Did the 2017 Tax Cuts and Jobs Act Negatively Impact the U.S. Housing Market in Cities with High State and Local Taxes?

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Abstract

The 2017 Tax Cuts and Jobs Act (TCJA) has dramatically reduced the number of households who itemized deductions on their federal income taxes and it has therefore altered the incentive to own a house. U.S. housing market data for 50 cities ending in December 2018 show a slowing of home price appreciation (HPA), relative to the year prior, despite a stronger economy. Using a vector error correction framework and a unique dataset matching federal, state and local tax rates to HPA by city, I show that the reduced deductibility of state and local tax rates lowered HPA by 45 bps in 2018 for high-tier homes. However, once the gains from lower federal tax rates in each city are included, TCJA had only a minor impact on HPA. Further, I find, against conventional wisdom, TCJA's impact on HPA was less pronounced in metro areas known to have high SALT deductions due to high state income tax rates. The overriding factors determining a TCJA-related HPA slowdown in 2018 were high property tax rates and the reduced value of itemizing.

Key words: home price appreciation, TCJA, property tax rates, federal income tax rates
Economic Literature Codes: R11, R31 and R21

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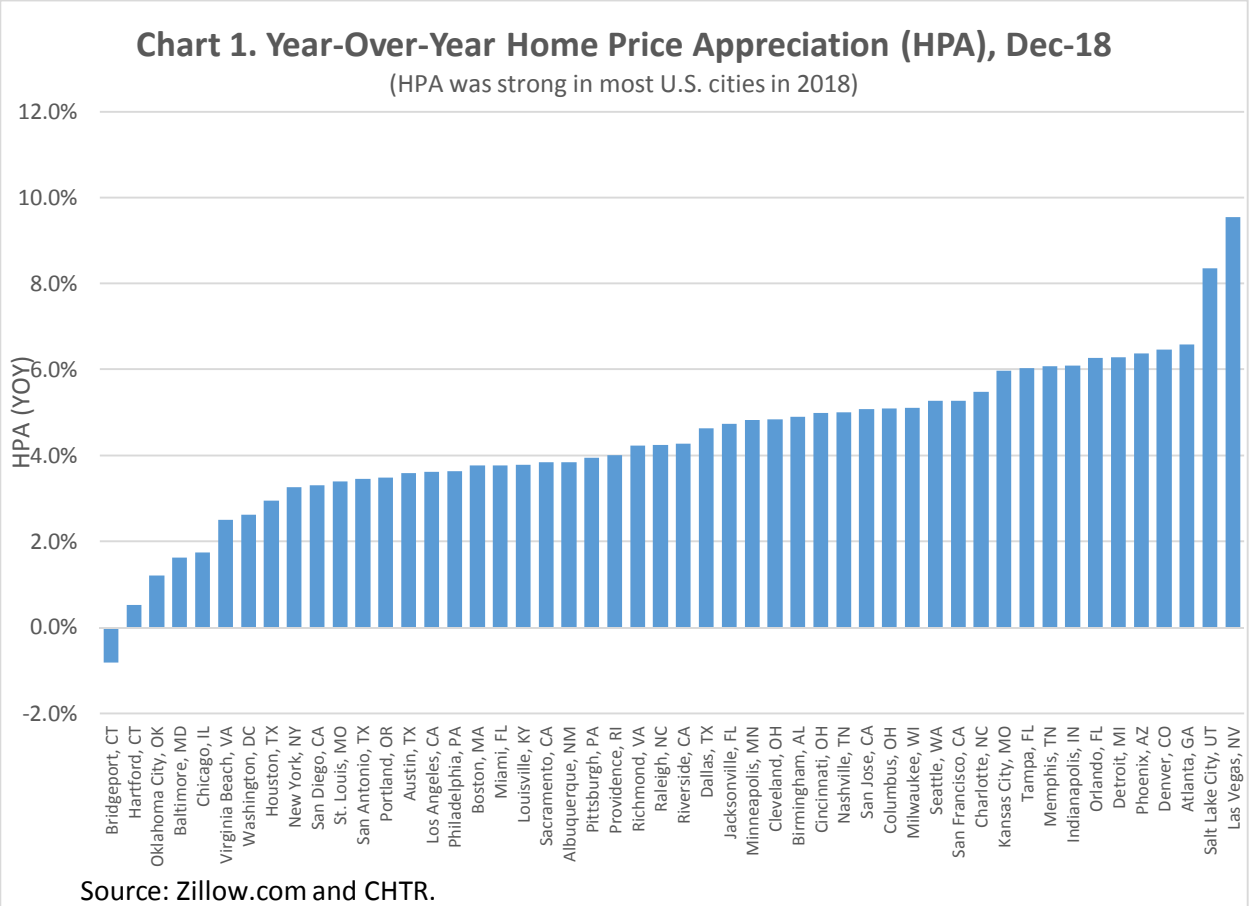
1. Introduction

Home price growth in the U.S. has been consistently high for the past several years. Chart 1 below shows the one year home price appreciation (HPA), ending in Dec-18, for 50 Core Based Statistical Areas (CBSAs, or cities) for high-tier homes using data from Zillow.com. The mean growth for the period Dec-17 to Dec-18 was an impressive 4.4 percent.

