. No institutional review board approval was sought because the research did not involve collection of data on human subjects.

REFERENCES

Ambrose, Brent W., Patric H. Hendershott, David C. Ling, and Gary A. McGill, 2022. "Homeownership and Taxes: How the TCJA Altered the Tax Code's Treatment of Housing." *Real Estate Economics* 50 (5), 1167–1200, https://doi.org/10.1111/1540-6229.12374.

Apps, Patricia, and Ray Rees, 2009. *Public Economics and the Household*. Cambridge University Press, Cambridge.

Bahl, Roy, Richard Hawkins, Robert E. Moore, and David L. Sjoquist, 1993. "Using Microsimulation Models for Revenue Forecasting in Developing Countries." *Public Budgeting and Financial Management* 5 (1), 159–186.

Barro, Robert, and Jason Furman, 2018. "Macroeconomic Effects of the 2017 Tax Reform." *Brookings Papers on Economic Activity* 2018 (March), 257–345, https://doi.org/10.1353/eca.2018.0003.

Bhattarai, Saroj, Jae Won Lee, Woong Yong Park, Choongryul Yang, and UT Austin, 2019. "Macroeconomic Effects of Capital Tax Rate Changes." Working Paper. Department of Economics, University of Texas, Austin.

Bierbrauer, Felix J., Pierre C. Boyer, and Andreas Peichl, 2021. "Politically Feasible Reforms of Nonlinear Tax Systems." *American Economic Review* 111 (1), 153–191, https://doi.org/10.1257/aer.20190021.

Bishop, Kelly, Bradley Heim, and Kata Mihaly, 2009. "Single Women's Labor Supply Elasticities, Trends and Policy Implications." *Industrial and Labor Relations Review* 63 (1), 146–168.

Blau, Francine D., and Lawrence M. Kahn, 2007. "Changes in the Labor Supply Behavior of Married Women: 1980–2000." *Journal of Labor Economics* 25 (3), 393–438, https://doi.org/10.1086/513416.

Blundell, Richard, 1992. "Labour Supply and Taxation: A Survey." *Fiscal Studies* 13 (3), 15–40, https://doi.org/10.1111/j.1475-5890.1992.tb00181.x.

Blundell, Richard, Pierre-Andre Chiappori, Thierry Magnac, and Costas Meghir, 2007. "Collective Labour Supply: Heterogeneity and Non-Participation." *Review of Economic Studies* 74 (2), 417–445.

Blundell, Richard, Alan Duncan, Julian McCrae, and Costas Meghir, 2000. "The Labour Market Impact of the Working Families' Tax Credit." *Fiscal Studies* 21 (1), 75–104, https://doi.org/10.1111/j.1475-5890.2000.tb00581.x.

Blundell, Richard, and Thomas Macurdy, 1999. "Labor Supply: A Review of Alternative Approaches." In Ashenfelter, Orley, and David Card (eds.), *Handbook of Labor Economics*, Vol. 3, 1559–1695. Elsevier, Amsterdam, https://ideas.repec.org/h/eee/labchp/3-27.html.

Brill, Alex, and Derrick Choe, 2018. "Charitable Giving and the Tax Cuts and Jobs Act." *AEI Economic Perspectives*, https://www.aei.org/research-products/report/charitable-giving-and-the-tax-cuts-and-jobs-act/.

Chetty, Raj, 2009. "Sufficient Statistics for Welfare Analysis: A Bridge Between Structural and Reduced-Form Methods." *Annual Review of Economics* 1 (1), 451–488, https://doi.org/10.1146/annurev.economics.050708.142910.

Chetty, Raj, 2012. "Bounds on Elasticities with Optimization Frictions: A Synthesis of Micro and Macro Evidence on Labor Supply." *Econometrica* 80 (3), 969–1018, https://doi.org/10.3982/ECTA9043.

Cohen, Nicholas H., and Manoj Viswanathan, 2020. "Corporate Behavior and the Tax Cuts and Jobs Act by Nicholas H. Cohen and Manoj Viswanathan." *University of Chicago Law Review Online*, April, https://lawreviewblog.uchicago.edu/2020/04/02/corporate-behavior-and-tcja-cohen-viswanathan/.

