Tax Incentives and Housing Decisions: Effects of the Tax Cut and Jobs Act

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Abstract

The 2017 Tax Cut and Jobs Act (TCJA) altered the US tax code, greatly reducing itemization rates and effective homeownership subsidies. Using American Community Survey data combined with the NBER TAXSIM program, we estimate that the TCJA caused the average effective homeownership subsidy to decline from $2,154 to $801. Differences in state taxes and house price levels create variation in exposure to the TCJA effective homeownership subsidy shock. Utilizing this variation, we find that each percentage point decline in the effective homeownership subsidy relative to home values lowered homeownership rates by 0.56 percentage points and mortgage use by 0.69 percentage points.

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1 Introduction

Do homeownership subsidies increase homeownership, or are they simply transfers to lucky landowners? This important policy question has received tremendous attention, yet prior research has often found a neutral or negative subsidy effect on homeownership. In 2018, the Tax Cut and Jobs Act (TCJA) caused a large decline in effective homeownership subsidies by increasing the standard deduction and limiting state and local tax deductions. We define the effective homeownership subsidy rate as the expected tax liability difference for a renter relative to a homeowner divided by the home value with both the mortgage interest deduction (MID) and property tax deductions contributing to homeownership subsidies. Based on a random sample of American Community Survey (ACS) households, we use the NBER TAXSIM program to create a simulated policy variable for the TCJA shock to effective homeownership subsidies. We utilize the differential exposure to the TCJA shock caused by state tax or house price variation to estimate how effective homeownership subsidies affect homeownership and mortgage use.

The TCJA caused the largest annual decline in realized homeownership subsidies in US history. In 2017, the MID and property tax deductions reduced taxable income by $290 and $220 billion. In 2018, the MID and property tax deductions decreased by 45% to $175 billion and $105 billion. This amounts to a $65 billion annual loss for homeowners, greater than the annual spending on rental assistance programs (public housing, housing vouchers, low-income housing tax credit, etc.)

While the TCJA tinkered directly with the MID, the homeownership subsidy decline comes from the drop in itemization rates driven by the standard deduction increase and the $10,000 limitation on state and local income taxes. Figure 1 displays the percent of households itemizing taxes, claiming the MID, and property tax deductions between 1984 and 2018.[1] Since the 1986 Tax Reform Act, at least

[1]IRS tax statistics of income:`https://www.irs.gov/statistics/soi-tax-stats-individual-income-tax-returns-publication-1304-complete-report`

28% of tax filers itemized deductions each year, and most itemizers claimed the MID and property tax deductions. The year the TCJA was enacted, itemization had its largest annual decline. It plummeted by 20 percentage points to 11%.

As a cornerstone of the "American Dream" (Gabriel and Painter (2008), Goodman and Mayer (2018)), homeownership has historically enjoyed broad political support and dominates household balance sheets. Home equity is the largest component of wealth for most families. Homeownership and mortgages encourage asset accumulation over the life-cycle (Wainer and Zabel (2020), Di et al. (2007), Goodman and Mayer (2018)) and provide insurance in retirement against rising housing costs and long-term care costs (Davidoff, 2010).

Because most homes are purchased with mortgage debt, the MID could be economically justified if it increases homeownership and if there are positive homeownership externalities. Prior research has found evidence of homeownership externalities through increased civic engagement (DiPasquale and Glaeser (1999), Engelhardt et al. (2010), Jiang (2018)), increased property values (Coulson and Li, 2013), and improved child outcomes (Aaronson (2000), Green et al. (1997), Haurin et al. (2002)). However there is also a small but growing literature on potential negative homeownership externalities as well including Munch et al. (2006), Blanchflower and Oswald (2013), and Bracke et al. (2018).

Though positive homeownership externalities may exist, economists have widely criticized the MID. A primary reason is that the MID is a regressive subsidy primarily benefitting higher-income in higher-cost areas (Gyourko and Sinai (2003), Brady et al. (2003), Glaeser and Shapiro (2003), Poterba and Sinai (2008)). The MID also distorts consumption decisions leading to greater housing and mortgage consumption (Hanson (2012), DeFusco and Paciorek (2017), and Hanson (2020)).

Few studies have found a direct positive link between homeownership subsidies and homeownership. A rare example is Hembre (2018), which finds that the temporary first-time homebuyer tax credit, worth up to $8,000 from 2008 to 2010, had a small positive effect on homeownership. Several other studies, such as Hilber and Turner

(2014), Sommer and Sullivan (2018), and Chambers et al. (2009) find the counter-intuitive result that the MID lowers homeownership. Sommer and Sullivan (2018) and Chambers et al. (2009) attribute this finding, in part, to the MID increasing house prices, which reduces homeownership among lower-income households who benefit less from the MID. Hilber and Turner (2014) find the house price response to the MID is particularly powerful in areas with less elastic housing supply. Most recently, Gruber et al. (2021) exploit mortgage interest policy changes in Denmark and find that a reduction in the mortgage interest deduction has a precisely estimated null effect on homeownership, though it lowered home values and decreased housing and mortgage consumption.

A limitation of this prior work is the measurement of homeownership subsidies. Two approaches have generally been used to measure homeownership subsidies. The first, utilized by Sommer and Sullivan (2018), Floetotto et al. (2016), Chambers et al. (2009), and Gervais (2002) is to treat mortgage interest or property taxes as fully tax-deductible, evaluated at marginal tax rates. This approach greatly over-states the value of homeownership subsidies. Our simulations suggest that only 27% of mortgage interest and property taxes would reduce federal and state income taxes prior to the TCJA. Importantly, the differences between assumed and realized homeownership subsidies vary greatly by income, housing demand, and state taxes which muddies analyses relying on these dimensions for statistical inference.

The second approach is to proxy MID or property tax deduction subsidies with a "last-dollar" policy measure. For instance, both Hilber and Turner (2014) and Poterba and Sinai (2008) utilize the National Bureau of Economic Research (NBER) simulated marginal subsidy rate for an additional dollar of mortgage interest or property tax among households that itemize deductions. Other works such as Green and Vandell (1999), Martin and Hanson (2016), and Hanson (2012) use statutory marginal state and federal MID subsidy rates. These marginal subsidy rates provide an intensive margin approximation of subsidies for housing consumption, such as home size or mortgage debt amount. Additionally, if

households focus on marginal tax rates when making decisions in a complex tax policy environment, so-called "spot-lighting" as suggested by Liebman (2004), then these tax measures may accurately approximate the policies households are responding to.

However, there are several issues with using the "last-dollar" approach for estimating the homeownership subsidy effect on homeownership. Using the top marginal rate or the expected rate for the top 1% of households disregards differences in the full tax burden and ignores the complex non-linear interaction between homeownership tax benefits and itemization. Using marginal tax rates greatly overstate the expected extensive margin homeownership subsidy a household would receive based on their housing tenure or mortgage origination choices. Because state-level income tax differences are often utilized to identify these homeownership effects, differences in the progressivity of state income tax schedules are ignored. For instance, in California, the top income tax rate is 12.3%, the highest in the country, yet the marginal tax rate for a median family in California pays only 6%, closer to the average state tax rate. A similar issue arises in the labor economics literature with the earned income tax credit. The household labor force participation choice in response to the earned income tax credit appears less unresponsive to the marginal income tax rates within the credit but instead, makes this extensive margin choice in response to an extensive accounting of the expected tax benefit.

The TCJA shock to effective homeownership subsidies provides a unique opportunity to study the subsidy effects on homeownership and mortgages. We expand on prior work by incorporating tax itemization into an effective homeownership subsidy measure. Because the TCJA primarily affected homeownership subsidies through itemization it is critical to incorporate the itemization complexity to accurately measure the TCJA effective homeownership subsidy shock. We use the NBER TAXSIM program to create a simulated policy variable for the TCJA effective homeownership subsidy shock. This shock is computed as the difference in expected tax liability between homeowning and

renting between 2018 and 2017 as a percentage of the expected home value. Because we use a fixed sample of households to compute this expected shock for each state and income level, our shock variation is driven by state differences in tax rates and house prices.

We estimate the TCJA lowered the average annual effective homeownership subsidy by $1,353 from $2,154 to $801. This subsidy shock was eight times greater for above-median income households at $2,453 than for below median-income households at $301. This amount subsidizes 8.8% and 1.2% of the imputed rental value of homes for these households, respectively.

Using our simulated policy variable to exploit the differential state exposure to the effective homeownership subsidy shock, we find that the TCJA reduced homeownership and mortgage use. For each percentage point decrease in the effective homeownership subsidy, we find that the propensity to own decreased by 0.56 percentage points, and mortgage use decreased by 0.69 percentage points. These findings suggest a significant housing and mortgage demand response during the first two years of TCJA implementation, equating to a 0.23 percentage point decrease in homeownership and a 0.28 percentage point decrease in mortgage utilization. We additionally find evidence that households reduced housing and mortgage consumption as measured by lowered home values and second mortgages, although these effects are partially offset by higher greater mortgage and rental payments.

2 The Tax Cut and Jobs Act and Effective Homeownership Subsidies

2.1 TCJA Details

The TCJA modified several aspects of the personal income tax code. The TCJA increased the standard deduction from $6,500 to $12,000 for single filers ($13,000 to $24,000 for joint filers), increasing the threshold required to benefit from itemization. The TCJA also limited state and local tax (SALT) deductions to $10,000. SALT deductions include income, sales, and property taxes.[2] These two changes were the primary causes of the itemization rate declining from 31% to 11% and indirectly lowered effective homeownership subsidies.