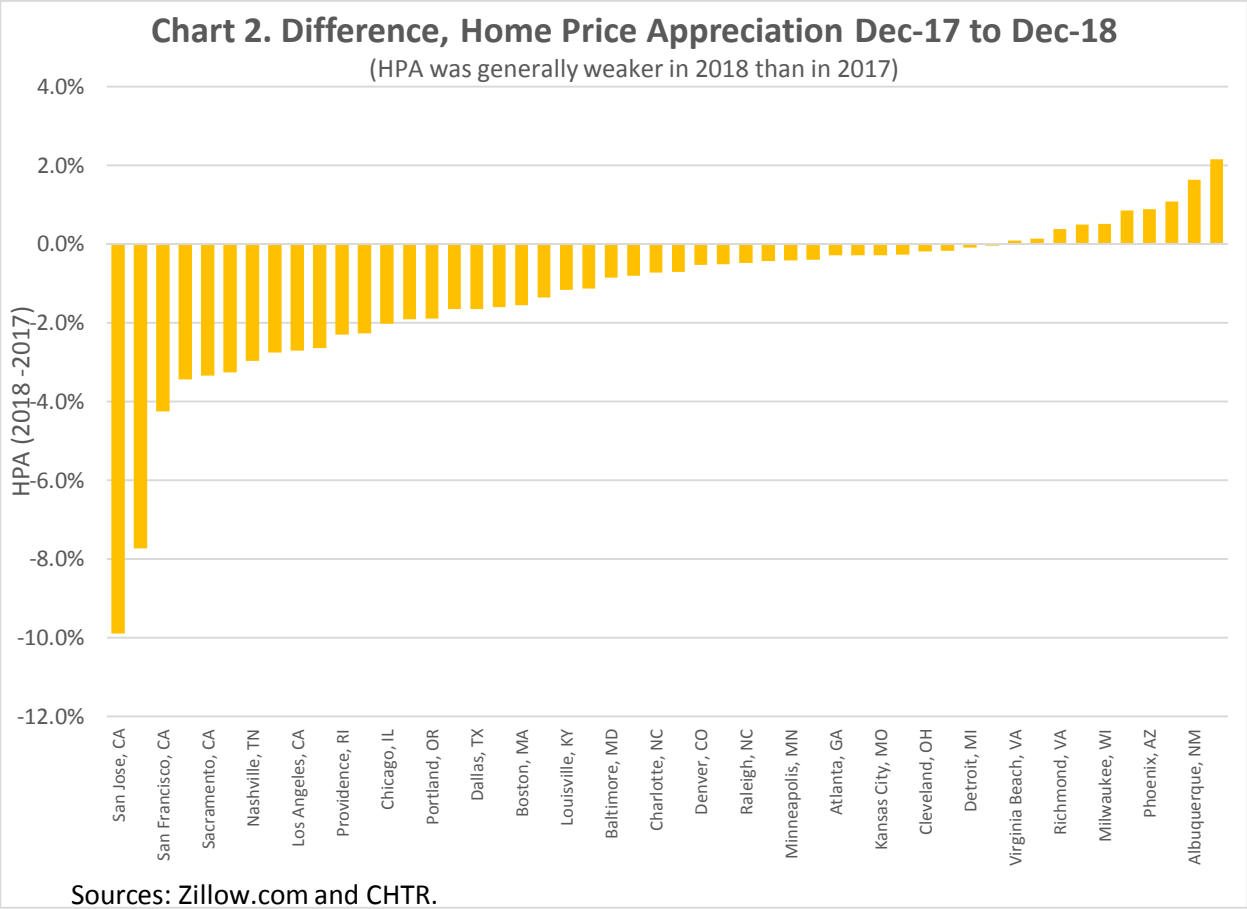


Despite the strong growth in high-tier home prices from Dec-17 to Dec-18 as shown in Chart 1, a comparison to the one-year HPA of 5.6 percent for a similar length of time from Dec-16 to Dec-17 (prior to the passage of the 2017 Tax Cuts And Jobs Act) yields a different conclusion. Chart 2 below, shows the difference between the one-year home price growth rates from pre-TCJA to post-TCJA.[1]

This slower HPA growth was true despite the fact that when Congress passed the Tax Cuts and Jobs Act in Dec-17, it injected billions of dollars into the hands of consumers. U.S. GDP grew from 2.22 percent in 2017 to 2.9 percent in 2018. Simultaneously, however, TCJA reduced the value of deducting state and local taxes and mortgage payments ð the standard deduction became more cost advantageous than itemizing separate deductions for computing oneôs federal taxes.

[1] TCJA was passed on Dec-17. By Post-TCJA I mean the 12 months after passage.

Furthermore, earlier home price growth in 2016 and 2017 had made many CBSAs unaffordable even as the 30-year mortgage rate rose by about 70 bps in the 12 months of the early post-TCJA period. These three events worked to dampen HPA in 2018. This paper attempts to parse out the causes of slower HPA in 2018 due to falling affordability, rising mortgage rates and the reduced benefit of itemizing. Additionally, after controlling for the major forces impacting HPA in 2018, I test to see if TCJA adversely impacted HPA in cities with high state and local taxes (SALT) more than those with low tax rates.



2. Background

In December 2017, Congress passed the 2017 Tax Cut and Jobs Act. This federal tax law limits the home mortgage interest deduction (MID) on the first $750,000 of mortgage debt (reduced from the pre-TCJA limit of $1 million of mortgage debt) for mortgage loans taken out after December 15, 2017. In addition, homeowners may no longer deduct interest paid on home equity loans, unless the debt is used to buy, build, or substantially improve the taxpayerôs home that secures the loan. Homeowners still may deduct mortgage interest on both their primary residence and a second home, as long as the second home is not rented out during the tax year. Taxpayers also can still deduct state and local real estate, personal property, and either income or sales taxes, but TCJA capped the total state and local tax (SALT) deduction at $10,000.

Since TCJA severely reduces the SALT and MID deductions, these changes to the federal tax law have markedly raised the average effective tax rate paid by citizens in states with high personal income tax rates, like New York, Connecticut, Maryland and Washington DC vis-à-vis other states. Also the MID cap makes high-tier homes more expensive vis-à-vis lower priced homes that do not exceed the MID cap, particularly so in high tax rate states. It thus has reduced demand for high-tier homes and dampened home price growth.[2]

One might think that TCJA only impacted the high-tier home market. However, the TCJA tax law raised the standard deduction to $24,000 for married couples lowering the overall federal tax bill for many U.S. households in 2018. This, in itself, lowered costs for many homeowners. However, to take advantage of the SALT and MID deductions, a tax filer has to itemize deductions. Since the tax reform also increased the standard deduction substantially, the combined impact of these two tax law changes reduced the incentive to itemize after Dec-17. Hence capping the SALT and MID deductions reduces the tax benefits of owning even a low-tier house. This motivated many individuals, even those with lower priced homes to no longer deduct their mortgage payment and instead take the standard deduction. A higher cost of owning a home in the midst of a lower overall tax bill is still a motivation to alter housing consumption. Because the mortgage payments often last for 30 years, the substitution effect is likely to outweigh the income effect and many potential homebuyers of even low-tier homes, chose an even smaller home or looked for a cheaper place to live, because they no longer chose to take the MID deduction.

Other than high property prices and taxes, individuals leave a city for a variety of reasons, including crime, weather, family, and better economic opportunities. However, TCJA provides a particularly strong incentive to flee less favorable tax burdens. These two changes (to the MID and SALT deductions) made homes less attractive to new homebuyers and caused some taxpayers to leave the high-tax states. Both of these forces show up as a lower demand for homes and might have caused home price appreciation to slow or even decline.

