Match renter households in ASEC by state and county (where possible) to similar households in the ACS (same matching variables as we used for owners) and impute an estimate of rent paid to each ASEC renter household.

Use the Zillow price rent ratios by state to estimate home values for each ASEC renter given their estimated rent paid

At the state and county level (where possible) estimate the property tax rate paid given the ASEC household income level

We estimate property tax rates using our imputed estimates for home values and property taxes for homeowners

For each homeowner we have an individual property tax rate defined as property taxes divided by home value

We fit a function to these property tax rates at the state (and county) level as

$$\tau_i(y) = \alpha_{0,i} + \alpha_{1,i} \log(y) + \alpha_{2,i} \log(y)^2$$

where i denotes state and county. We run this regression at the inidividual household level

Then when we have estimated the coefficients we impute property taxes for household j in ASEC as

$$prop\_tax_{j,i} = \left(\alpha_{0,i} + \alpha_{1,i} \log(y_j) + \alpha_{2,i} \log(y_j)^2\right) \hat{p}_j$$

Then the last step was to make a scatterplot where we plot property taxes against log household income for both homeowners and renters in the same state, with the homeowner dots in blue and the renter dots in red

Questions? Are Zillow ratios available at the county level?