Itemization rates vary by state and household type. Higher-income households itemize more frequently because they have a greater income for deductible expenditures. In 2017, only 8% of households with an adjusted gross income between $25,000 and $50,000 itemized, while 76% of households with an adjusted gross income between $200,000 and $500,000 itemized. Similarly, households in states with higher income, sales, and property taxes are more likely to itemize, creating substantial state variation itemization rates even with similar households. In 2017, 75% of Marylanders with adjusted gross income between $75,000 and $100,000 itemized while only 25% of North Dakotans in the same income range itemized.

Other important TCJA changes included lowering marginal tax rates, altering tax brackets, eliminating the personal exemption, and raising the alternative minimum tax exemption threshold. The TCJA mostly lowered marginal tax rates, particularly for lower and middle-class households, while marginal tax rates on some high-earning households increased slightly.[3]

[2]Households can only claim either sales or state income tax deductions, not both.

[3]A comprehensive accounting of the TCJA tax changes is discussed by The Tax Founda-

The TCJA also directed affected homeownership subsidies. The TCJA removed the tax deductibility of home equity lines of credit (HELOCs) when the new debt is not used to finance home constructions or renovations. The TCJA also lowered the maximum MID amount from $1,000,000 to $750,000. However, this change only affects the 4.2% of households that own homes valued above $750,000.[4]

2.2 Effective Homeownership Subsidies

The US tax code has a long history of subsidizing homeownership. The two primary subsidies for homeowners are the tax deductibility of mortgage interest and property taxes.[5]

The MID was incorporated into the tax code in 1913 because similar treatment was given to other forms of debt interest. There is no indication the MID originally intended to incentivize homeownership (Ventry, 2010). While perhaps an incidental initial inclusion, the MID has consistently remained one of the largest tax deductions and retained strong political support. Most homeowners (63%) have a mortgage, and mortgage payments are the largest annual housing cost for homeowners averaging $15,816 among mortgage holders.

Property taxes account for a substantial fraction of the annual housing cost as homeowners pay an average of $3,340 per year in property taxes.[6] Similar to state income and sales taxes, property taxes can be deducted from taxable income. Homeowners benefit from the property tax deduction but only if the household itemizes deductions and only half of the homeowners itemized deductions prior to

tion.https://files.taxfoundation.org/20171220113959/TaxFoundation-SR241-TCJA-3.pdf Appendix Figure A.1 displays the TCJA changes in marginal tax rates by income and filer status.

[4]ACS, 2017

[5]We refer to these tax rules as subsidies, but there are a number of areas in which the taxation of housing consumption and investments are treated differently for homeowners relative to landlords, so whether it is a subsidy per se or simply differential treatment is a matter of debate. Brueckner (2014) provides a detailed discussion of the differential tax treatment of homeowners and landlords.

[6]2018 American Community Survey

the TCJA. Renters cannot deduct property taxes paid by landlords, but many indirectly benefit from the property tax deduction their landlords may claim. Though renters could benefit from the property tax deduction, we combine the MID and property tax deductions as "homeownership subsidies" since the homeownership (and mortgage) incentives, and tax implications households consider are similar for these two deductions.

The MID and property tax deduction combine to subsidize a substantial portion of homeownership costs. Consider a household deciding whether to purchase a $250,000 home.[7] Suppose the household purchases the home with a 20% down payment at a mortgage interest rate of 4% and pays $3,340 in annual property taxes. Assuming the household itemizes deductions regardless of housing tenure status and has a marginal income tax rate of 28%, the homeownership subsidy is worth $3,175. [8] Maintained over a 30-year term, the accumulated homeownership subsidy amounts to $40,246 or 16% of the home value.

Quantifying the homeownership subsidy is a complicated non-linear function of marginal tax rates, deductions, and itemization. Two example households, displayed in Figure 2, illustrate the TCJA effect on effective homeownership subsidies. Household 1 has $7,000 in combined mortgage interest and property tax deductions and $2,000 in other itemizable deductions. In 2017, this household itemizes their deductions and receives a $2,500 reduction in their taxable income through homeownership subsidies since they deduct $9,000 from their gross income instead of taking the standard deduction of $6,500 if they were to rent. To compute the effective homeownership subsidy value, multiply the marginal tax rate by the $2,500. In 2018, after the TCJA, Household 1 receives no homeownership subsidy, despite paying $7,000 in mortgage interest and property taxes, because they will claim the standard deduction of $12,000 regardless of their homeownership status.

Household 2 has greater mortgage interest and property tax deductions totaling

[7] This is approximately the 2017 average US home value.

[8] Subsidy calculation: 0.28*($250,000*0.8*0.04)+$3,340) = $3,175.20.

$9,000 with $4,000 in other deductions. In 2017, these deductions are well above the standard deduction and result in a $6,500 reduction in taxable income. In 2018, Household 2 still itemizes, but the homeownership tax benefit declines to $1,000 because of the standard deduction increase. Note that because Household 2 itemizes in both years, increases to their mortgage interest or property tax amounts are deducted in both 2017 and 2018.[9] This example illustrates that the TCJA effective homeownership subsidy shock is non-monotonic across the income distribution. The subsidy initially rises with income as households become more likely to itemize, but peaks after deductions are large enough to trigger itemization in both periods. Alternatively, if other deductions, such as charitable contributions, were greater than the TCJA standard deduction, the TCJA shock to homeownership subsidies would be confined to the SALT cap or maximum mortgage interest changes.

3 Methodology

To determine the effective homeownership subsidy effect on homeownership and mortgage use, we use our simulated policy variable with a two-way fixed effect model. First, we have to create the effective homeownership subsidy measure. We define the effective homeownership subsidy rate as the expected tax liability difference for a renter relative to a homeowner divided by the home value. To compute this expectation, we have to predict mortgage interest and property taxes for each household, so we begin by estimating a housing demand model as a function of household characteristics for each state. Using these estimates, we can compute the effective homeownership subsidy for any household in any state by obtaining the tax differential between homeowning and renting based on these housing and property tax predictions and using the NBER TAXSIM program.

[9]This is true until mortgage interest hits the $750,000 cap or property taxes hit the $10,000 limit.

Following Currie and Gruber (1996), we create our simulated policy variable for effective homeownership subsidies by drawing a random sample of households and then simulating their effective homeownership subsidy in every state prior to and following the TCJA. Our variable of interest, $TCJA$, represents the predicted homeownership subsidy shock caused by the TCJA (i.e., the difference in homeownership subsidies between 2017 and 2018). Because we calculate the $TCJA$ on a fixed sample of households, variation in $TCJA$ is driven only by state tax policies and house prices.

We match our $TCJA$ variable to the full sample of ACS households based on income, state, and marital status groups to estimate the homeownership subsidy effect on housing decisions. We then regress homeownership and mortgage utilization rates on $TCJA$ in a state and year fixed-effects model. Interacting $TCJA$ with a dummy for the Post-TCJA period provides our estimate of the causal TCJA effect on homeownership and mortgages.

3.1 Housing Demand

To predict the homeownership subsidy every household would receive if they were to become homeowners, we begin by estimating the following equations:

$$\theta_i = \beta_0^k + \beta_1^k X_i + \epsilon_i^k \tag{1}$$

$$\phi_i = \gamma_0^k + \gamma_1^k X_i + \rho_i^k \tag{2}$$

Where θ_i and ϕ_i are the home value and property tax rate (annual property taxes divided by home value) for household i (if a homeowner), and X_i is a set of demographic characteristics. Equations (1) and (2) are estimated separately for each state and marital status (single or married) group k to capture marital status and state-level variation in housing demand, price levels, and property taxes. We estimate Equations (1) and (2) using the 2017 American Community Survey (ACS) to avoid any TCJA behavioral responses corrupting into our coefficient estimates.

Estimates from Equations (1) and (2) are used to predict home values and property taxes in our simulation sample.[10] Estimating Equations (1) and (2) on the sample of homeowners may bias predicted home values and property taxes if unobserved characteristics of homeowners differ from renters. For example, conditional on observable characteristics, homeowners may have greater financial wealth or credit history than renters. This would upwardly bias our home value prediction for observed renters. However, our identification strategy relies on comparing households of similar income levels in different states by exposure to the homeownership subsidy shock. This prediction bias is differenced out unless there is a systematic correlation between these unobservable characteristics and policies that affect our homeownership subsidy (i.e., if selection on unobservables is greater in higher-tax states).

3.2 Measuring Effective Homeownership Subsidies

To construct the TCJA effective homeownership subsidy shock, $TCJA$, we want to first calculate the effective homeownership subsidy in the adjacent years, 2017 and 2018. We then define the TCJA shock as the change in this homeownership subsidy from 2017 to 2018.

Following Currie and Gruber (1996), we approximate the actual homeownership subsidy with a subsidy measure that depends only on the state variation in taxes and price levels. We select a random sample of 250 households from each marital status (single or married) and \$10,000 income group, g, in the 2017 ACS (N = 25, 000) to create this variable.[11] For each of these 25,000 households, we simulate their expected tax liability in 204 scenarios: as a homeowner and renter in each of the 51 states for the 2017 and 2018 tax regimes. This results in a total of 5,100,000

[10]Estimates of predicted home value and property taxes by income are available in Appendix Figure A.2. Our income spline has knots at \$33,900, \$64,000,\$110,000, and \$200,000.