To think about the impact of local tax rates on single family home price growth, I follow the approach developed by Poterba (1984) that develops housing in terms of a user cost of capital. The user cost of capital (UCK) is normally written as

$$= P\,([k + \tau_p + m - E(\cdot)] - [(k + \tau_p) * \tau_f]) \qquad (1)$$

Where P is the home price; k is the mortgage rate; τ_p is the property tax rate, a tax payment relative to house price; m is the maintenance cost, $E(\cdot)$ is the expected home price appreciation and τ_f is the federal tax rate. Even though Equation 1 generally does not include the values of the deduction of the state income taxes in the consideration of home buying process, he would surely include the values of the deduction for state and local income tax payments in his decision to stay or leave a particular region, implicitly changing the cost of his home. Thus I additionally write the cost of housing as,

[2] For a complete list of the changes TCJA made to the tax landscape see Gale, et al. (2018).

$$= P\left([k + \text{Ű}_{\wp} + m \text{ï } E(\acute{})] \text{ï } [Y^*(\dot{I}_s + \dot{I}_p) + k * P)] * \dot{I}_f\right) \quad (2)$$

The value of the SALT and MID deductions prior to Dec-17 are in the second bracketed term. The variable Y is income; $\dot{I}_f$ is the federal tax rate, payment relative to income; T_s is the combined state and local income tax burden, payment relative to income, $\dot{I}_p$ is the property tax ñburdenò, property tax payment relative to income. The value of the SALT deduction is captured by $[Y^*(\dot{I}_s + \dot{I}_p)^*\dot{I}_f$. The value of the MID is captured by $[(k*P)] * \dot{I}_f$. I assume that homebuyers use a 100 percent LTV mortgage to buy the home. This circumvents the issue of opportunity cost of the down payment. The combined value of the SALT and MID historically have partially offset the property tax rate. Removing the second bracketed term from the home buying decision raises the cost of home ownership.

Since homeowners also have the option to take the standard deduction equal to $24,000 for joint filers, they will only itemize when,

$$\text{Max } ([Y^*(\dot{I}_s + \dot{I}_p), \$10{,}000] + k * P) > \$24{,}000. \quad (3)$$

As an example, in 2018 the value of the SALT deductions to the average taxpayer making $75k to $100k in New York, NY was about $1,700. Assuming that this taxpaying household owned, or was thinking about buying a low-tier home in the CBSA ($300k), they could look forward to deducting a further $1,800 deduction (MID) from their federal taxes prior to TCJA passage. The combined SALT and MID in Dec-17 was thus about $3,500. Taking this into 2018, the household had a choice between taking the standard deduction at $24,000 or the itemized deduction at $3,500. The value of itemizing, in 2018 became worthless to the potential buyer of a low-tier home leading to a substitution towards lower priced homes.

Moving to those households making more than $200k, the economics change, but not by much. First we have to recognize the cap put on the SALT deduction at $10,000. If we assume that the $200k taxpayer buys the median high-tier home ($800k, just near the $750k MID cap), that household could deduct about $9,800 (MID). The capped SALT deduction combined with the MID for the average high-income taxpayer would be about $20,000, or almost equal to the standard deduction. Again, the value of itemizing for the average homebuyer falls to zero.[3] In both cases, except in the most expensive cities, the UCK in 2018 jumped to the mortgage rate plus the property tax rate because the value of itemizing was lower than taking the standard deduction. The new home buyer in 2018 had the cost effective option to take the standard deduction. There is nothing to deduct and they might now be better off renting. TCJA raised the 2018 UCK in New York City over what it was in 2017 by about 172 bps for high-tier homes.

Following this line of reasoning, ceteris paribus, home price growth in the post-TCJA period should be hindered in areas with high income and property taxes more than in the pre-TCJA period since it raised the opportunity cost of itemizing. This report is concerned with how TCJAôs passage influenced the decision to buy a home in 50 major CBSAs from Dec-17 to Dec-18. This paper, along with the recent paper by Li and Yu (2020), are the first to directly assess the long-term

[3] The wealthy household might have other deductions that make itemizing worthwhile.

impact of the 2017 TCJA tax change on local property market values. This paper is the first paper to explicitly incorporate federal, state and local tax rate information by income levels from the IRS and matching it to price tier levels for 50 CBSAs into a short-term home price model. The contribution is that it debunks the theory that TCJA hinders HPA in Northeast cities which have high income tax rates and favors Southern cities which have low or no income tax rates. Results show that it is the property tax rate that matters.

It should be mentioned that TCJA changed not only the value of the SALT and MID deduction, but nearly 40 other tax rules including lowering federal income tax rates. It also altered state and local tax collection. It pumped billions of dollars into each CBSAôs economy. There are many confounding factors when we try to understand the impact of TCJA on HPA. To think ceteris paribus, I try to account for the local economy and change to federal tax rates.

The paper is organized into four additional sections: Section 3 reviews the academic research on the impact of tax rate increases on home prices (when does a tax rate increase represent an exogenous shock) and the construction of error correction models. Section 4 discusses the data and my approach to matching tax data from the IRS to home price data from Zillow by CBSA. Section 5 presents the model and the results. In Section 6, I present my conclusions and offer some inferences about the housing market going forward.

3. Prior research on the impact of taxes on housing

Original research on a topic often independently arises from several different sources. In early 2020, Li and Yu concluded an assessment of the impact of TCJA on home price growth using county level data (Li and Yu, 2020).[4] Their paper uses a difference-in-difference (DD) approach to look at how TCJA impacted low-property tax burdened (PTB) counties (the counterfactual) versus high-PTB counties (the treatment group). The DD identifying assumption rests on parallel trends in the outcome in the pre-period, which suggests that the trend in the outcome among the unexposed in the post-TCJA periods provides a good counterfactual for what would have happened to the exposed group in the absence of exposure. This allows for a comparison between two groups before and after. This approach can help to minimize unobserved heterogeneity due to fixed-effect confounders. [5]

This paper takes a different approach and asks slightly different questions.

Many earlier studies of housing using a variety of methodologies and covering many time periods, countries and cities have found evidence of serial correlation and mean reversion. These characteristics are a pervasive and ubiquitous feature of housing. See Abraham and Hendershot

[4] Peach and McQuillan (2019) and Gilbukh et al. (2019) find evidence that changes to the federal tax laws enacted in Dec-17 contributed to a slowdown in housing sales.

