Real Estate Taxes and Home Value: Evidence from TCJA

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October 16, 2020

- The 2017 Tax Cuts and Jobs Act (TCJA) made significant changes in tax treatment of home ownership

- Affect different geographical locations very differently

- This paper:
  - Do we see differential effects in the housing markets?
  - Any real impacts such as construction activities?
  - How do households respond to these changes?

Tax Cuts and Jobs Act

- Passed on Dec 22, 2017 and became effective on Jan 1, 2018

- Made most significant changes in tax treatment of home ownership since 1986

- Changes in deductions directly related to home ownerhip
  - Capping state and local tax (SALT) deductions at $10,000 (single or married filed jointly)
  - Mortgage interest deduction cap lowered to $750k from $1million (only affects new purchases)

- Changes indirectly related to home ownership
  - Lower income tax rates
  - Higher standardized deduction

Directly Related Literature

- Peach, Kosar, and Gorton (2018): blog post, focus on NYC, simulation of cost of home ownership
- Gilbukh, Haughwout, Landau, and Tracy (2018): blog post, price-to-rent ratio, a narrowing of gap between top quartile itemization and bottom quartile itemization metros
- Peach and McQuillian (2019): blog post, sales declined
- Rappoport (2018): simulation model, house prices can decline up to 2 percent on average

User Cost Model

$$\omega = [\tau_p + i_b(Q - m)/Q + i_m m/Q + \delta - \pi_H]$$
$$- \tau_y[\tau_p + i_m m/Q] \times I[\text{itemized}]$$

- ω : one-period user cost per unit of housing services
- Q : house price
- m : mortgage borrowed
- τ_y : federal income tax rate
- τ_p : property tax rate
- i_b : opportunity cost of house equity
- i_m : mortgage interest rate
- δ : house maintenance cost as a proportion of house value
- π_H: expected house appreciation rate

User Cost Model

$$\omega = [\tau_p + i_b(Q - m)/Q + i_m m/Q + \delta - \pi_H]$$
$$- \tau_y[\tau_p \max(\tau_p Q, 10000 - T_s, 0) + i_m m]/Q \times I[\text{itemized}]$$

T_s : other state or local taxes

- Before Reform
  - $I[\text{itemized}] = I[\tau_p Q + T_s + i_m m + X > 12700)$

- After Reform
  - $I[\text{itemized}] = I[\max(\tau_p Q + T_s, 10000) + i_m m + X > 24000)$
  - Less likely to itemize

- Assume $Q\omega$ is kept fixed, house prices Q fall as user cost ω increases.
  - This particularly affects places with higher real estate taxes.

Empirical Strategy

- Difference-in-Difference approach

- Real estate tax burden measures from the IRS
  - Average real estate tax relative to income in a county in 2016

- House price growth before and after tax changes
  - Monthly median home value per sq foot growth before and after 2018
  - Monthly data by counties from Zillow 2015-2019

Real Estate Tax Burden

Average real estate tax relative to income in a county (%)
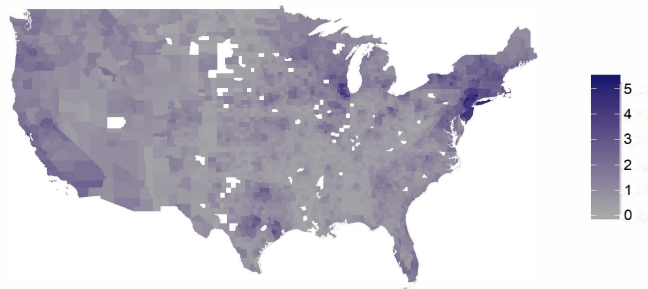
- Total real estate tax reported in a county divided by total taxable income in a county
  - Real estate tax reported only if a filer itemizes
- Examples
  - 0 percent: Houston County, GA, King County, TX and Hayes County, NV
  - 5+ percents: Putnam County and Rockland County, NY