Deaton, Angus, 2018. "What Do Self-Reports of Wellbeing Say about Life-Cycle Theory and Policy?" Working Paper No. 24369. National Bureau of Economic Research, Cambridge, MA, https://doi.org/10.3386/w24369.

Devereux, Paul J., 2004. "Changes in Relative Wages and Family Labor Supply." *Journal of Human Resources* 39 (3), 696–722, https://doi.org/10.2307/3558993.

Dobridge, Christine L., Joanne Hsu, and Mike Zabek, 2023. "Personal Tax Changes and Financial Well-Being: Evidence from the Tax Cuts and Jobs Act." Working Paper. Washington, DC, https://mikezabek.com/pdf/231212DobridgeHsuZabekPersonal.pdf.

Dowd, Tim, Christopher Giosa, and Thomas Willingham, 2020. "Corporate Behavioral Responses to the TCJA for Tax Years 2017–2018." *National Tax Journal* 73 (4), 1109–1134, https://doi.org/10.17310/ntj.2020.4.09.

Eissa, Nada, Henrik Jacobsen Kleven, and Claus Thustrup Kreiner, 2008. "Evaluation of Four Tax Reforms in the United States: Labor Supply and Welfare Effects for Single Mothers." *Journal of Public Economics* 92 (3–4), 795–816, https://doi.org/10.1016/j.jpubeco.2007.08.005.

Feenberg, Daniel, and Elisabeth Coutts, 1993. "An Introduction to the TAXSIM Model." *Journal of Policy Analysis and Management* 12 (1), 189–194, https://doi.org/10.2307/3325474.

Fiorio, Carlo V., 2008. "Analysing Tax-Benefit Reforms Using Non-Parametric Methods." *Fiscal Studies* 29 (4), 499–522.

Flood, Sarah, Miriam King, Steven Ruggles, and Robert Warren, 2015. "Integrated Public Use Microdata Series, Current Population Survey: Version 4.0." [Data set]. University of Minnesota, Minneapolis, https://doi.org/10.18128/D030.V4.0.

Flood, Sarah M., and José Pacas, 2017. "Using the Annual Social and Economic Supplement as Part of a Current Population Survey Panel." *Journal of Economic and Social Measurement* 42 (3–4), 225–248, https://doi.org/10.3233/JEM-180447.

Furman, Jason, 2019. "'Not Much': What Macroeconomic Data Say about the Impact of the Tax Cuts and Jobs Act." *American Enterprise Institute—AEI* (blog), September 18, https://www.aei.org/economics/not-much-what-macroeconomic-data-say-about-the-impact-of-the-tax-cuts-and-jobs-act/.

Gaertner, Fabio B., Dan Lynch, and Mary Vernon, 2020. "The Effects of the Tax Cuts & Jobs Act of 2017 on Defined Benefit Pension Contributions." SSRN Scholarly Paper ID 3185711. Social Science Research Network, Rochester, NY, https://papers.ssrn.com/abstract=3185711.

Gale, William G., 2020. "Did the 2017 Tax Cut—The Tax Cuts and Jobs Act—Pay for Itself?" *Brookings* (blog), February 14, https://www.brookings.edu/policy2020/votervital/did-the-2017-tax-cut-the-tax-cuts-and-jobs-act-pay-for-itself/.

Gale, William G., Hilary Gelfond, Aaron Krupkin, Mark J. Mazur, and Eric Toder, 2018. "Effects of the Tax Cuts and Jobs Act: A Preliminary Analysis." Tax Policy Center, Brookings Institution, Washington, DC, https://www.brookings.edu/research/effects-of-the-tax-cuts-and-jobs-act-a-preliminary-analysis/.

Gale, William G., and Claire Haldeman, 2021. "The Tax Cuts and Jobs Act: Searching for Supply-Side Effects." *National Tax Journal* 74 (4), 895–914, https://doi.org/10.1086/717132.