[5] I believe that the parallel trends assumption is too strong to apply here and would take us in the wrong direction. In order for the DD technique to work I must assume that the omitted variables impact the treatment and the control group equally. Additionally establishing a cut-point is arbitrary and TCJA passage is not the only thing that changed in that one year period of 2018 as mortgage rates went up by 70 bps.

(1996), and Capozza, Hendershott and Mack (2004), and Fout, Haidorfer and LaCour-Little (2017). Underlying the concept of mean reversion is the basic notion that in the long-run, markets tend towards equilibrium. It is reasonable to assume that in each time period t, and in each CBSA, that there is a long-run equilibrium value for the unit price of a house that that it is determined by economic conditions, or $P_{it}^* = p(\mathbf{X_{it}})$, where P_{it}^* is the equilibrium price of a house and $\mathbf{X_{it}}$ is a vector of exogenous explanatory variables. This relationship can be viewed as a reduced form arising from a supply-and-demand relationship. Thus an equilibrium relationship exists between P* and **X,** and the values of P* can be thought of arising from fundamentals. If P is below P* then P must adjust upward (mean revert). I estimate the long-run relationship for 50 CBSAs over the time period from Jan-11 to Dec-18 and then use the error term as part of a second, or short-term model. This is the standard vector error correction model approach (VECM). In the short term model, I parse out the many forces impacting HPA and ask what the impact of TCJA on HPA was.

Tax rate changes can be exogenous or endogenous to the market and market forces. Romer and Romer (2010) make the case that tax shocks driven by spending changes or ñcountercyclicalò tax cuts in response to concerns of a likely downturn are potentially endogenous. State officials may be trying to raise anemic employment by lowering corporate tax rates, but employment continues to fall sending incorrect signals about the efficacy of lower tax rates. On the other hand, exogenous tax changes are not motivated by the desire to temporarily return output to normal, but rather to reduce the federal deficit or to raise the long-run growth rate of potential output. As Kumar (2019) emphasizes ñEstimates would be credible only if the TCJA were an exogenous tax change, i.e. if it was uncorrelated with factors affecting current economic activity and using the criteria outlined in Romer and Romer (2010), TCJA tentatively fits the definition of an exogenous tax change.ò I follow this train of thought.

This paper also asks: Did TCJA impact the low-tier housing market differently than the high-tier housing market? Households in the lower-tier segment appear to have functioned differently from their high-tier counterparts. Only at the end, do I focus on high-property-tax-rate CBSAs (high-PTR) versus low-PTR (Similar to Li and Yu (2020)). Here, I find that HPA in the cities with high property tax rates did perform slightly worse than those with low property tax rates (similar to Li and Yu (2020)), but my results suggest TCJAôs impact is more muted.

4. Data

4.a Home prices

Zillow.com provides data on low- and high-tier homes for many cities in the country. The data in Table A1 in the appendix shows listed one year percentage changes in price appreciation in 50 CBSAs for high-tier properties as of Dec-18 (HPA).

4.b Payroll employment

The payroll measure is the two year change in the payroll growth rate (EMP). Data is from the BLS.

4.c. CBSA property tax rates and federal income tax rates

The IRS reports income and tax data for eight income cohorts, by county, every year up to 2018. The highest income cohort available from this dataset is for incomes greater than $200k. I match this data to Zillow.com property prices for high-tier homes. The IRS also reports data on individuals earning $75k to $100k. I match this data by CBSA to data for low-tier home purchases. Thus the data on taxes, income, population and property prices are matched for two distinct cohorts i.e., high-income to high-tier and low-income to low-tier. The number of observations for each cohort for the 50 CBSAs for the long-term model (Jan-11 to Dec-18) is 4,800.

The IRS reports the average property tax rate paid each year. I divide the IRS data on average property taxes paid by the median price of the home each month to get a property tax rate (PTR) each month. The IRA also reports yearly taxable income and all of federal taxes paid by households in each county. Aggregating by county to get to a CBSA federal tax amount, and then dividing by the IRS reported income for those counties, I get an average federal tax rate (FTR) by CBSA. The monthly numbers are thus identical values in a given year. The IRS data is only for those who itemize. Tax data on those taking the standard deduction are thus not included. I use the same approach for the $75k to $100k cohort.

4.d Population

The IRS reports the number of households each year for both cohorts (POP).

4.e Affordability index

Home purchases are also impacted by the affordability of the geography. I calculate an affordability index for each CBSA. I use the median listed home prices from Zillow times 80 percent. This considers that the homebuyer puts 20 percent down. I assume that the homebuyer should allocate 25 percent of his income (from BLS) to the home payment. Values greater than 1.0 indicate the housing market is affordable. The affordability index is lagged one year to reduce endogeneity (L12AFI).

4.f Annual average high temperature.

CBSA data on temperature is from the National Climatic Data Center. NOAA's 1981-2010 Climate Normals. It is the average high temperature for the year (temp).

4.g User cost of capital.

The user cost of capital is calculated as in Equation 1 (UCK). The value of the SALT and the MID are set at zero for both the low- and high-tier homes except in the case of San Francisco, CA and San Jose, CA.

4.h Mortgage rate.

The mortgage rate information is from Freddie Macôs monthly survey. It is the rate on 30-year mortgages and it includes points (FRM).

5. Model, results and implications

5.a Model

I first construct a separate database for low-tier homes and also high-tier homes. I then estimate a long-term model of home prices (in levels) on the counts of population and employment using a fixed-effect model to eliminate CBSA fixed effects. Let,

$$\ln P_{it} = \text{const} + \breve{U}_1 * \ln EMP_{it} + \breve{U}_2 * \ln POP_{it} + \varepsilon_{it} \quad (4)$$

Where:

- $\ln P_{it}$ = median price of homes (low-tier and high-tier) in two separate samples,
- $\ln EMP_{it}$ is the payroll number for $CBSA_i$ in month t from the BLS,
- $\ln POP_{it}$ is the number of tax paying households, from the IRS,
- ε_{it} is the error term, to be used as the error correction tem (ECT) in the next step,
  For i = 1,é ,50 CBSAs and t = Jan-11 to Dec-18 yielding 4,200 monthly observations for each of the two separate samples after accounting for lagged values.