Home Value Growth by Real Estate Tax Burden

(a) Home value growth by real estate tax burden
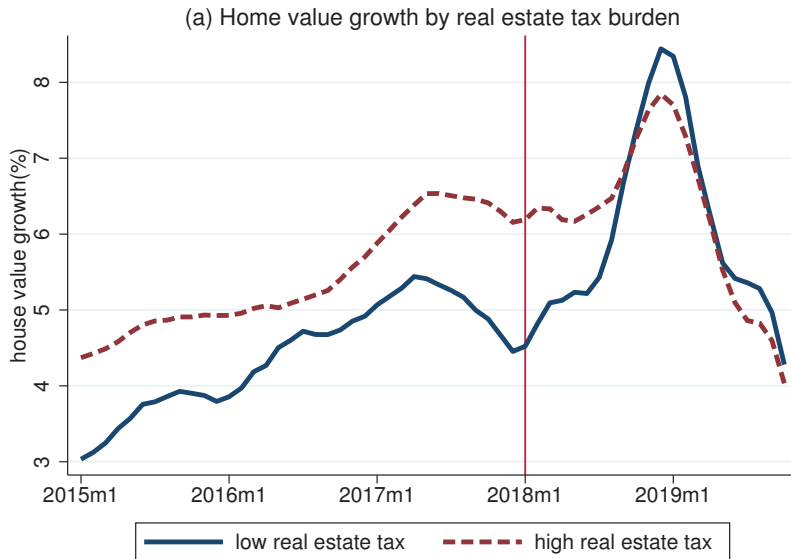
Differences in Home Value Growth

(b) High minus low in real estate tax burden

(c) Top quintile minus bottom quintile in real estate tax burden
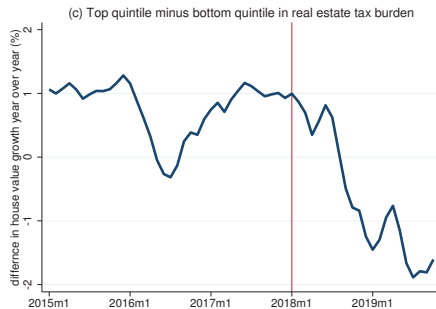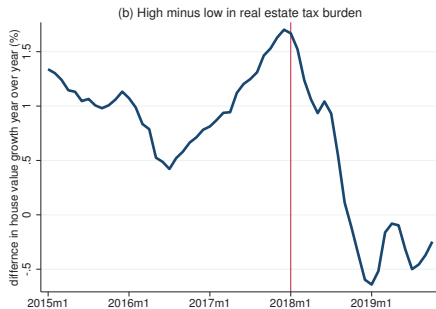
Challenges in Identification

- Confounding factors
  - Events coincide with the tax law changes, AND
  - Have different impacts on high and low real estate tax counties
  - Examples: income, local demand, monetary policy

- Parallel trend assumption
  - House price of high and low real estate tax counties moved similary absent of the tax reform

- Measurements in home price and tax burdens
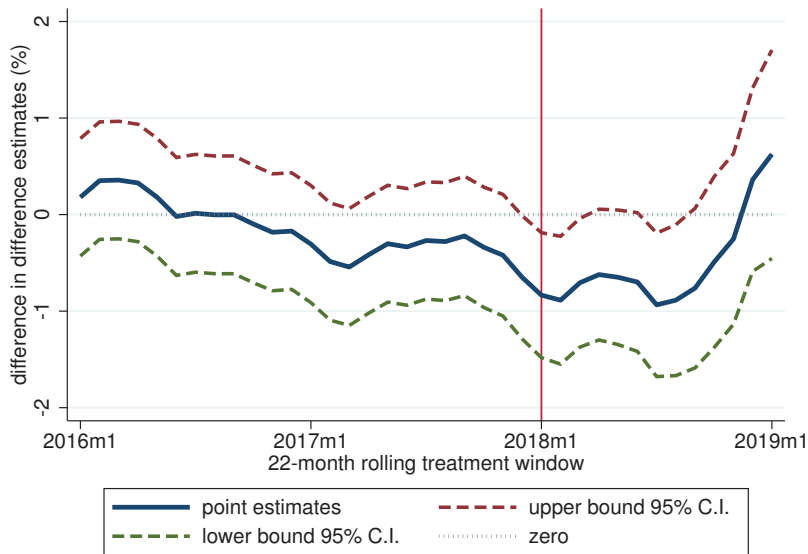
Controlling Confounding Factors