[11]We place an upper bound on income at \$500,000. For a small number of higher-income buckets for singles, the full ACS sample did not include 250 observations. In these cases, we randomly duplicate observations to achieve the 250 observations for the simulations.

tax simulations.

To predict expected mortgage interest and property tax deductions for each simulation, we utilize coefficient estimates from Equations (1) and (2):

$$\hat{\theta}_i^s = \hat{\beta}_0^k + \hat{\beta}_1^k X_i + \hat{\epsilon}_i^k$$
$$\hat{\phi}_i^s = \hat{\gamma}_0^k + \hat{\gamma}_1^k X_i + \hat{\rho}_i^k$$

where $\hat{\theta}_i^s$ and $\hat{\phi}_i^s$ are the predicted home value and property tax rate in state s. Predicted property taxes (ψ) are derived by multiplying the predicted property tax rate by the predicted home value:

$$\hat{\psi}_i^s = \hat{\theta}_i^s * \hat{\phi}_i^s$$

Predicted mortgage interest (μ) is derived from the predicted home value by assuming the household uses a 20% downpayment and has a mortgage interest rate of 4%:

$$\mu_i^s = \hat{\theta}_i^s * 0.80 * 0.04$$

By assuming an 80% loan-to-value ratio on the mortgage, our effective homeownership subsidy measure represents the potential subsidy available to homeowners since the option to refinance up to this equity level is available to most households. We assume a 4% interest rate based on the average interest rate for mortgages originated in 2017.[12] These assumptions help our variable abstract from observed mortgage behavioral responses to mortgage subsidy rates.

To have our predicted home value and property tax distributions mirror the observed distributions, we include randomly drawn residuals $\hat{\epsilon}_i^k$ and $\hat{\rho}_i^k$ from the estimation of Equations (1) and (2). Because the effective homeownership subsidy is a non-linear function of tax deductions bounded below by zero (if the household does not itemize), excluding this error term would downwardly bias our subsidy

[12] http://www.freddiemac.com/pmms/pmms30.html

estimates.

After obtaining the set of predicted mortgage interest and property taxes for our simulations, we use the NBER TAXSIM program to calculate the federal tax liability (τ) for each simulation.[13] For each household in every state we calculate the tax liability in the four housing tenure-year states {Rent (j=0), Own (j=1) } x { 2017, 2018}:

$$\begin{aligned} \tau_{ist1} &= f(\hat{\mu_i^s}, \hat{\psi_i^s}, t, X_i, \omega_i, \xi_s(X_i, \omega_i, \hat{\mu_i^s}, \hat{\psi_i^s})) \\ \tau_{ist0} &= f(0, 0, t, X_i, \omega_i, \xi_s(X_i, \omega_i, 0, 0)) \end{aligned}$$

where $\xi_s(X_i, \omega_i, \hat{\mu_i^s}, \hat{\psi_i^s})$ is the income tax regime for state s as a function of household characteristics.

For our primary specification, we focus on the combined federal (τ) and state (ξ) income tax liability since many state income tax deductions incorporate federal deductions, thus were indirectly affected by the TCJA. As part of our robustness checks, we consider only the federal tax burden (τ).

Aside from mortgage interest and property taxes, inputs for the TAXSIM program include income (by source), marital status, and the number of dependents available in the ACS data. The TAXSIM program calculates expected state income tax and sales tax deductions to be included in the tax liability calculation. Information on other potential itemizable tax deductions (ω), such as charitable contributions, healthcare expenditures, and gambling losses, are unobserved in the ACS data. We assume each household spends 5% of their income on these other potential itemizable goods regardless of year or housing tenure. In our sensitivity analysis, we test how our results change when the other deductions amount is assumed to be 0% and 10% of income.

The effective homeownership subsidy (σ_{ist}) for household i in state s and year t is

[13]The TAXSIM program (Feenberg and Coutts, 1993) is available here: `https://www.nber.org/taxsim/`.

the tax liability difference from being a renter and a homeowner relative to the expected home value:

$$\sigma_{ist} = \frac{(\tau_{ist0} + \xi_{ist0}) - (\tau_{ist1} + \xi_{ist1})}{\hat{\theta}_i^k}$$

The TCJA shock to the effective homeownership subsidy, $TCJA_{is}$, is the difference in the expected homeownership subsidy between 2018 and 2017:

$$TCJA_{is} = \sigma_{is2018} - \sigma_{is2017}$$

We calculate the average TCJA effective homeownership subsidy shock by each marital status-state-income group g:

$$TCJA_g = \sum_i^N \frac{TCJA_{is} * \mathbb{1}_{[i \in g]}}{\mathbb{1}_{[i \in g]}} \tag{3}$$

$TCJA_g$ thus represents the average percentage change, relative to expected home value, in the homeownership subsidy between 2017 and 2018 for group g. Because the TCJA reduced effective homeownership subsidies, the value of $TCJA_g$ will be negative for almost every group and is likely to be more negative for higher-income groups. We then merge our TCJA shock with the full sample based on the marital status-state-income group g.

3.3 Estimation

To estimate the TCJA effect on housing outcomes, we regress homeownership and mortgage utilization on our policy variable, $TCJA_g$, using the following equation:

$$y_{ist} = \beta_0 + \beta_1 TCJA_g + \beta_2 TCJA_g \times Post_t + \beta_3 X_{it} + \beta_4 Z_{st} + \gamma_s + \alpha_t + \epsilon_{ist} \tag{4}$$

Where, $TCJA_g$ is our measure of the effective homeownership subsidy shock, assigned to each observation in the full sample based on their group g. The variable $Post_t$ is a dummy equal to one for years 2018 and later, X_{it} is a set of household characteristics including income group fixed effects, Z_{st} is a set of state-level macroeconomic variables, and γ_s and α_t are state and year fixed-effects, respectively. The outcome variable, y_{ist}, is either a binary variable equal to 100 for homeowners and 0 for renters or a binary variable equal to 100 for mortgage holders and 0 for non-mortgage holders. Our additional analysis considers a second mortgage indicator and the log of home values, mortgage payments, second mortgage payments, and rental payments as outcomes variables. Control variables X_{it} include the number of people in the household, an indicator for the presence of kids, and dummy variables for the household head being black, hispanic, having a high school degree, having greater than a high school degree, being a veteran, being male, and self-reporting a disability.

The coefficient of interest, β_2, represents the relationship between outcome y_{ist} and the effective homeownership subsidy rate. Because a lesser homeownership subsidy disincentivizes homeownership and mortgage use, we expect β_2 to be positive. That is, β_2 will be positive if groups with a larger reduction in their homeownership subsidies had a greater reduction in outcome y_{ist}.

4 Data and Empirical Implementation

4.1 ACS Data

The ACS is an annual national cross-sectional survey of about 3 million people, collecting a rich set of household demographic and economic characteristics. The ACS includes information on household demographics and consumption, such as the number of people in the household and their relation, race, ethnicity, marital status, education, location, and income. Critically, the ACS includes an indicator

for housing tenure, which indicates whether the household rents, owns their home with a mortgage, or owns their home without a mortgage.[14] Additional housing and mortgage consumption variables include the monthly amount of a first mortgage, rental, and second mortgage payments. The second mortgage payment variable includes all payments on all second or junior mortgages and home equity loans, including vacation or rental properties.

We restrict our estimation sample to household heads in 2014 to 2019 who are US citizens. We also exclude low (below $5,000) and high (above $500,000) income households. Households reporting income below $5,000 are more likely to reflect a transitory income shock or are otherwise likely to be receiving rental assistance, which would distort housing tenure decisions. The sample of households above $500,000 is sparse, making the estimation of $TCJA_g$ challenging.

We additionally incorporate several macroeconomic variables into our analysis to control for changes in local economic conditions. These include the state unemployment rate from the US Department of Labor and state median income and (log) population data from the US Census Bureau.

Table 1 displays summary statistics of the full ACS estimation sample of 6,694,008 households, split by above- and below-median income households and pre- versus post-TCJA time periods along with the full sample statistics in the final column. All dollar values are inflation-adjusted to 2017 dollars. Relative to the pre-TCJA period (2014-2017), homeownership rates increased by 0.7 percentage points following the TCJA for below-median income households, yet mortgages declined by 0.2 percentage points. Among above median income households, homeownership increased by 0.3 percentage points following the TCJA, while mortgage usage declined by 0.8 percentage points. Combined, these trends suggest the demand for mortgages declined while overall homeownership rates rose slightly, though a compositional shift in homeowners occurred from including relatively more lower-income households. Housing consumption, relative to income, declines with

[14] We exclude households who report occupying a unit without payment of rent.

income as below-median income households purchase homes worth six times their annual income compared to three times annual income for above-median income households.

Households holding a second or junior mortgage declined by 0.006 percentage points or 13% from the pre- to the post-TCJA period. In the ACS, Home equity lines of credit account for roughly eighty percent of these second mortgages. The average payment on these second mortgages increased by 8 percent or $30 across the pre- and post-TCJA periods despite the decline in second mortgage use.