Home prices (P) often overshoot their equilibrium value (P*). Thus the error term (ε_{it}) is a measure of a market being over/undervalued. It is an error correction term. We want to include this long-term force into a model which measures short-run changes to home prices. Using the ECT information from Equation 4, a second (the short-term) model is specified as Equations 5 and 6. Home prices have been shown to be characterized by strong autocorrelation. The variable L3HPA is the same as the dependent variable ï the percentage change in the price -- but lagged by three months. The exclusion of a lagged dependent variable and the error correction term would ignore these major forces that operate in housing markets. The two short-term models are specified as,

$$HPA_{it} = \text{const} + \beta_1 * L3HPA_{it} + \beta_2 * L6\varepsilon_{it} + \beta_3 * L3FRM_{it} + \beta_4 * PTR_{it} + \beta_5 * \mathbf{X}_{it} + \mu_{it} \quad (5)$$

$$HPA_{it} = \text{const} + \partial_1 * L3HPA_{it} + \partial_2 * L6\varepsilon_{it} + \partial_3 * L6UCK_{it} + \partial_4 * L3UCKchg_{it} + \partial_5 * L6FTRchg_{it} + \partial_6 * \mathbf{X}_{it} + \mu_{it} \quad (6)$$

Where:

- HPA_{it} is the one year percentage change in home prices for low-tier and high-tier, or $\varphi \ln P_{it}$
- ε_{it} is the error term from Equation 4. The value of the coefficients should be negative.
- FRM_{it} is the 30 year FRM,
- PTR_{it} is the property tax rate for $CBSA_i$,
- UCK_{it} is the user cost of capital as defined in Equation 1,
- $UCKchg_{it}$ is the one year change in UCK,
- $FTRchg_{it}$ is the one year change in the average federal income tax rate.

Values included in **X** are

- $\ln EMPpchg_{it}$ is the two year percentage change in payroll growth for $CBSA_i$ from the BLS,
- $AFIchg_{it}$ is the one year change in lagged affordability index for $CBSA_i$,
- temp is the average high temperature for $CBSA_i$,
  For i = 1,é ,50 CBSAs and t = Jan-12 to Dec-18 of 4,200 monthly observations for each of the two separate samples.

I also include the 30-year mortgage rate and the property tax rate in Equation 5 along with three other city specific variables captured by the variable $\mathbf{X_{it}}$ (the one-year payroll growth rate, the 12 month lagged affordability index and the weather)**.** In Equation 5, I explicitly include the property tax rate (PTR) and the one-year employment growth (EMP). I attempt to understand the tradeoff between the positive income earning potential (captured by employment) and the negative income potential (the impact of taxes). I have also included the change in affordability from the year prior. A lack of affordability discourages home buyers and dampens home price growth. Equations 5 and 6 are first difference models. The inclusion of the change in payroll employment and the change in affordability means we are measuring each city against itself. It eliminates the city-specific fixed effects. This allows for estimation by OLS.

Equation 5 does not actually address the issue of the impact of TCJA on HPA in the year 2018. Thus I combine the property tax rate and the mortgage rate to get a user cost of capital (UCK) as specified in Equation 1. I include both the level and the change in Equation 5. As argued above, the value of the SALT and the MID for the average homebuyer of a low-cost home fell to zero in all cities and also fell to zero for the average high-tier borrower in all except San Francisco and San Jose where the median home price in 2018 exceeded the $750,000 cap. The absence of a federal tax deduction during 2018 raises the UCK. A higher UCK should slow HPA. The calculation of this impact is the primary goal of this paper recognizing that as many other potential confounders need to take account of.[6]

The IRS data does not allow for the calculation of the average state income tax burden for 2018.[7] However, the IRS data does permit calculation of the changes in the average federal income tax burden. By TCJAôs design, the many changes to the tax rules caused the average payment of federal taxes to decline for most taxpayers. A decline in the federal tax rate increases after tax income and should be a positive force on home price growth. In Equation 6, I include the change in the average federal income tax rate. My model thus has an explicit measure for two of TCJAôs countervailing impacts on HPA.

5.b Results

There are four sets of results. Table 1 shows all of the explanatory variables as significant and having the correct sign. We see that correlation and mean reversion are present in all four models. The value for the error correction term (ε_{it}, ECT) in all four cases are significant, negative and less than one.

In columns 1 and 3, higher mortgage rates (FRM) and property tax rates (PTR) are significant and negative (from Equation 5). The lagged affordability change (L12AFIchg) and growth in payroll

[6] TCJA might have lowered an individualôs overall federal and state tax bill when that individual chose the standard deduction.

[7] The variable of state income tax rates could not be included in the regression, since TCJA altered the data the IRS receives from each taxpayer. Including the 2017 average state income tax burden as a proxy for the actual 2018 IRS state average tax burden provided no additional significant results.

(EMPpchg) positively impact HPA. It is not surprising that CBSAs with higher property tax rates (PTR) have slower home price growth.

Columns 2 and 4 provide more information. The results for the two home price tiers are roughly equivalent for the economic forces, but they have different responses to TCJA. The impact of the change in the UCK is 0.256 versus 0.698, for the high- and low-tier, respectively and the change in the average federal income tax paid (0.102 versus 0.480). It is clear at this point that TCJA impacted each CBSAs differently and impacted the two price tiers differently. Low-tier homebuyers are more responsive to higher UCKs and income tax rate changes. The lower-tier sector witnessed a bigger negative impact from the reduced value of itemizing even as a lower federal income tax rate put more money into their pockets.

Table 1. Drivers Of Home Price Changes (HPA, in decimals):

	High-Tier		Low-Tier	
	(1)	(2)	(3)	(4)
(Intercept)	0.02***	-0.003	0.03***	-0.001
	0.003	0.002	0.004	0.002
L3HPA	0.89***	0.9***	0.88***	0.9***
	0.005	0.005	0.004	0.004
L6ECT	-0.15***	-0.15***	-0.13***	-0.13***
	0.005	0.005	0.004	0.004
EMPpchg	0.055***	0.055***	0.077***	0.05***
	0.01	0.01	0.01	0.01
L12AFIchg	0.0002***	0.0002***	0.0002***	0.0002***
	0.00	0.00	0.00	0.00
L3FRM	-0.487***		-0.8804***	
	0.06		0.07	
PTR	-0.076***		-0.07***	
	0.02		0.02	
L6UCK		-0.047*		-0.08***
		0.02		0.0180
L3UCKchg		-0.256***		-0.698***
		0.04		0.0448
FTRchg		-0.102***		-0.48***
		0.02		0.0296
temp	0.0002***	0.0002***	0.0002***	0.0002***
	0.00	0.00	0.00	0.00
R-squared	0.92	0.92	0.93	0.94
Number of obs	4200	4200	4200	4200
Standand Errors are below coeffi cients.				
Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '°' 0.1 ' ' 1				

5.c Implications

In order to test the impact of TCJA on HPA we point to the results in columns 2 and 4 (Equation 6). Both the level and the change in the user cost of capital negatively impact HPA. If we think of a two factor model such as HPA = $\breve{U}_0$ + $\breve{U}_1$ * UCK + $\breve{U}_2$ * UCKchg, the relationship between HPA

and UCK would be negative and the UCK change would represent a shift in the negatively sloped HPA function. The coefficient on L3UCKchg has a direct interpretation. For every 100 bps of increase in the UCK, high-tier home price growth slows by about 25 bps.