Interest rate changes, mortgage interest deduction, and income distribution

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	House price growth (%)	House price growth (%)	House price growth (%)	House price growth (%)	House price growth (%)	House price growth (%)	House price growth (%)
High real estate tax to income * Tax reform	-1.351***	-1.873***	-0.912***	-1.006***	-0.886***	-1.750***	-1.476***
	(0.175)	(0.237)	(0.288)	(0.334)	(0.290)	(0.353)	(0.328)
High income * Tax reform	-1.271***	-1.888***	-1.765***		-1.740***	-1.239***	
	(0.181)	(0.254)	(0.246)		(0.259)	(0.369)	
High real estate tax to income	0.623***						
	(0.112)						
High income	0.324**						
	(0.129)						
Tax reform	1.677***						
	(0.167)						
Percent of filers with income less than $1 * Tax reform				0.602**			1.224***
				(0.242)			(0.352)
Percent of filers with income between $1 and $10k * Tax reform				-0.147			-0.0186
				(0.142)			(0.139)
Percent of filers with income between $10k and $25k * Tax reform				0.0825			0.298*
				(0.123)			(0.157)
Percent of filers with income between $50k and $75k * Tax reform				-1.196***			-0.879***
				(0.284)			(0.338)
Percent of filers with income between $75k and $100k * Tax reform				1.552***			1.865***
				(0.263)			(0.278)
Percent of filers with income between $100k and $200k * Tax reform				-0.261**			-0.291**
				(0.116)			(0.130)
Percent of filers with income above $200k * Tax reform				-0.333***			0.167
				(0.103)			(0.159)
Percent of mortgages above $750k * Tax reform						-0.136	-0.515
						(0.237)	(0.373)
Median sale price one year ago * Tax reform						-0.00852***	-0.00780***
						(0.00144)	(0.00266)
Unemployment rate (%)	0.0934***	0.0266	-0.321***	-0.227**	-0.321***	-0.236**	-0.239**
	(0.0284)	(0.0879)	(0.103)	(0.0951)	(0.103)	(0.113)	(0.113)
Employment growth (%)	0.136***	0.0539*	0.0199	0.0125	0.0196	0.0276	0.0129
	(0.0206)	(0.0317)	(0.0430)	(0.0413)	(0.0430)	(0.0522)	(0.0542)
N	101014	101014	100957	100957	100957	52724	52724
R-sq	0.133	0.198	0.280	0.284	0.280	0.338	0.340
Fixed effects		county, time	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time
Lagged dependent variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Placebo Test – Alternative Cut-off Year

	(1)	(2)	(3)	(4)	(5)	(6)
	Time dummy = 1 if year >= 2014	Time dummy = 1 if year >= 2015	Time dummy = 1 if year >= 2016	Time dummy = 1 if year >= 2017	Time dummy = 1 if year >= 2018	Time dummy = 1 if year >= 2019
High real estate tax to income * Time dummy	0.361 (0.391)	-0.389 (0.294)	-0.418 (0.320)	-0.514* (0.284)	-0.899*** (0.274)	-0.380 (0.388)
High income * Time dummy	-1.944*** (0.348)	-1.253*** (0.261)	-1.316*** (0.244)	-1.660*** (0.222)	-1.883*** (0.234)	-1.257*** (0.324)
Unemployment rate (%)	-0.355*** (0.101)	-0.342*** (0.101)	-0.326*** (0.100)	-0.306*** (0.0993)	-0.323*** (0.0983)	-0.394*** (0.100)
Employment growth (%)	0.0532** (0.0213)	0.0534** (0.0214)	0.0575*** (0.0194)	0.0546*** (0.0201)	0.0531** (0.0209)	0.0539*** (0.0206)
N	141294	141294	141294	141294	141294	141294
R-sq	0.315	0.315	0.316	0.316	0.316	0.315
Fixed effects	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time
Lagged dependent variables	Yes	Yes	Yes	Yes	Yes	Yes