In part, because the TJCA was not a balanced-budget reform, the TJCA reduced affected after-tax incomes. To account for the possibility that this increased after-tax income could have affected housing decisions, and because the magnitude of the income effect varied across the income distribution, we calculate the TCJA income shock (ι_g), independent of $TCJA_g$, by computing the change in tax liability for each group g:

$$\iota_g = \sum_{i}^{N} \frac{((\tau_{is2018,1} + \tau_{is2018,0}) - (\tau_{is2017,1} - (\tau_{is2017,0})) * \mathbb{1}_{[i \in g]}}{2 * \mathbb{1}_{[i \in g]}}$$

To make this income shock independent of housing tenure decisions, we averaged across potential housing tenure states. We find lower-income households paid $570 less tax following the TCJA, or 1.46% of income, while higher-income households had their tax liability decline by $2,646, or 2.03% of income.

Figure 3 displays the change in homeownership and mortgage rates by income percentile between 2017 and 2019. Relative to 2017, homeownership and mortgage rates both increased for households in the first two income deciles by 2019. Changes in mortgage use decline steadily with respect to household income, which correlates with the larger TCJA subsidy shocks. Households in the top income decile experienced both the largest homeownership and mortgage rate declines, dropping by 0.42 and 2.08 percentage points, along with the near-largest TCJA

shock at 0.83%.

4.2 Effective Homeownership Subsidy

Prior to the TCJA in 2017, the effective homeownership subsidy averaged $2,154 or 0.54% of the average home value. Following the TCJA, this average subsidy declined to $801 or 0.20%. As shown in Table 1, below-median income homeowners only lost $301 in subsidy value from the TCJA while above-median homeowners lost $2,453. These annual losses are small relative to the home value at 0.1% and 0.7% but compared to the annual rental value suggests that the TCJA reduced the annual homeownership subsidy by a more substantial 1.2% and 8.8% for below- and above-median income households. Using TAXSIM to incorporate the tax code complexity greatly changes our subsidy measure relative to assuming full deductibility of mortgage interest and property taxes. Among our simulation sample, only 27% of predicted mortgage interest and property taxes actually reduce tax liability.

The right axis in Figure 3 pairs with the dark blue line displaying the mean $TCJA_g$ value within each income decile. The TCJA shock is minuscule for the first three income deciles but grows substantially by the eighth decile, where $TCJA_g$ flattens out. The dotted lines on either side of the mean correspond to the $TCJA_g$ 75th and 25th percentile range within each income decile, revealing considerable cross-state variation in $TCJA_g$ conditioning on income percentile.

Table 2 summarizes $TCJA_g$ by income level and marital status. As expected, the TCJA has a minimal effect on the homeownership subsidy for lower-income households. Households earning between $10,000 and $20,000 had their effective homeownership subsidy reduced by -0.003% of their predicted home value. The subsidy shock increases sharply among higher-income households, rising to 0.799% and 0.750% for singles and married couples earning between $100,000 and $150,000. The variable $TCJA_g$ declines slightly among married households with incomes

greater than $250,000 as households become more likely to itemize deductions regardless of housing tenure status.

5 Results

5.1 Homeownership and Mortgages

Table 3 displays the results of estimating Equation (4) on homeownership. All specifications include state, year, and income-by-marital status fixed effects. Robust standard errors are clustered by state. The simple specification in Column (1) finds that each percentage point decrease in the $TCJA_g$ reduced homeownership by 0.74 percentage points and is statistically significant from zero at the 99% confidence level. This coefficient declines slightly to 0.69 in Column (2) when macroeconomic controls are added and further decreases to 0.57 in Column (3) when demographic and household controls are included.

Our primary specification in column (4) of Table 3, includes the TCJA income effect, ι_g. Changes to expectations of potential future taxes to offset this tax cut could counteract much of this income effect and similarly vary by income level but are unobserved. Our baseline specification includes our ι_g measure, but results are robust to the exclusion of the variable.

The TCJA income effect is correlated with homeownership over the sample period, with a one percentage point increase in the income effect being associated with a 1.46 percentage point decline in the propensity to own. However, the relationship between the income effect and homeownership does not change when interacted with the TCJA dummy variable, suggesting homeownership did not respond to after-tax income changes from the TCJA. Controlling for ι_g only slightly reduces β_2 to 0.56.

These findings reveal that homeownership decreased more among households with

greater exposure to $TCJA_g$ following TCJA enactment. The aggregate effect in homeownership due to this homeownership subsidy shock is modest in magnitude. With an average change in $TJCA_g$ of -0.41, the expected TCJA effect on homeownership, assuming no effect on house price levels, is a reduction of just under a quarter of a percent or roughly half of the average annual change in the national homeownership rate since 2000.[15]

Two points are worth considering. First is that these estimates only reflect a short-term housing response to the TCJA. Given the large transaction costs of buying and selling homes, this subsidy shock is more likely to affect households already moving as opposed to inducing a transition away from homeownership. Assuming the TCJA did not affect moving, the $TCJA_g$ grows considerably if the affected group is the only 13.3 percent of households that moved in 2018 or 2019. Further, given the long-term planning involved with homeownership decisions, future tax policy expectations may reduce the expected cumulative subsidy benefits if households believe TCJA provisions might eventually be repealed.

Second, prior work, including Hilber and Turner (2014), Hanson (2012), and Sommer and Sullivan (2018) have rarely documented a positive relationship between homeownership subsidies and homeownership. We do not rule out the possibility the general equilibrium TCJA effect on homeownership is positive if the TCJA caused house price levels to decline enough to induce a greater number of homeowners. Regardless, our finding that households respond positively to homeownership subsidies remains a fairly unique finding within the literature.

Table 4 reports coefficients from estimating Equation 4 on mortgages. Estimates of the $TCJA_g$ effect on mortgages are stable – ranging between 0.69 and 0.82 – and are statistically significant at the 95% confidence level or higher. Across the four specifications, the mortgage effect is greater than the homeownership effect.

In percent terms, relative to the 2017 rate of homeownership and mortgages, the mortgage β_2 estimate range is nearly double the homeownership range with values

[15]U.S. Census Bureau

between 1.61 and 1.92 compared to 0.82 and 1.09. The larger mortgage effect is unsurprising in part because the mortgage decision is paired with homeownership since a household cannot have a mortgage while renting. The reduction in the MID value directly reduces the mortgage subsidy but only indirectly reduces the homeownership subsidy since households can maintain homeownership while paying off or reducing mortgage debt.

5.2 Robustness

To test the robustness of our homeownership subsidy measure, Table 5 presents estimates of the TJCA effect on homeownership and mortgage utilization using alternative subsidy measures. Column (1) presents the preferred specification estimates, Column (4) from Tables 3 and 4 which include macroeconomic and household controls along with ι_g. Column (2) of Table 5 removes state income taxes ξ from the $TCJA_g$ calculation, leaving only τ. Disregarding ξ reduces the $TCJA_g$ by 6 percent and increases the β_2 estimates for homeownership and mortgages by 4 and 8 percent. Combined, the aggregate TCJA effect on homeownership and mortgages remains similar regardless of whether ξ is included.

Columns (3) and (4) consider the effective mortgage subsidy μ separate from the property tax deductions ω regardless of mortgage status. That is, we consider an additional housing state of owning a home without a mortgage ($j = 2$) and then re-define σ_{ist} as:

$$\sigma_{ist} = \frac{(\tau_{ist2} + \xi_{ist0}) - (\tau_{ist1} + \xi_{ist1})}{\hat{\theta}_i^k}$$

Now σ_{ist} represents the just effective marginal subsidy provided by the MID, μ, when deciding whether to originate a mortgage since homeowners can deduct ψ regardless of mortgage status. For homeowners evaluating their mortgage decision, the TCJA reduced the annual mortgage subsidy by 0.313 or 0.296 percent of home value depending on whether ξ is included. Replacing the $TCJA_g$ estimate with our

new σ_{ist}, the β_2 estimates for both homeownership and mortgage utilization rise between 2 to 12 percent when using the effective MID subsidy. However, a t-test rejects the hypothesis that the β_2 estimate is statistically different from the $TCJA_g$ estimate.

5.3 Sensitivity

To create $TCJA_g$, we had to incorporate assumptions about mortgage credit and tax deductions. We test the sensitivity of our β_2 estimates to these assumptions in Table 6. Our baseline tax simulations assume each household has the option to originate a mortgage at an 80% loan-to-value ratio at a 4% interest rate. We alternatively test the sensitivity of our results using a MID based on a 70% loan-to-value ratio because most homeowners have paid down some of their initial mortgage debt. Column (2) of Table 6 shows that this alternative MID assumption increases our estimated TCJA effect sizes slightly by 8 and 5 percent on homeownership and mortgages.

Our baseline assumption is that a household can originate a mortgage with a 4% interest rate. However, if households positively select into homeownership based on creditworthiness, many renters may face a higher expected mortgage rate than the observed average. Column (3) of Table 6 alternatively increases the mortgage rate to 5% and shows that our estimates decline by 12 and 7 percent. Both of these sensitivity checks maintain the statistical significance of the coefficient of interest at the 95% level. Changing the MID assumption to 70% loan-to-value and 5% mortgage interest reduces $TCJA_g$ by -8 and 14 percent. The net effect for both these sensitivity checks is minimal on the predicted change to homeownership and mortgage utilization.

Columns (4) and (5) of Table 6 test the sensitivity of our results to the assumptions on households' unobserved potential tax deductions ω. Our baseline assumption was that $\omega = 5\%$. Because of the interaction with the standard deduction and

marginal income tax brackets, assumptions about ω could significantly affect the $TCJA_g$. Column (4) displays results assuming ω=0, a lower bound, increases the homeownership effect by 16 percent and lowers the mortgage effect by 15 percent. Alternatively, Column (5) assumes ω=10%, which we consider to be an upper bound. This increase in ω increases the β_2 estimate on homeownership by 14 percent and increases on mortgages by 44 percent. While assumptions about ω have a moderate impact on β_2, the direction and general magnitude of our main findings remain similar across the full range of reasonable ω values.

