DESCRIPTION OF “TCJA AND THE HOUSING MARKET: EVIDENCE FROM HMDA AND THE ACS”

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**Data**

Three data sources are used to cover home purchases and mortgages in the years 2017 and 2018. Because it is not possible to match data at the individual level, data is aggregated up to the Public Use Microdata Area (PUMA) level and matched at that level. Data for the first two sources is in the public domain. Availability of data from the third source will need permission from the owners of the data.

1. For the median value of new mortgages in each year, data from the FFIEC, commonly known as HMDA data, are used.
2. For the median tax subsidy in each year, data from the American Community Survey are used. More information on tax calculations are included at the end of this document. We process the data as follows. Individuals in group quarters are removed. To match HMDA data, within each PUMA we rake the ACS weights to match HMDA totals for income and the categorical variables cohabitation status, race, and ethnicity. Through the raking procedure, the weighted sums of each category equal the corresponding totals in HMDA; for example, the weighted sum of Hispanic households in a given PUMA equals the number of new loans in that PUMA obtained by Hispanic applicants. We supplement these weights with “dummy” observations for HMDA observations that are not observed in the ACS.
3. For home value data we use Zillow. Data for newly purchased homes are aggregated to the PUMA level.

**Hypothesis/Outcomes**

We will measure the effect of the TCJA on mortgages, and then the values of newly purchased homes. The null hypothesis is that the TCJA had no effect on either. The TCJA reduced several tax incentives for mortgages, through provisions including:

A Increased standard deduction   
This reduced the number of taxpayers who itemize their deductions. Those who itemize receive a subsidy for interest paid on mortgages, so the increased standard deduction reduces the number of taxpayers receiving a subsidy.

B Restricted qualifying HELOC deductions  
Interest paid on home equity lines of credit is not deductible for itemizing taxpayers, including interest on pre-existing debt.

C Lowered the limit on size of qualifying mortgage from $1 million to $750,000

D Decreased marginal tax rates  
Itemizing taxpayers receive smaller tax reductions from itemizing when tax rates are reduced. The TCJA reduced tax rates for most taxpayers.

E Capped state and local tax deduction at $10,000  
Itemizing taxpayers can deduct state and local taxes, including property taxes, from taxable income. Some argue that this provides an incentive for state and local governments to maintain high tax levels, knowing that some share is effectively paid by the federal government. The $10,000 cap, along with the increased standard deduction, reduces the number of taxpayers that itemize deductions. The capped taxes include property taxes, so that more taxpayers with expensive homes are more likely to lose more tax subsidies than those with less expensive homes.

At least two types of regressions each are planned for mortgages and home values. In all three, regressions of log mortgages will be supplemented by regressions with increasing numbers of control variables, such as affordability indexes and imputed interest rates.

In the first set of regressions, the change in median new mortgages is estimated as a function of the change in median tax subsidy for 2,270 PUMAs. The parameter of interest is the coefficient on the tax subsidy rate in a linear regression (pooled and fixed effects) of mortgage size on tax subsidies and sequentially added control variables.   
  
In the second, a simple difference-in-difference estimate of the effect of the TCJA compares the change in mortgages for PUMAs in which the median home purchaser itemized in 2017 and used the standard deduction in 2018 to the change in mortgages in PUMAs in which the median taxpayer did not change status.   
  
In addition, we may estimate the difference in the effects of the TCJA by comparing the coefficients of tax subsidies for the PUMAs in which the median taxpayer switched itemization status with those from PUMAs in which the median taxpayer did not switch or in which there was no predominate itemization status.

**Sample Size and Statistical Power**

To establish the sample size necessary to detect a meaningful effect, we used the power command in Stata with the oneslope option. Using a power of 0.8 and an alpha of 0.05, we found that to estimate an elasticity of -0.2 requires a sample size of 26, which is substantially below our sample size of 2,270.

**Intervention/Policy**

The intervention being examined is the Tax Cuts and Jobs Act. The controls and comparisons are described in the Hypothesis/Outcomes section.

**Design/Analysis Considerations**

All three regressions rely on the assumption that the trends in mortgages and home prices do not vary with the tax subsidy. We have verified that the ‘pre-trends’, which are the trends before the intervention for mortgages in PUMAs with median taxpayers switching itemization status, are the same as the pre-trends for PUMAs in which the median taxpayer continued to itemize, PUMAs in which the median taxpayer continued to use the standard deduction, and PUMAs in which there is no dominant itemization decision. We also verified that the pre-trends are similar across deciles of mortgage subsidy rate in the pre-treatment period.

We also assume that the change in tax subsidy for mortgage interest did not induce taxpayers to move to a new state, and that taxpayers in 2017 did not adjust their incomes or home purchases in anticipation of the TCJA.

**Tax Calculation**

To simulate the effect of the TCJA on tax subsidies to homeownership, we run our weighted ACS sample through TAXSIM four times: with and without a mortgage under pre-TCJA law, and with and without a mortgage under the TCJA. To avoid possibility endogeneity, we use 2017 values all four times. In other words, we use 2017 tax law on 2017 income and expenditure values and then apply 2018 tax law to 2017 income and expenditure values.