Placebo Test – Rolling Windows

Alternative Price Measures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Median value per sq ft growth (%)	Sale price growth (%)	List price per sq ft growth (%)	Zillow HPI growth (%)	Median value per sq ft year over year growth (%)	Sale price year over year growth (%)	List price per sq ft year over year growth (%)	Zillow HPI year over year growth (%)
High real estate tax to income * Tax reform	-0.912*** (0.288)	-3.476*** (1.167)	-2.306*** (0.857)	-0.392*** (0.127)	-0.0909** (0.0402)	-0.302*** (0.116)	-0.502*** (0.160)	-0.0391** (0.0152)
High income * Tax reform	-1.765*** (0.246)	-1.125 (1.119)	-3.759*** (0.501)	-0.763*** (0.0956)	-0.209*** (0.0317)	-0.459*** (0.0666)	-0.141 (0.189)	-0.0678*** (0.0120)
Unemployment rate (%)	-0.321*** (0.103)	-0.483 (0.403)	-0.902*** (0.344)	-0.136*** (0.0409)	-0.0578*** (0.0107)	-0.0314 (0.0396)	-0.0169 (0.0455)	-0.0235*** (0.00434)
Employment growth (%)	0.0199 (0.0430)	-0.0225 (0.170)	0.169 (0.166)	0.00454 (0.0184)	-0.0000177 (0.00562)	0.00794 (0.0202)	-0.00190 (0.0239)	0.00100 (0.00206)
N	100957	60828	111550	111689	100746	107967	56129	111417
R-sq	0.280	0.417	0.312	0.820	0.958	0.851	0.813	0.994
Fixed effects	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time
Lagged dependent variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Alternative Measures of Tax Burdens

	(1) House price growth (%)	(2) House price growth (%)	(3) House price growth (%)	(4) House price growth (%)
High real estate tax to income * Tax reform	-0.912*** (0.288)			
High state and local tax to income * Tax reform		-0.142 (0.333)		
High real estate tax * Tax reform			-1.640*** (0.272)	
High state and local tax * Tax reform				-1.390*** (0.442)
High income * Tax reform	-1.765*** (0.246)	-2.034*** (0.243)	-1.527*** (0.246)	-1.594*** (0.280)
Unemployment rate (%)	-0.321*** (0.103)	-0.327*** (0.103)	-0.325*** (0.104)	-0.327*** (0.104)
Employment growth (%)	0.0199 (0.0430)	0.0193 (0.0431)	0.0175 (0.0435)	0.0163 (0.0434)
N	100957	100957	100957	100957
R-sq	0.280	0.280	0.281	0.281
Fixed effects	county, state by time	county, state by time	county, state by time	county, state by time
Lagged dependent variables	Yes	Yes	Yes	Yes

Different Impacts – Back of Envelope Calculation

- House prices are about 0.9 percentage point lower per year for counties with higher real estate taxes
  - 22 months of data after the reform
  - Prices 1.65 percentage points lower in high tax counties relatively
  - Median house price is 160k, the amount of relative loss is 2.64k of housing wealth on average

- House price decrease in high tax counties a coincidence?
  - Similar patterns in other housing market indicators

$4,995,000

**For sale:** 7 bd 8 ba 8,132 sqft 18 Katies Pond Rd, Princeton, NJ 08540

Time on Zillow: **273 days**

Price and tax history

DATE	EVENT	PRICE
12/12/2019	Listing removed	$8,900
11/30/2019	Listed for rent	$8,900
5/31/2019	Listed for sale	$4,995,000 (-16.8%)
11/13/2018	Listing removed	$6,000,000
4/13/2018	Listed for sale	$6,000,000 (+50%)
11/29/2007	Sold	$4,000,000 (+400%)
8/27/2005	Sold	$800,000 (+52.4%)

Dynamic Price Effects

$$log(HPI_{c,t+i}/HPI_{c,t+i-1}) = \beta_1^{(i)} Taxburden_{c,t-1} + \beta_2 X_{c,t} + \alpha_c + \gamma_{s,t} + \varepsilon_{c,t}, \quad (1)$$
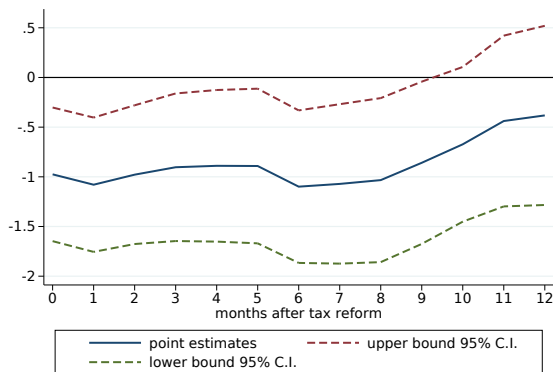
Housing Market Liquidity (Income Distribution)