5.4 Additional Housing Outcomes

The TCJA caused a large decline in effective homeownership subsidies. While the primary focus of this study examines the homeownership and mortgage response to this decline, the $TCJA_g$ effect may extend beyond these extensive margin outcomes. Households with a larger $TCJA_g$ may decide to consume less housing or less mortgage debt even if they remain homeowners. Additionally, if the TCJA reduced demand for owned homes, this could affect the supply and demand for rental units.

Table 7 reports the β_2 estimates for many alternative housing market outcomes across the same specification set in Table 3. The first and second rows of Table 7 measure the $TCJA_g$ effect on the log of home value and mortgage payments (among homeowners and mortgage holders). For each percentage point decline in $TCJA_g$, the home value of homeowners declined between 4.2 and 1.5 percent, while mortgage payments increased between 0 and 0.6 percent following TCJA enactment. A long history on the mortgage interest deduction, dating back to Poterba (1984) and continuing through Gruber et al. (2021) has found evidence of the MID value being capitalized into home values. The significant reduction in home values includes both the potential reduction in home values due to reduced effective homeownership subsidies and the behavioral response of households consuming less housing. If home values immediately absorbed the full MID

incidence from the TCJA, we would expect a roughly 5 percent reduction in home values.

The $TCJA_g$ effect on mortgage payments is in the opposite of our predicted direction but is weak in magnitude and statistical significance. These intensive-margin estimates may include some selection bias because of housing responses found in Tables 3 and 4. However, the magnitude of this bias is limited since these extensive margin responses are roughly a quarter of a percentage point.

Rows 3 and 4 of Table 7 display the $TCJA_g$ effect on having a second mortgage and on the size of the second mortgage payment (in logs). We find that for each percentage point decrease in $TCJA_g$, the rate of having a second mortgage payment declines between 1.42 and 1.58 percentage points though the size of the second mortgage payment increased between 2.2 to 3.2 percent. Evaluated at the average reduction in $TCJA_g$ of -0.41, the TCJA reduced second mortgages by roughly 0.6 percentage points or 10 percent of the pre-TCJA mean. This large responsiveness of second mortgages to the TCJA could be driven by the combination of reducing the maximum mortgage interest amount from $1,000,000 to $750,000 and limiting the deductibility of interest on home equity lines of credit for home improvements coupled with a reduced incentive for housing consumption through second homes.

The last row of Table 7 considers the TCJA effect on the rental payments. Rental price levels could be affected by the TCJA through increased demand for rentals as households exit homeownership and the potential increased supply of rental units from conversions of previously owned units to rentals. Examining the rental payment effect also provides a comparison for the mortgage payment effect as common shocks to housing demand to both owners and renters, such as changes to expected future income or housing prices, would be included in both measures. We find that each percentage point decrease in the effective homeownership subsidy rate increased rental payments between 0.91 to 1.25 percent.

6 Conclusion

The TCJA altered the US tax landscape and is perhaps the largest ever US shock to effective homeownership subsidies. Using a simulated policy variable to capture cross-state effective homeownership subsidy variation, we find that for each percentage point decline in effective homeownership subsidies, households significantly reduced their homeownership and mortgage usage by 0.56 and 0.69 percentage points.

These findings have significant policy implications. While not fully repealed, the TCJA greatly hobbled MID and property tax deductions. Recent congressional proposals have discussed repealing the TCJA $10,000 SALT cap. This SALT cap was a primary cause of the itemization reduction, and removing it would increase itemization and homeownership subsidies. These benefits would largely be reaped by higher-income homeowners and likely increase home values. Our estimates suggest that the TCJA resulted in 294,000 fewer homeowners by 2019. Even at this upper bound estimate, the tens of billions of increased annual tax revenue provided by reducing these homeownership subsidies greatly outweigh the estimated $382 million in increased property value.[16]

These findings build upon a vast literature about the effects of homeownership subsidies on housing outcomes. While little prior research has found evidence of a positive homeownership response to homeownership subsidies, we find a moderate reduction in homeownership from the TCJA subsidy shock. We also find a stronger reduction in mortgage utilization in response to homeownership subsidies and evidence of fewer second mortgages and home values.

These results do not necessarily contradict previous work such as Sommer and Sullivan (2018) or Chambers et al. (2009) since we do not account for any TCJA general equilibrium house price effects, which could shift aggregate homeownership

[16]This estimate uses the $1,300 annual homeowner externality estimated by Coulson and Li (2013).

rates up. Future work exploring this issue is important to understand the aggregate TCJA effects on homeownership. Though our study does verify that households can be responsive to homeownership tax incentives at an individual level.

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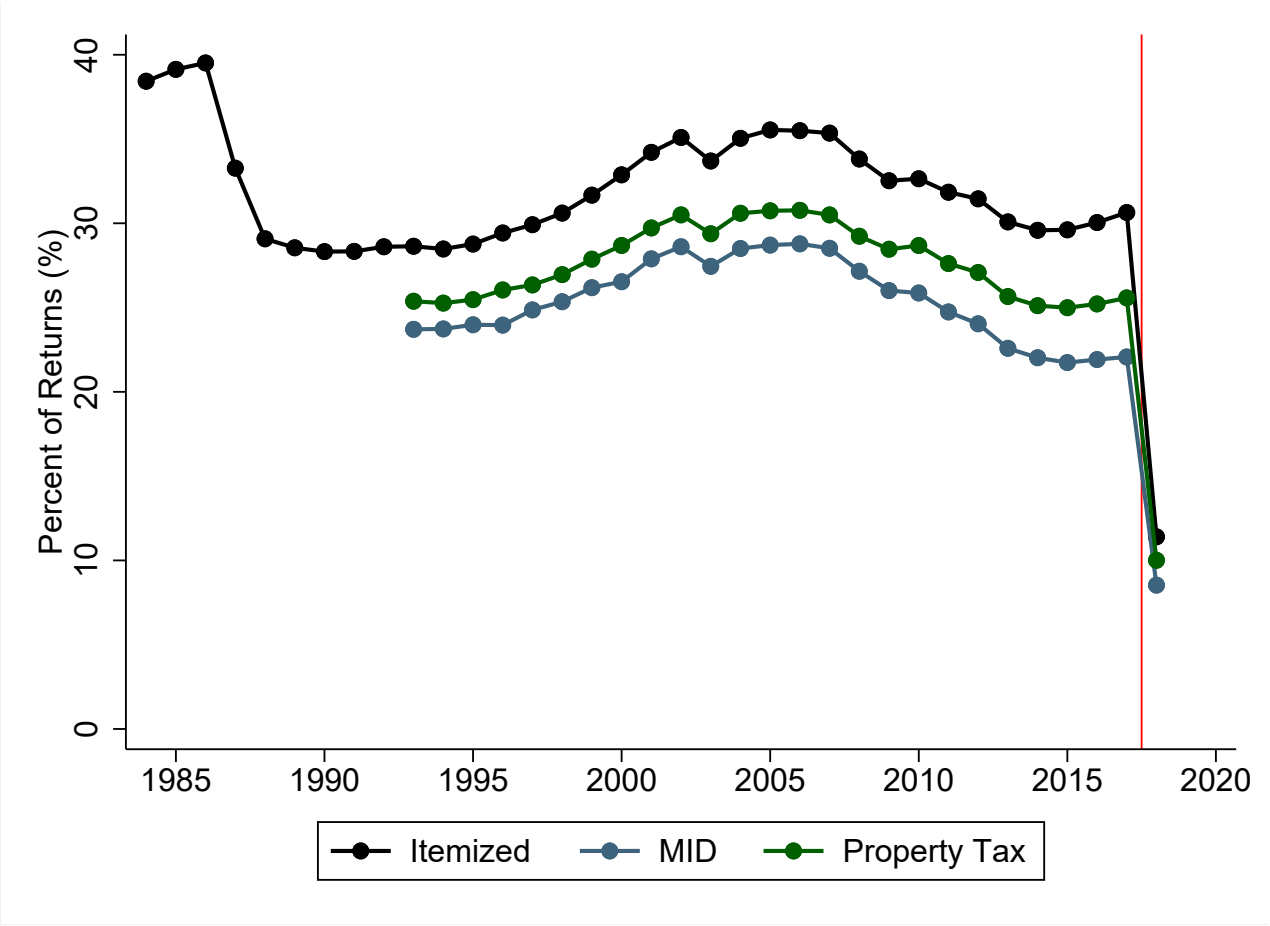
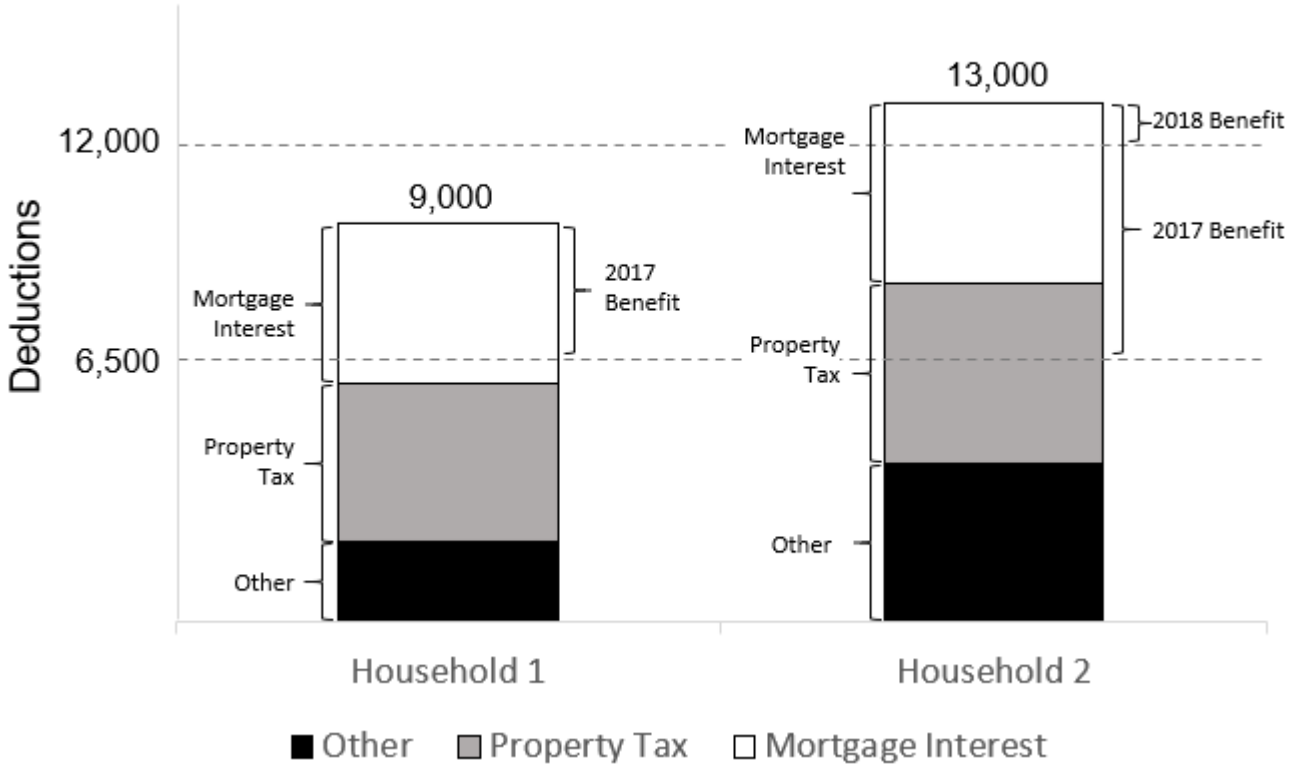
Figure 1: Itemization and Homeownership Subsidy Claiming Rates