Referring back to New York, NY during 2018, Table 2 shows that TCJA raised the UCK by 172 bps. Mortgage rates also went up by 70 bps. The combined change in the L3UCK was 242 bps. We are only concerned about TCJAôs impact. The average impact was a negative 0.2560 (the ∂_4 coefficient in column 2). The impact on HPA in New York City from the reduced value of the SALT and the MID deduction by the end of 2018 was a negative 44 bps.

TCJA, however, changed other things in addition to the cost of borrowing. The IRS data allows us to capture the change in the federal income tax rate for 2018. In New York, NY, the average federal income tax rate on high income tax paying households (AGI > $200k) fell by 377 bps. Each 100 bps of decline, on average raises HPA by 10 bps (∂_5). So TCJA positively impacted HPA in New York City by 39 bps. The combined impact for New York, NY by the end of 2018 was HPA ran 5 bps slower that had TCJA not been passed.

Table 2. Impact Of TCJA on 2018 HPA

New York, NY High-Tier				Low-Tier	High-Tier
Negatives:	Change in 2018	Coeffcient	Impact on HPA	Impact on HPA	Impact on HPA
L3UCK change	0.0172	-0.2560	-0.0044	-0.00820	-0.00445
FRM change	0.0070		-0.0018		
L12AFI_cchg	4.9599	0.0002	0.0009		
Positives:					
Unemployment	0.0296	0.0547	0.0016		
Federal taxes	-0.0377	-0.1024	0.0039	0.01306	0.00356
Combined TCJA			-0.0005	0.0049	-0.0009

TCJA also impacted employment growth and the stock market valuations. The complete mix of things that TCJA changed is nearly impossible to account for in a single model. Above is a partial equilibrium analysis, but it shows that the rise in the UCK was only one piece of the general equilibrium analysis.

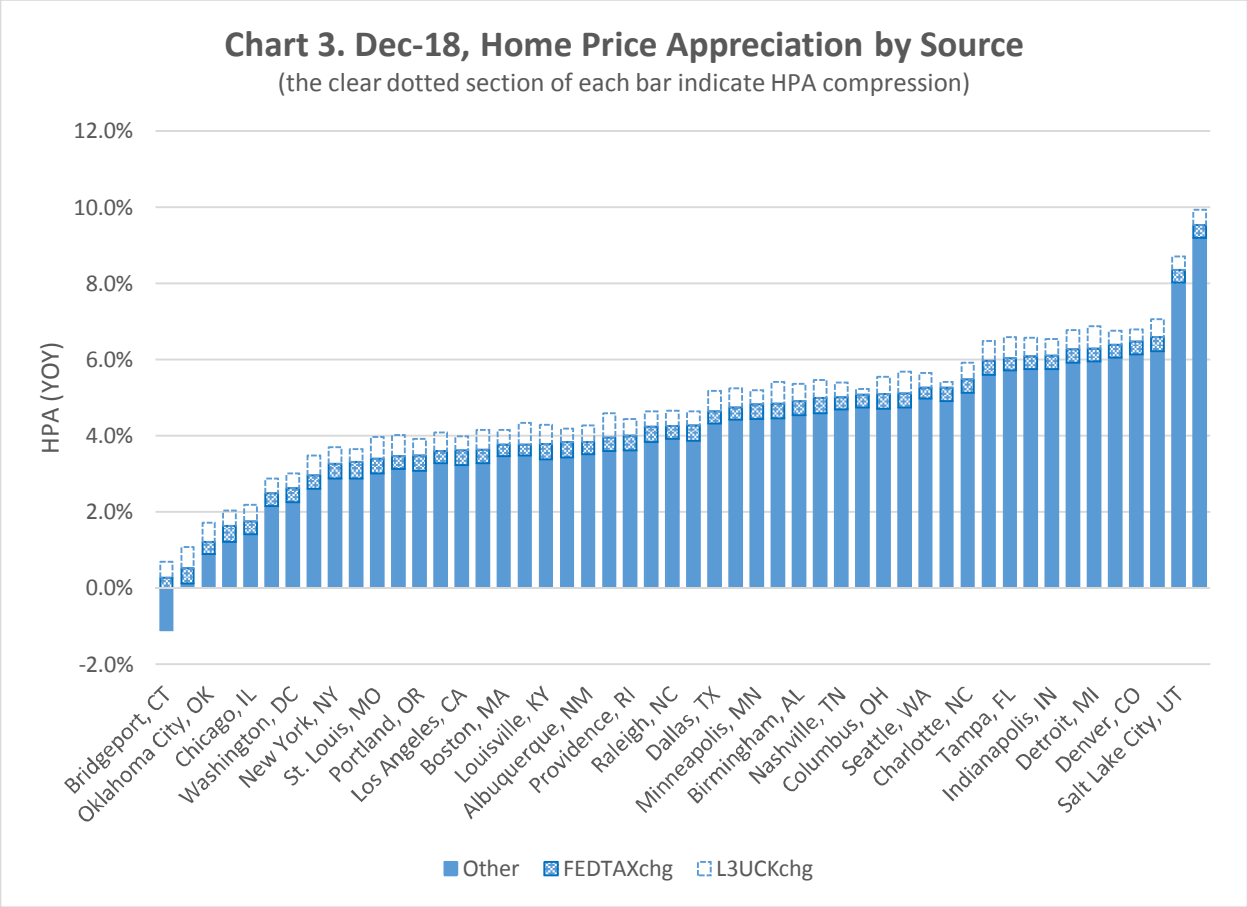
5.d Low- Versus High-Tier

In Table 2, the combined impact of TCJA was a positive 50 bps for lower-income households ($75k <= AGI < $100k). The lower income tax rates more than offset the higher UCK due to reduced itemizing. The combined impact for high-tier households was -9 bps. The two cohorts behaved differently.