	(1) House price growth (%)	(2) Number of sales (log)	(3) Percent with price cut	(4) Days on market	(5) Sale-to-list ratio (%)
High real estate tax to income * Tax reform	-1.006*** (0.334)	-0.0148*** (0.00500)	0.0540 (0.0655)	1.272** (0.606)	-0.152** (0.0648)
Percent of filers with income less than $1 * Tax reform	0.602** (0.242)	0.00492 (0.00310)	-0.0691 (0.0844)	0.253 (0.547)	0.0468 (0.0607)
Percent of filers with income between $1 and $10k * Tax reform	-0.147 (0.142)	0.00284 (0.00188)	0.0161 (0.0423)	0.249 (0.275)	-0.0422 (0.0347)
Percent of filers with income between $10k and $25k * Tax reform	0.0825 (0.123)	0.00554** (0.00253)	-0.0653* (0.0368)	-0.0945 (0.232)	-0.0369 (0.0234)
Percent of filers with income between $50k and $75k * Tax reform	-1.196*** (0.284)	0.00423 (0.00387)	0.157* (0.0843)	1.464*** (0.506)	-0.180*** (0.0614)
Percent of filers with income between $75k and $100k * Tax reform	1.552*** (0.263)	0.00623* (0.00358)	-0.299*** (0.0706)	-1.470*** (0.543)	0.0401 (0.0536)
Percent of filers with income between $100k and $200k * Tax reform	-0.261** (0.116)	0.00211 (0.00194)	0.0414 (0.0348)	0.254 (0.210)	-0.00865 (0.0225)
Percent of filers with income above $200k * Tax reform	-0.333*** (0.103)	0.00349* (0.00178)	-0.0137 (0.0387)	0.274 (0.198)	-0.0945*** (0.0238)
Unemployment rate (%)	-0.227** (0.0951)	-0.00507*** (0.00186)	0.0116 (0.0269)	0.743*** (0.222)	-0.0834*** (0.0284)
Employment growth (%)	0.0125 (0.0413)	0.000703** (0.000339)	-0.0177*** (0.00667)	-0.235** (0.110)	0.00976 (0.0111)
N	100957	141123	92967	35458	56758
R-sq	0.284	0.993	0.902	0.946	0.926
Fixed effects	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time
Lagged dependent variables	Yes	Yes	Yes	Yes	Yes

Tax Burdens by Quintiles

	(1) House price growth (%)	(2) Number of sales (log)	(3) Percent with price cut	(4) Days on market	(5) Sale-to-list ratio (%)
Real estate tax to income 1st quintile * Tax reform	-0.406 (0.509)	0.0122 (0.00892)	0.0987 (0.0993)	2.903*** (0.832)	-0.0210 (0.0777)
Real estate tax to income 2nd quintile * Tax reform	-0.325 (0.359)	0.00620 (0.00640)	0.0587 (0.0730)	0.536 (0.936)	-0.0679 (0.0510)
Real estate tax to income 4th quintile * Tax reform	-1.633*** (0.324)	-0.00688 (0.00510)	0.0296 (0.0712)	1.586*** (0.501)	-0.155*** (0.0509)
Real estate tax to income 5th quintile * Tax reform	-1.890*** (0.344)	-0.0166** (0.00671)	-0.00168 (0.0894)	1.997*** (0.620)	-0.155** (0.0625)
N	100957	141123	92967	35458	56758
R-sq	0.285	0.993	0.902	0.946	0.926
Fixed effects	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time
Lagged dependent variables	Yes	Yes	Yes	Yes	Yes
Income distritution, fixed effects and local demand controls included in regressions					

Real Effects

- Housing markets are affected by the tax reform
    - Counties with higher real estate taxes had weaker housing markets

- Does the distribution effects also affect real activities?
    - Such as construction activities and employment

Construction Activities

	(1)	(2)	(3)	(4)	(5)	(6)
	Construction sector employment growth (%)	Log number of building permits (multi-family units)	Log number of building permits (single-famílty units)	Construction sector employment growth (%)	Log number of building permits (multi-family units)	Log number of building permits (single-famílty units)
High real estate tax to income * Tax reform	-0.302** (0.143)	-0.0509*** (0.0177)	-0.00840 (0.0124)			
High income * Tax reform	-0.207** (0.105)	0.0237 (0.0153)	-0.00613 (0.00806)			
Real estate tax to income 1st quintile * Tax reform				0.263 (0.466)	0.0865 (0.0732)	-0.0142* (0.00860)
Real estate tax to income 2nd quintile * Tax reform				-0.0759 (0.340)	0.0507 (0.0497)	-0.00320 (0.00575)
Real estate tax to income 4th quintile * Tax reform				-0.194 (0.228)	-0.0270** (0.0136)	-0.00920 (0.0107)
Real estate tax to income 5th quintile * Tax reform				-0.518* (0.276)	-0.0141 (0.0152)	-0.00758 (0.0144)
Unemployment rate (%)	-0.414*** (0.0700)	-0.00141 (0.00411)	-0.00411** (0.00187)	-0.386*** (0.0836)	-0.00134 (0.00421)	-0.00449** (0.00216)
Non-construction employment growth (%)	-0.0458 (0.0400)	-0.000168 (0.000959)	0.000325 (0.000350)	-0.0494 (0.0476)	-0.000114 (0.000961)	0.000349 (0.000341)
N	141057	18187	33301	141057	18187	33301
R-sq	0.717	0.991	0.999	0.717	0.991	0.999
Other controls				income distribution	income distribution	income distribution
Fixed effects	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time	county, state by time
Lagged dependent variables	yes	yes	yes	yes	yes	yes