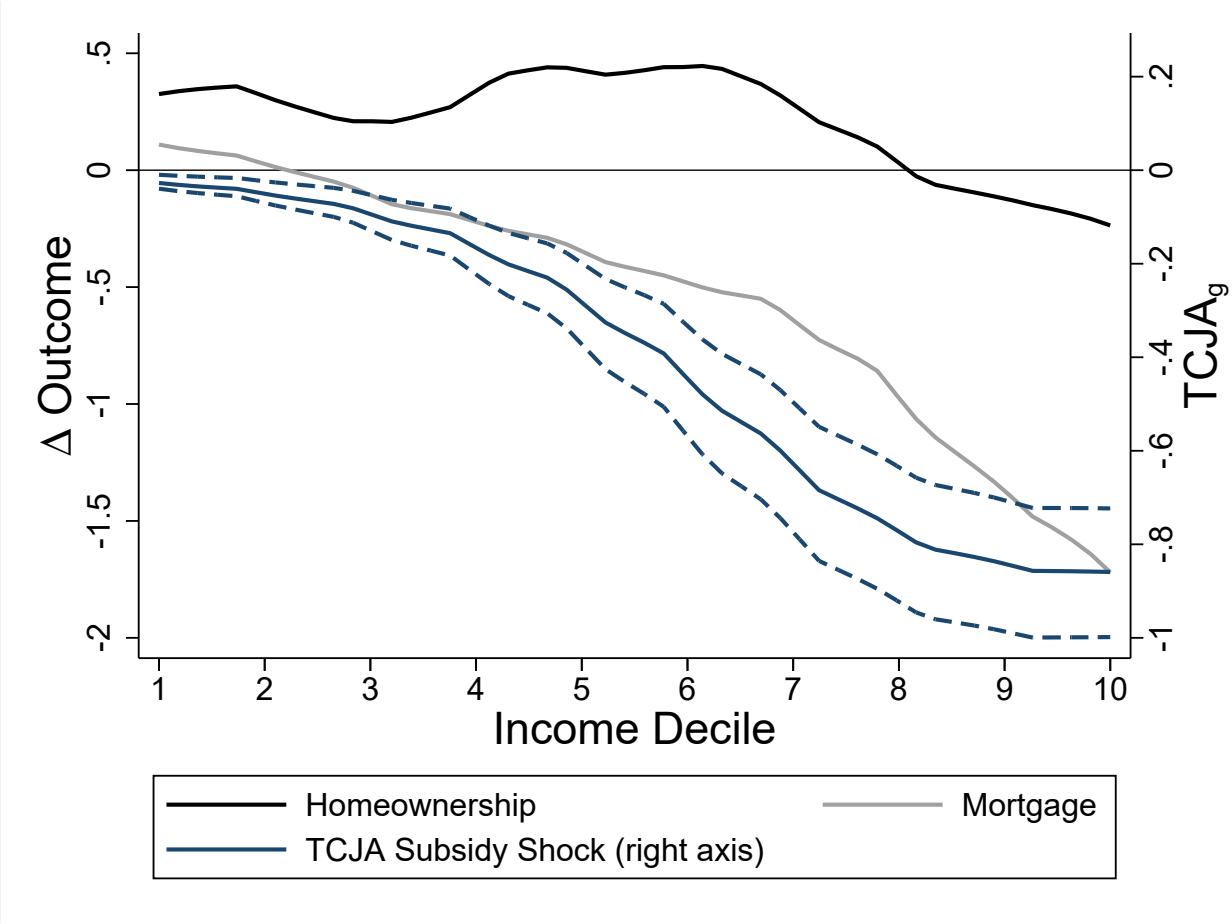
Source: IRS Statistics of Income. This figure plots the percent of returns that itemize deductions (black), claim the mortgage interest deduction (blue), and claim the property tax deduction (green). The vertical line displays when the TCJA was enacted beginning in 2018. Data for MID and Property Tax is not available prior to 1993.

Figure 2: Effective Homeownership Subsidies Example



Notes: This figure displays two examples of a single household and their tax deductions under the 2017 and 2018 tax regimes. The portion of the bar above the dotted lines at \$6,500 and \$12,000 reveals the reduction in taxable income resulting from homeownership subsidies in 2017 and 2018.

Figure 3: Change in Homeownership and Mortgages and TCJA Subsidy Shock by Income Decile, 2019-2017



Source: American Community Survey.
Notes: This figure displays the percentage change in homeownership and mortgages between 2019 and 2017 by household income. The TCJA subsidy shock is the difference in the 2018 and 2017 effective homeownership subsidy, $TCJA_g$, in percentage points relative to home value. The dotted lines represent the 75th and 25th $TCJA_g$ percentiles within each income decile.

Table 1: ACS Summary Statistics

	Below-Median Income		Above-Median Income		Full Sample
	Pre-TCJA	Post-TCJA	Pre-TCJA	Post-TCJA	
Own	59.5	60.2	75	75.3	67.5
	(49.1)	(49)	(43.3)	(43.1)	(46.8)
Mort	30.3	30.1	54.8	54	42.5
	(46)	(45.9)	(49.8)	(49.8)	(49.4)
Home Value	203,824	213,708	343,557	359,279	286,886
	(270,855)	(281,231)	(395,101)	(405,542)	(356,828)
Mortgage Payment	935	960	1,440	1,500	1,278
	(629)	(639)	(891)	(915)	(852)
Second Mortgage Indicator	.0361	.0299	.087	.0726	.0583
	(.187)	(.17)	(.282)	(.26)	(.234)
Second Mortgage Payment	341	363	414	452	403
	(368)	(416)	(444)	(502)	(442)
Rent	942	933	1,412	1,424	1,124
	(499)	(494)	(683)	(673)	(620)
$TCJA_g$ (%)	-.0858	-.0974	-.68	-.717	-.394
	(.0936)	(.103)	(.306)	(.29)	(.376)
$TCJA_g$ ($)	-269	-301	-2,297	-2,453	-1,325
	(327)	(356)	(1,731)	(1,752)	(1,630)
ι_g (%)	-1.41	-1.46	-2.04	-2.03	-1.73
	(.556)	(.571)	(.73)	(.769)	(.726)
Income	36,443	38,392	123,356	130,353	81,883
	(21,526)	(22,789)	(78,042)	(79,769)	(73,017)
Number of Children	.464	.441	.515	.506	.484
	(.97)	(.956)	(.94)	(.939)	(.953)
Number of People	2.27	2.23	2.64	2.66	2.45
	(1.37)	(1.35)	(1.45)	(1.46)	(1.42)
Hispanic	.111	.119	.0866	.0964	.102
	(.314)	(.324)	(.281)	(.295)	(.302)
White	.765	.757	.814	.804	.787
	(.424)	(.429)	(.389)	(.397)	(.41)
Black	.15	.152	.0975	.099	.124
	(.357)	(.359)	(.297)	(.299)	(.33)
Other Race	.0848	.0903	.0886	.0971	.0891
	(.279)	(.287)	(.284)	(.296)	(.285)
Married	.506	.499	.509	.508	.506
	(.5)	(.5)	(.5)	(.5)	(.5)
< HS	.137	.122	.0364	.0341	.0833
	(.344)	(.328)	(.187)	(.182)	(.276)
HS	.325	.321	.172	.164	.246
	(.468)	(.467)	(.378)	(.371)	(.431)
> HS	.538	.557	.791	.802	.671
	(.499)	(.497)	(.406)	(.399)	(.47)
Male	.528	.529	.477	.477	.502
	(.499)	(.499)	(.499)	(.499)	(.5)
Disabled	.25	.245	.102	.101	.174
	(.433)	(.43)	(.302)	(.301)	(.379)
Observations	2,200,845	1,139,137	2,212,125	1,141,901	6,694,008

Source: American Community Survey.
Notes: $TCJA_g$ is the difference in the 2018 and 2017 effective homeownership subsidy in percentage points relative to home value. The Pre-TCJA period is 2014-2017. The Post-TCJA period is 2018 and 2019. ι_g is the TCJA income effect relative to household income. Second mortgages include second and junior mortgages and HELOCs.