To highlight the limited impact of TCJA on HPA, the combined blue sections of Chart 3 reproduce Chart 1. As Equation 5 and 6 indicate there are many other reasons for positive HPA beside TCJA. The solid blue sections are due to the normal economic activity of a CBSA. The positive force of

the federal income tax reduction shows up as the sections of each bar with spots. The combined height of economic, demographics, weather plus federal tax rate change on HPA matches the bars in Chart 1. The empty dotted line sections of each bar shows the counterfactual home price gain if TCJA had not passed and the UCK had not increased in 2018. I call this home price growth that never happened as ñHPA Compression ".

Chart 3 suggests three important findings: (1) The capping of the itemized deductions adversely impacted home prices; (2) Its impact was small relative to the other economic forces functioning in each CBSA and (3) The CBSAs which were most negatively impacted were not the CBSAs in the Northeast, but the CBSA geographies that do not have income tax rates and instead rely heavily on property and sales tax revenues (CBSAs mainly in the South). This becomes clearer in Chart 4.

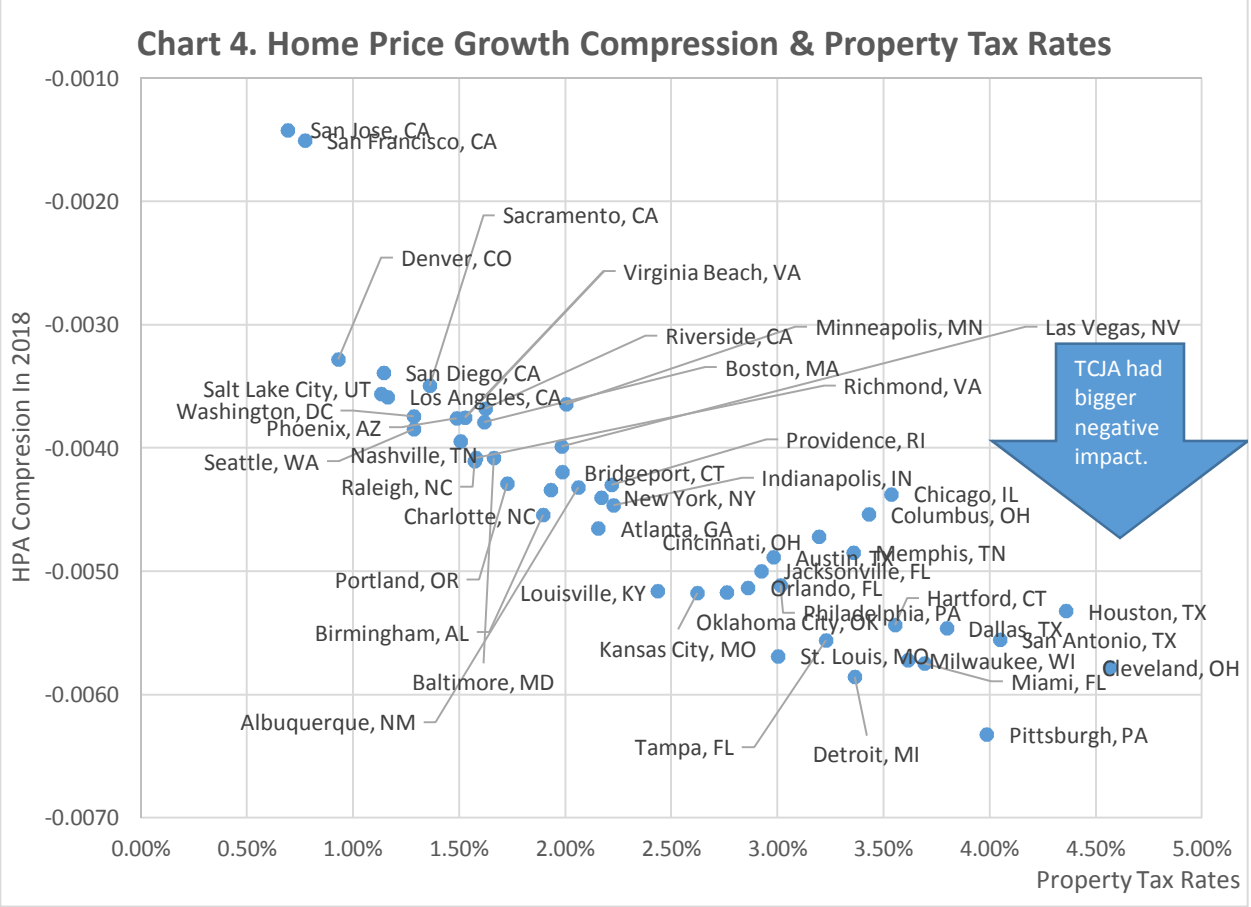


5.e Low- PTR versus High-PTR

Chart 4 displays HPA compression against property tax rates. Just to reiterate, in Equation 2, the UCK equation only considers property taxes. Thus those CBSAs which have high property tax rates witnessed UCK increases in 2018 greater than those CBSAs which have high income tax rates, but low property tax rates. The Southern cities of Houston, TX, Miami, FL , Tampa FL and

Dallas, TX all show up on the far right-hand side of the chart. Chart 4 corroborates the finding of Li and Yu (2020) ï the geographies with higher property tax rates did see lower HPA due to TCJA.

My finding, however, suggest that other forces were at play besides the impact on the user cost of capital, and thus focusing on the property tax rates and the resulting slower HPA is misleading. Chart 3 demonstrates that autocorrelation, mean reversion, employment growth and affordability all are confounders to the change in the UCK. These four other forces had a significant impact on HPA. If we segment out each CBSA by property tax burden into two cohorts, I find that the average HPA for low-PTR CBSAs was only 15 bps higher than high-PTB CBSAs. This is a small impact.



6. Conclusions and going forward

The 2017 Tax Cuts and Jobs Act has radically altered tax revenue collections in the U.S. As many economists have advocated, the removal of the MID and SALT deductions reduces the distortion to over consume housing. However, it is an external shock to migration, housing and tax revenue collections. Since Jan-18, it has changed the incentives regarding home ownership and places of residence.