To calculate taxes only for the primary family in each household, we drop all individuals that are not heads of household, spouses, unmarried partners, or children. We use this information to determine marital status, spouse age/wage, and dependents for each taxpaying unit, but ultimately only estimate taxes for heads of household and unmarried partners—each of which is representative of a tax unit. Each TAXSIM variable is calculated as follows, with ACS variables denoted in all-caps:

Taxsim Variables: <https://users.nber.org/~taxsim/taxsim27/>

1. **taxsimid: case ID**

Assigned using random sequence.

1. **year**

Set as 2017 for pre-TCJA runs and 2018 for TCJA runs.

1. **State**

Recode STATEFIP to corresponding state SOI code: <https://users.nber.org/~taxsim/statesoi.html>

1. **mstat: marital status (1 = single or HOH, 2 = joint, 6 = married filing separately, 8 = dependent)**

Code as 2 if a spouse is present in the household (RELATE = 2); otherwise, code as 1.

1. **page: age of primary taxpayer**

For heads of household (RELATE = 1) and unmarried partners (RELATED = 1114), code as AGE.

1. **sage: age of spouse**

Code as AGE of spouse if one is present in household; otherwise, code as 0.

1. **depx: number of dependents**

Dependents are defined as children (RELATE = 3) under 19 (AGE < 19) or children under 24 who are enrolled in school (SCHOOL = 2). For households headed by unmarried partners, dependents are assigned to the primary earner.

For married and non-cohabitating heads of household, depx is coded as the number of dependents. For cohabitating heads of household and unmarried partners, depx is coded as the number of dependents if individual is the primary earner in the household (as measured by INCTOT[[1]](#footnote-1)); otherwise, depx is coded as 0.

1. **dep13: number of children under 13 with eligible child care expenses**

See depx. It doesn’t matter if these children have eligible child care expenses because we set such expenses to zero (see childcare).

1. **dep17: number of children under 17**

See depx.

1. **dep18: number of qualifying children for EITC**

Equal to depx (we assume all dependents are citizens and otherwise EITC eligible).

1. **pwages: wage and salary income of primary taxpayer**

For heads of household and unmarried partners, code as INCEARN1.

1. **swages: wage and salary income of spouse**

Code as INCEARN1 of spouse if one is present; otherwise, code as 0.

1. **Dividends**

Set to zero.

1. **intrec: interest received**

If unmarried, code as INCINVST1. If married, code as sum of INCINVST1 and spouse’s INCINVST1.

1. **stcg: short term capital gains or losses**

Set to zero.

1. **ltcg: long term capital gains or losses**

Set to zero.

1. **otherprop: other property income subject to NIIT**

If unmarried, code as INCOTHER1. If married, code as sum of INCOTHER1 and spouse’s INCOTHER1.

1. **nonprop: other non-property income not subject to Medicare NIIT**

Set to zero.

1. **pensions**

If unmarried, code as INCRETIR1. If married, code as sum of INCRETIR1 and spouse’s INCRETIR1.

1. **gssi: gross Social Security benefits**

If unmarried, code as INCSS1. If married, code as sum of INCSS1 and spouse’s INCSS1.

1. **ui: unemployment compensation received**

Set to zero.

1. **transfers**

If unmarried, code as INCWELFR1 + INCSUPP1. If married, code as sum of INCWELFR1 and INCSUPP1 of both spouses.

1. **rentpaid**

Set to zero.

1. **proptax**

Annual property taxes are calculated using the median value of PROPTX99 in each PUMA. For unmarried couples, property taxes are distributed according to the income share of each partner. For TCJA runs, property taxes are adjusted for inflation using the CPI. For runs when there is no mortgage, proptax is set to zero.

1. **otheritem: other itemized deductions that are AMT preference items**

Set to zero.

1. **childcare**

Set to zero.

1. **mortgage: deductions not included in otheritem and not AMT preference items**

This variable has two components: a) charitable contributions, and b) home mortgage interest.

1. Charitable contributions are imputed from the Survey of Consumer Finances (SCF) using contributions per income by marital status for various income groups.
2. Home mortgage interest is imputed using HMDA and is only included in runs with a mortgage.   
   Loans are imputed as the median mortgage-to-income ratio in the PUMA multiplied by the total income of both spouses/unmarried partners. In the TCJA run with a mortgage, this loan amount is capped at $750,000. A monthly loan payment is then calculated from this loan assuming a 30-year fixed-rate loan with an interest rate that is imputed from the 2018 HMDA dataset. The monthly loan payment is multiplied by 12 to get an annual payment amount, and 70% of this is assumed to be interest. Among unmarried partners, mortgage interest is distributed according to the income share of each partner.

1. Adjusted to calendar year using ADJUST and adjusted for inflation using average wage index increases for TCJA runs. [↑](#footnote-ref-1)