Table 2: TCJA Homeownership Subsidy Shock by Income and Marital Status

	Single			Married		
Income ($)	Min	Mean	Max	Min	Mean	Max
$5,000-$9,999	-0.006	0.004	0.147	-0.018	0.004	0.166
$10,000-$19,999	-0.023	-0.003	0.118	-0.009	0.003	0.104
$20,000-$29,999	-0.130	-0.057	0.025	-0.026	-0.001	0.085
$30,000-$39,999	-0.259	-0.133	-0.052	-0.079	-0.014	0.042
$40,000-$49,999	-0.374	-0.216	-0.079	-0.166	-0.037	0.105
$50,000-$59,999	-0.627	-0.417	-0.205	-0.261	-0.084	0.042
$60,000-$69,999	-0.765	-0.531	-0.264	-0.340	-0.104	-0.028
$70,000-$79,999	-0.963	-0.636	-0.324	-0.418	-0.167	-0.049
$80,000-$89,999	-1.083	-0.713	-0.356	-0.480	-0.221	-0.073
$90,000-$99,999	-1.140	-0.744	-0.354	-0.540	-0.297	-0.102
$100,000-$149,999	-1.311	-0.799	-0.327	-1.395	-0.750	-0.190
$150,000-$199,999	-1.219	-0.683	-0.236	-1.545	-1.043	-0.452
$200,000-$249,999	-0.998	-0.545	-0.159	-1.534	-1.085	-0.799
$250,000-$299,999	-1.271	-0.651	-0.186	-1.400	-1.060	-0.816
$300,000-$349,999	-1.391	-0.737	-0.241	-1.412	-1.055	-0.781
$350,000-$399,999	-1.670	-1.002	-0.362	-1.405	-1.026	-0.639
$400,000-$449,999	-2.311	-1.125	-0.310	-1.428	-0.966	-0.561
$450,0000-$500,000	-2.625	-1.397	-0.441	-1.404	-0.921	-0.525

Notes: This table displays the distribution of the TCJA homeowner subsidy shock by income level and marital status. For incomes above $100,000 averages are shown in $50,000 increments. The homeownership subsidy each year is calculated as the difference in tax liability for a household if they were to be a homeowner compared to a renter divided by the expected home value. Mortgage interest is assumed to be 80% of the home value at a 4% interest rate.

Table 3: TCJA Effect on Homeownership

	(1)	(2)	(3)	(4)
$TCJA_g$ x Post	0.7407***	0.6929***	0.5721***	0.5591**
	(0.1999)	(0.1837)	(0.1760)	(0.2395)
$TCJA_g$	-3.9016*	-3.8888*	-4.5330**	-4.1162**
	(2.0120)	(2.0040)	(1.8861)	(1.7134)
Unemployment Rate		-0.0346	-0.0338	-0.0305
		(0.1165)	(0.1115)	(0.1096)
Ln(Population)		8.1850*	10.2454**	10.5462**
		(4.6176)	(4.7968)	(4.7937)
Kids			-9.0037***	-9.0000***
			(0.6101)	(0.6088)
Number of People			-0.4617**	-0.4626**
			(0.2210)	(0.2204)
Black			-19.8409***	-19.8430***
			(0.6833)	(0.6840)
Other Race			-6.6862***	-6.6760***
			(1.2463)	(1.2427)
HS			0.6311	0.6285
			(0.6493)	(0.6463)
>GTHS			-1.5603**	-1.5608**
			(0.5896)	(0.5872)
Veteran			4.3458***	4.3460***
			(0.4820)	(0.4832)
Male			2.5640***	2.5601***
			(0.1769)	(0.1760)
Disabled			2.7550***	2.7532***
			(0.5243)	(0.5243)
ι_g x Post				0.0094
				(0.1278)
ι_g				1.4617**
				(0.7032)
Constant	42.7602***	-82.5084	-107.3438	-110.8357
	(0.9581)	(70.9503)	(73.6444)	(73.3654)
Year FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
N	6,691,517	6,691,517	6,691,517	6,691,517

* p<0.10, ** p<0.05, *** p<0.010

Source: American Community Survey.

Notes: $TCJA_g$ is the difference between the 2018 and 2017 effective homeownership subsidy, calculated for each state-income group-marital status group g.

Table 4: TCJA Effect on Mortgages

	(1)	(2)	(3)	(4)
$TCJA_g$ x Post	0.8242***	0.7976***	0.8201***	0.6899**
	(0.2230)	(0.2119)	(0.2119)	(0.3092)
$TCJA_g$	-2.8733*	-2.8626*	-2.7075*	-3.0965**
	(1.5572)	(1.5531)	(1.4583)	(1.3876)
Unemployment Rate		0.1435	0.0991	0.1079
		(0.1101)	(0.1033)	(0.1024)
Ln(Population)		4.8121	5.4248	5.8703
		(3.6712)	(3.5316)	(3.5088)
Kids			7.2747***	7.2712***
			(0.9843)	(0.9866)
Number of People			0.8771***	0.8781***
			(0.1551)	(0.1558)
Black			-6.1032***	-6.1010***
			(0.6344)	(0.6334)
Other Race			-3.8266***	-3.8375***
			(0.7725)	(0.7767)
HS			3.0768***	3.0786***
			(0.2953)	(0.2936)
>GTHS			6.6372***	6.6368***
			(0.3855)	(0.3829)
Veteran			-2.6496***	-2.6500***
			(0.3494)	(0.3488)
Male			0.6030***	0.6073***
			(0.1791)	(0.1793)
Disabled			-3.2762***	-3.2744***
			(0.1745)	(0.1748)
ι_g x Post				0.1836
				(0.1553)
ι_g				-1.5983
				(1.1131)
Constant	14.6170***	-60.2151	-71.7431	-79.8259
	(0.6710)	(56.4153)	(54.2537)	(53.8620)
Year FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
N	6,691,517	6,691,517	6,691,517	6,691,517

* p<0.10, ** p<0.05, *** p<0.010

Source: American Community Survey. **Notes:** $TCJA_g$ is the difference between the 2018 and 2017 effective homeownership subsidy, calculated for each state-income group-marital status group g.

Table 5: TCJA Robustness

	$\mu + \psi$		μ	
	τ+ξ	τ	τ+ξ	τ
	(1)	(2)	(3)	(4)
Own	0.5591**	0.5827**	0.6237*	0.6560*
	(0.2395)	(0.2289)	(0.3500)	(0.3433)
Mortgage	0.6899**	0.7445**	0.7056	0.7842
	(0.3092)	(0.3106)	(0.4757)	(0.4982)
Year FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
N	6,6915,170	6,691,5170	6,6915,170	6,691,5170

* p<0.10, ** p<0.05, *** p<0.010

Source: American Community Survey.

Note: This table compares estimates of $TCJA_g$ varying whether it includes both federal (τ) and state (ξ) income taxes or just federal, and whether only the MID μ and property taxes ψ or just the MID is considered. All estimates use the covariate specification from Column(4) in Table 3.

Table 6: TCJA Sensitivity

	Baseline	Mortgage 70%	Interest 5%	ω=0%	ω=10%
	(1)	(2)	(3)	(4)	(5)
Homeownership	0.5591**	0.6015**	0.4934**	0.6475**	0.6361***
	(0.2395)	(0.2530)	(0.2177)	(0.3205)	(0.1758)
Mortgages	0.6899**	0.7249**	0.6415**	0.5898	0.9901***
	(0.3092)	(0.3234)	(0.2843)	(0.4252)	(0.2064)
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
N	6,691,517	6,691,517	6,691,517	6,691,517	6,691,517

* p<0.10, ** p<0.05, *** p<0.010

Source: American Community Survey.

Note: This table tests the sensitivity of the $TCJA_g$ effect on homeownership and mortgages by varying assumptions used to calculate $TCJA_g$. Column (1) corresponds to Column (4) of Table 3. Column (2) assumes a loan-to-value ratio on the mortgage of 70%. Column (3) assumes a mortgage interest of 5%. Column (4) assumes no other deductions. Column (5) assumes other deductions are 10% of household income.