Gustman, Alan L., 1983. "Modeling Individuals' Behavior: Evaluation of a Policymaker's Tool." *Journal of Policy Analysis and Management* 3 (2), 191–205.

Hanlon, Michelle, Jeffrey L. Hoopes, and Joel Slemrod, 2018. "Tax Reform Made Me Do It!" Working Paper No. 25283. National Bureau of Economic Research, Cambridge, MA, https://doi.org/10.3386/w25283.

Heim, Bradley T., 2009. "Structural Estimation of Family Labor Supply with Taxes: Estimating a Continuous Hours Model Using a Direct Utility Specification." *Journal of Human Resources* 44 (2), 350–385, https://doi.org/10.1353/jhr.2009.0002.

Hoopes, Jeff, n.d. "The TCJA Effects Tracker: What Do We Know about the Effects of the Tax Cuts and Jobs Act?" UNC Tax Center (blog), https://tax.unc.edu/index.php/what-do-we-know-about-the-effects-of-the-tax-cuts-and-jobs-act/.

Hotchkiss, Julie L., 2022. "Millennials: Maligned or Miscreants?" *Southern Economic Journal* 88 (4), 1248–1276, https://doi.org/10.1002/soej.12560.

Hotchkiss, Julie L., Mary Mathewes Kassis, and Robert E. Moore, 1997. "Running Hard and Falling Behind: A Welfare Analysis of Two-Earner Families." *Journal of Population Economics* 10 (3), 237–250.

Hotchkiss, Julie L., Robert E. Moore, and Fernando Rios-Avila, 2012. "Assessing the Welfare Impact of Tax Reform: A Case Study of the 2001 U.S. Tax Cut." *Review of Income and Wealth* 58 (2), 233–256, https://doi.org/10.1111/j.1475-4991.2012.00493.x.

Imai, Susumu, and Michael P. Keane, 2004. "Intertemporal Labor Supply and Human Capital Accumulation." *International Economic Review* 45 (2), 601–641.

Immervoll, Herwig, Henrik Jacobsen Kleven, Claus Thustrup Kreiner, and Nicolaj Verdelin, 2011. "Optimal Tax and Transfer Programs for Couples with Extensive Labor Supply Responses." *Journal of Public Economics*, Special Issue: International Seminar for Public Economics on Normative Tax Theory, 95 (11), 1485–1500, https://doi.org/10.1016/j.jpubeco.2011.06.005.

Joint Committee on Taxation, 2018. "List of Expiring Federal Tax Provisions 2016–2027." JCX-1-18, https://buchanan.house.gov/_cache/files/1/c/1c5f987d-18ae-4c70-8186-1810bc86defa/0AE716BA77C4A07B3D377B9879CB25DE.x-1-18-5057-1-.pdf.

Keane, Michael P., 2011. "Labor Supply and Taxes: A Survey." *Journal of Economic Literature* 49 (4), 961–1075, https://doi.org/10.1257/jel.49.4.961.

Keane, Michael P., and Nada Wasi, 2016. "Labour Supply: The Roles of Human Capital and the Extensive Margin." *Economic Journal* 126 (592), 578–617, https://doi.org/10.1111/ecoj.12362.

Kumar, Anil, 2009. "Nonparametric Estimation of the Impact of Taxes on Female Labor Supply." *Journal of Applied Econometrics* 27 (3), 415–439, https://doi.org/10.1002/jae.1205.

Kumar, Anil, 2020. "Did Tax Cuts and Jobs Act Create Jobs and Stimulate Growth? Early Evidence Using State-Level Variation in Tax Changes." Working Paper 2001. Federal Reserve Bank of Dallas, https://doi.org/10.24149/wp2001.

Li, Huaqun, and Kyle Pomerleau, 2018. "Distributional Impact of the Tax Cuts and Jobs Act over the Next Decade." Fiscal Fact No. 596. Tax Foundation, Washington, DC, https://taxfoundation.org/the-distributional-impact-of-the-tax-cuts-and-jobs-act-over-the-next-decade/.