Household Reponse

- The longer term effects may be different depending on household's response to the tax reform
  - Effects in counties with higher taxes may exacerbate if people move away
  - Local governments can also change their tax treatment of home ownership

- Initial evidence:
  - Cross-county migration (changes in zipcode in New York Fed CCP/Equifax)
  - 2018 Senate race

Cross-county Migration

	(1)	(2)	(3)
		Net move out rate (conditional on having a mortgage) (%)	
	Net move out rate (%)		Net move out rate (no mortgage) (%)
Real estate tax to income 1st quintile * Tax reform	0.0660 (0.0756)	0.426* (0.241)	0.0235 (0.0774)
Real estate tax to income 2nd quintile * Tax reform	0.0416 (0.0580)	0.231 (0.171)	0.0232 (0.0623)
Real estate tax to income 4th quintile * Tax reform	0.0601 (0.0598)	0.273** (0.118)	0.0346 (0.0647)
Real estate tax to income 5th quintile * Tax reform	0.194*** (0.0685)	0.390*** (0.130)	0.188*** (0.0726)
Unemployment rate (%)	0.108*** (0.0163)	0.121*** (0.0355)	0.103*** (0.0168)
Employment growth (%)	-0.0162*** (0.00458)	-0.0118 (0.0115)	-0.0155*** (0.00463)
N	58158	58093	58158
R-sq	0.338	0.189	0.311
Fixed effects	county, state by time	county, state by time	county, state by time
Lagged dependent variables	Yes	Yes	Yes
Lagged dependent variables	Yes	Yes	Yes

Data source: New York Fed CCP/Equifax

2018 Senate Election

	(1)	(2)	(3)	(4)
	2018 voting share for Democratic candidates (%)	2018 voting share for Democratic candidates (%)	2018 voting share for Democratic candidates (%)	2018 voting share for Democratic candidates (%)
2016 voting share for Democratic candidates (%)	0.828*** (0.0127)	0.839*** (0.0116)	0.867*** (0.0115)	1.040*** (0.0129)
High real estate tax to income	1.421* (0.735)	2.696*** (0.709)	1.761** (0.712)	1.183*** (0.343)
High income	4.413*** (0.708)	4.308*** (0.657)	3.934*** (0.637)	1.172*** (0.256)
i(Incumbent is Democrat 2016)		-9.682*** (0.591)	-12.18*** (0.704)	
i(Incumbent is Democrat 2018)		4.466*** (0.680)	4.950*** (0.751)	
Unemployment rate 2016 (%)			-0.0399*** (0.00559)	-0.00412** (0.00206)
Unemployment rate 2018 (%)			0.0486*** (0.00682)	0.00339 (0.00269)
Employment growth rate 2016 (%)			-0.0247* (0.0149)	0.00354 (0.00299)
Employment growth rate 2018 (%)			0.00943 (0.00853)	-0.00682 (0.00583)
N	806	806	806	806
R-sq	0.859	0.877	0.893	0.979
Fixed effects				State

Conclusion

- TCJA has differential impacts in the housing markets
  - Home value growth lower in counties with more real estate tax burden
  - Similar in other housing market indicators
- There are real impacts:
  - Construction activities and employment growth weaker in counties with higher property taxes
- Household responses:
  - Moving out of locations with higher local taxes
  - More people in counties with higher property taxes voted for Democratic candidates in 2018 Senate races relative to 2016 races
- Other implications
  - Reducing inequality?
  - Local governments try to lower taxes to attract people?