Table 7: TCJA Other Outcomes

	(1)	(2)	(3)	(4)	N
Home Value	0.0420***	0.0303***	0.0226***	0.0148***	4,931,584
	(0.0085)	(0.0056)	(0.0054)	(0.0053)	
Mortgage Payment	-0.0004	-0.0051	-0.0056*	-0.0062**	2,942,116
	(0.0033)	(0.0032)	(0.0030)	(0.0030)	
Second Mortgage	0.0158***	0.0157***	0.0155***	0.0142***	6,691,517
	(0.0015)	(0.0015)	(0.0015)	(0.0019)	
Second Mortgage Payment	-0.0222**	-0.0260**	-0.0271**	-0.0315**	430,321
	(0.0109)	(0.0116)	(0.0116)	(0.0124)	
Rental Payment	-0.0091**	-0.0125***	-0.0103***	-0.0092**	1,759,933
	(0.0044)	(0.0037)	(0.0035)	(0.0038)	
Year FE	Yes	Yes	Yes	Yes	
State FE	Yes	Yes	Yes	Yes	
Controls	No	No	Yes	Yes	

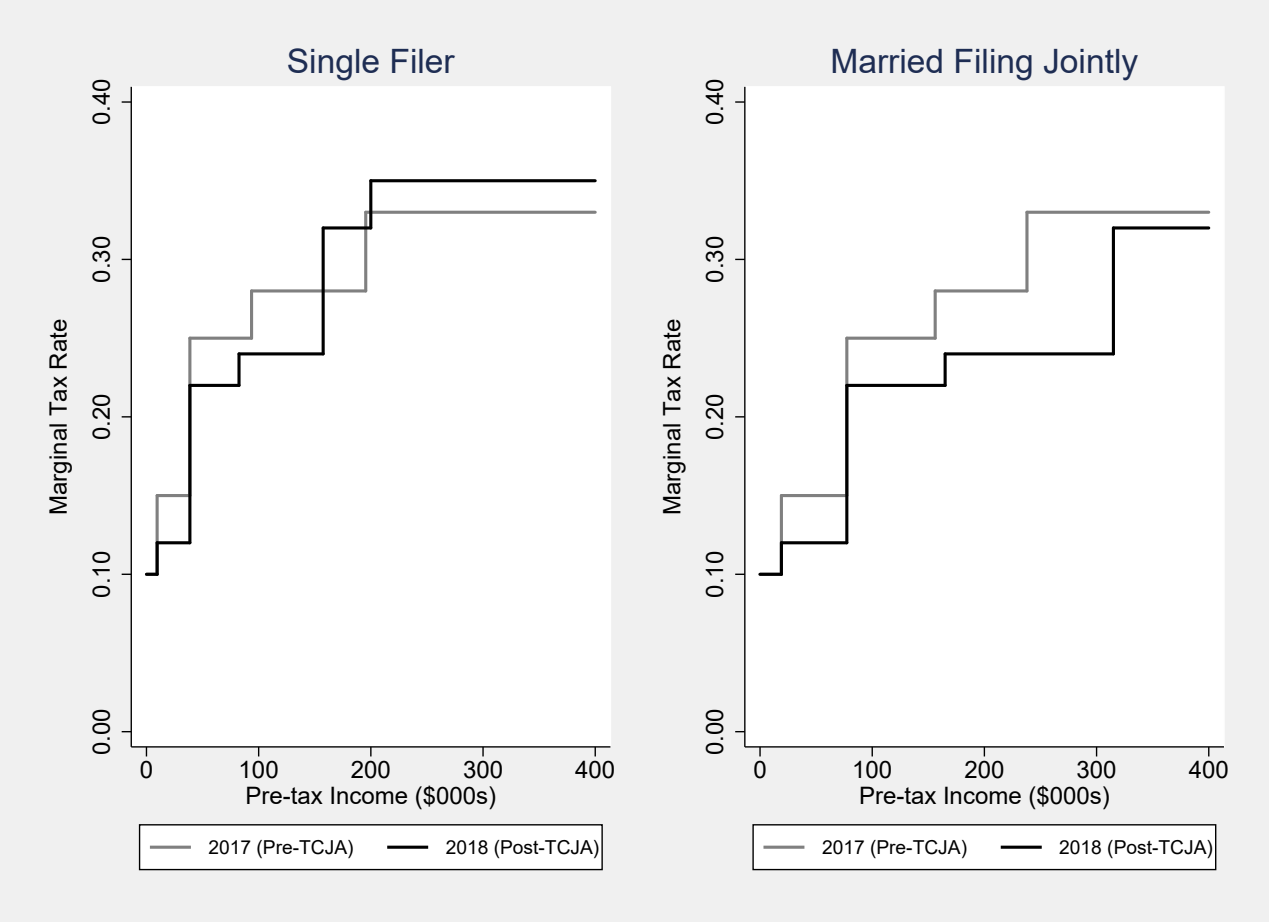
* p<0.10, ** p<0.05, *** p<0.010

Source: American Community Survey.

Note: This table presents coefficient estimates of $TCJA_g$ on log home value, log first mortgage payment, log second mortgage payment, log rental payments, and an indicator for having second mortgage payments. Covariate specifications in Columns (1) through (4) mirror those in Table 3.

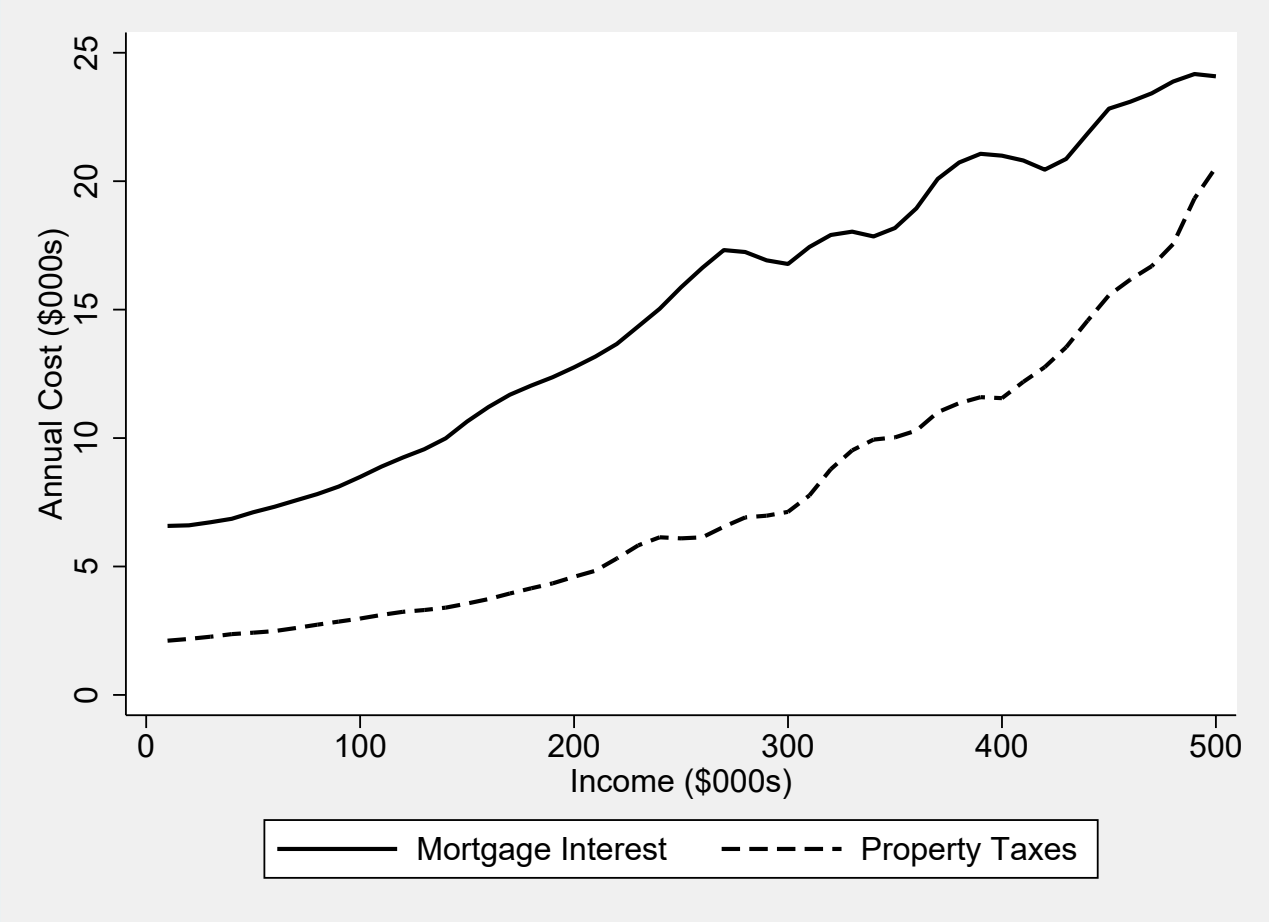
Appendix

Figure A.1: Marginal Income Tax Rates, 2017 and 2018



Notes: This figure displays income tax liability as a function of taxable income, marital status, and filing year.

Figure A.2: Predicted Mortgage Interest and Property Taxes by Income



Source: American Community Survey.
Notes: This figure displays mortgage interest and property taxes estimates based on Equations (1) and (2). Mortgage interest assumes a mortgage balance of 80% of predicted home value and an interest rate of 4%.