Lieberknecht, Philipp, and Volker Wieland, 2019. "On the Macroeconomic and Fiscal Effects of the Tax Cuts and Jobs Act." CEPR Discussion Paper 13629. Center for Economic Policy Research, London, https://ideas.repec.org/p/cpr/ceprdp/13629.html.

Little, Roderick J. A., 1988. "Missing-Data Adjustments in Large Surveys." *Journal of Business and Economic Statistics* 6 (3), 287–296, https://doi.org/10.2307/1391878.

Malkov, Egor, 2021. "Welfare Effects of the Labor Income Tax Changes on Married Couples: A Sufficient Statistics Approach." Working Paper, http://arxiv.org/abs/2108.09981.

McClelland, Robert, and Shannon Mok, 2012. "A Review of Recent Research on Labor Supply Elasticities." Working Paper 2012-12. Congressional Budget Office, Washington, DC.

Moreau, Nicolas, and Olivier Bargain, 2005. "Is the Collective Model of Labor Supply Useful for Tax Policy Analysis? A Simulation Exercise." SSRN Scholarly Paper ID 396040. Social Science Research Network, Rochester, NY, http://papers.ssrn.com/abstract=396040.

Morris, Tim P., Ian R. White, and Patrick Royston, 2014. "Tuning Multiple Imputation by Predictive Mean Matching and Local Residual Draws." *BMC Medical Research Methodology* 14 (1), 75, https://doi.org/10.1186/1471-2288-14-75.

Mroz, Thomas A., 1987. "The Sensitivity of an Empirical Model of Married Women's Hours of Work to Economic and Statistical Assumptions." *Econometrica* 55 (4), 765–799, https://doi.org/10.2307/1911029.

Nallareddy, Suresh, Ethan Rouen, and Juan Carlos Suárez Serrato, 2018. "Do Corporate Tax Cuts Increase Income Inequality?" Working Paper No. w24598. National Bureau of Economic Research, Cambridge, MA, https://doi.org/10.3386/w24598.

Page, Benjamin R., Joseph Rosenberg, James R. Nunns, Jeffrey Rohaly, and Daniel Berger, 2017. "Macroeconomic Analysis of the Tax Cuts and Jobs Act." Tax Policy Center, Urban Institute and Brookings Institution, Washington, DC.

Pencavel, John, 2002. "A Cohort Analysis of the Association between Work Hours and Wages among Men." *Journal of Human Resources* 37 (2), 251–274, https://doi.org/10.2307/3069647.

Ransom, Michael R., 1987. "An Empirical Model of Discrete and Continuous Choice in Family Labor Supply." *Review of Economics and Statistics* 69 (3), 465–472, https://doi.org/10.2307/1925534.

Sammartino, Frank, Philip Stallworth, and David Weiner, 2018. "The Effect of The TCJA Individual Income Tax Provisions Across Income Groups and Across the States." Tax Policy Center, Urban Institute and Brookings Institution, Washington, DC, https://www.taxpolicycenter.org/publications/effect-tcja-individual-income-tax-provisions-across-income-groups-and-across-states/full.

Tax Policy Center, 2024. "How Did the Tax Cuts and Jobs Act Change Personal Taxes?" In *Briefing Book: A Citizen's Guide to the Fascinating (Though Often Complex) Elements of the US Tax System* (blog), https://www.taxpolicycenter.org/briefing-book/how-did-tax-cuts-and-jobs-act-change-personal-taxes.

Triest, Robert K., 1990. "The Effect of Income Taxation on Labor Supply in the United States." *Journal of Human Resources* 25 (3), 491–516, https://doi.org/10.2307/145991.

van Soest, Arthur, 1995. "Structural Models of Family Labor Supply: A Discrete Choice Approach." *Journal of Human Resources* 30 (1), 63–88, https://doi.org/10.2307/146191.

Zeida, Teegawende H., 2022. "The Tax Cuts and Jobs Act (TCJA): A Quantitative Evaluation of Key Provisions." *Review of Economic Dynamics* 46 (October), 74–97, https://doi.org/10.1016/j.red.2021.08.003.