It has been anticipated that TCJA would penalize states and CBSAs that have high property and income tax burdens while changing little for geographies that have no income tax and low property taxes. My conclusion, however is more subtle in four ways:

1. The capping of the itemized deductions did adversely impact home prices.
2. Its impact was small relative to the other economic forces functioning in each CBSA.
3. The lower-tier housing market saw an overall improvement to HPA due to TCJA.
4. The CBSAs which were most negatively impacted were not the CBSAs in the Northeast, but the CBSAs in geographies in the South that do not have income tax rates and instead rely heavily on property and sales tax revenues.

Importantly, TCJAôs geographical impact is not confined the Northeast. As states, cities and counties around the nation struggle to repair their budgets from the ravages of Covid-19 in 2021, taxing the wealthy may seem like the only politically feasible option. My results show that property taxes do constrain HPA and that higher property tax rates would discourage wealth creation in the form of slower higher home price appreciation and higher out-outmigration.[8]

In October 2020, the median home sale price increased 15 percent year-over-year to $320,625 ð the highest on record.[9] What we have witnessed in 2020 is that the impact of lower mortgage rates and an urge to get into a single family home easily overwhelmed the restraining impact of the reduced value of the deduction.

Having said that, almost all of TCJAôs individual tax cuts do expire at the end of 2025, unless Congress extends them. That means the old, higher tax rates would return, including the rate of 39.6% (TCJA changed the top rate to the current 37%) on high-income earners. When that happens, it would remove, a least, one aspect of TCJA that positively impacted high-tier HPA (higher disposable income due to lower tax rates), while retaining the negative force of reduce value of itemizing. This, however, could happen sooner. Budget managers need to be concerned about possible attempts by the Biden administration to reduce the federal budget by rescinding the tax breaks given at the federal level. At that point, higher mortgage rates and the negative tail winds of TCJA could deflate the housing market.

[8] Work by Haidorfer (2021) show that higher property tax rates also lead to high levels of out-migration.
[9] Redfin, October 2020.

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Table A1. Summary Statistics for Dec-18							
CBSAname	HPA	lnemp_cbsa_pchg2	L12AFI_cchg	L6UCK	L3UCKchg	FTRchg	temp
Albuquerque, NM	0.038	0.022	15.028	0.068	0.024	-0.031	65
Atlanta, GA	0.066	0.041	4.466	0.069	0.025	-0.035	72
Austin, TX	0.036	0.074	2.776	0.077	0.026	-0.030	80
Baltimore, MD	0.016	0.018	12.231	0.064	0.023	-0.042	65
Birmingham, AL	0.049	0.029	12.816	0.066	0.025	-0.037	74
Boston, MA	0.038	0.026	2.668	0.063	0.022	-0.029	59
Bridgeport, CT	-0.008	0.000	1.258	0.067	0.023	-0.027	61
Charlotte, NC	0.055	0.047	4.334	0.067	0.024	-0.034	71
Chicago, IL	0.018	0.014	5.187	0.082	0.024	-0.032	59
Cincinnati, OH	0.050	0.023	6.517	0.080	0.025	-0.038	65
Cleveland, OH	0.048	0.018	2.350	0.094	0.030	-0.036	60
Columbus, OH	0.051	0.026	-3.200	0.082	0.025	-0.038	63
Dallas, TX	0.046	0.047	1.344	0.086	0.028	-0.032	77
Denver, CO	0.065	0.046	2.735	0.057	0.020	-0.033	64
Detroit, MI	0.063	0.024	1.471	0.081	0.030	-0.033	59
Hartford, CT	0.005	0.012	10.939	0.082	0.028	-0.040	61
Houston, TX	0.030	0.043	11.181	0.091	0.028	-0.034	80
Indianapolis, IN	0.061	0.027	5.844	0.070	0.024	-0.034	63
Jacksonville, FL	0.047	0.055	10.485	0.077	0.027	-0.031	79
Kansas City, MO	0.060	0.017	5.551	0.074	0.027	-0.036	66
Las Vegas, NV	0.095	0.059	-8.619	0.068	0.023	-0.034	80
Los Angeles, CA	0.036	0.030	1.445	0.059	0.021	-0.038	75
Louisville, KY	0.038	0.019	5.731	0.072	0.027	-0.040	68
Memphis, TN	0.061	0.014	1.987	0.082	0.026	-0.033	73
Miami, FL	0.038	0.033	1.736	0.084	0.029	-0.028	84
Milwaukee, WI	0.051	0.012	14.126	0.084	0.029	-0.037	56
Minneapolis, MN	0.048	0.026	4.289	0.067	0.021	-0.038	55
Nashville, TN	0.050	0.064	-4.636	0.062	0.022	-0.030	70
New York, NY	0.033	0.030	4.960	0.069	0.024	-0.038	62
Oklahoma City, OK	0.012	0.043	14.365	0.075	0.027	-0.031	72
Orlando, FL	0.063	0.060	0.839	0.076	0.027	-0.033	83
Philadelphia, PA	0.036	0.023	8.277	0.077	0.027	-0.035	65
Phoenix, AZ	0.064	0.067	9.845	0.062	0.022	-0.031	87
Pittsburgh, PA	0.040	0.021	20.473	0.087	0.032	-0.035	61
Portland, OR	0.035	0.045	3.462	0.064	0.024	-0.040	63
Providence, RI	0.040	0.017	4.642	0.069	0.024	-0.039	61
Raleigh, NC	0.043	0.053	7.262	0.063	0.023	-0.032	72
Richmond, VA	0.042	0.023	4.150	0.063	0.023	-0.039	70
Riverside, CA	0.043	0.069	6.126	0.063	0.021	-0.040	81
Sacramento, CA	0.038	0.053	0.738	0.061	0.021	-0.040	74
Salt Lake City, UT	0.084	0.049	-0.820	0.059	0.021	-0.033	64
San Antonio, TX	0.035	0.037	-0.716	0.088	0.029	-0.033	80
San Diego, CA	0.033	0.037	0.066	0.058	0.020	-0.042	70
San Francisco, CA	0.053	0.043	1.474	0.048	0.013	-0.036	64
San Jose, CA	0.051	0.041	-7.020	0.047	0.013	-0.033	71
Seattle, WA	0.053	0.045	-3.399	0.060	0.022	-0.028	61
St. Louis, MO	0.034	0.013	1.983	0.077	0.029	-0.038	66
Tampa, FL	0.060	0.041	11.850	0.080	0.029	-0.031	82
Virginia Beach, VA	0.025	0.022	7.780	0.062	0.022	-0.034	68
Washington, DC	0.026	0.023	4.531	0.060	0.022	-0.037	67