On the Differential Impact of the Tax Cuts and Jobs Act on the Housing Market: Blue versus Red*

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*The views expressed herein are those of the author and do not necessarily reflect the views of Fannie Mae or its management.

Outline of Presentation

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Introduction

- The Tax Cuts and Jobs Act (TCJA) was passed in Congress on December 20 and signed into law by President Donald Trump on December 22, 2017
- The law came into effect on January 1, 2018
- It represents the most sweeping revision of US tax law since the Tax Reform Act of 1986
  - Many significant changes to the structure of both corporate and personal federal taxes have been introduced

Introduction

- It is widely believed that the TCJA would generate differential impact on the housing market between the blue and red states
  - Suggested by a *Wall Street Journal* article entitled "New Tax Laws Have Home Buyers Checking New Places" by Robyn A. Friedman on June 7, 2018
  - Hinted by an academic article saying that "one suspects that red-state, blue-state politics were also involved" (Slemrod, 2018)
- No prior research has been done to quantify the differential impact of the TCJA

Introduction

- This paper fills in this void by identifying and estimating the differential impact of the TCJA on the housing market, in particular, on the (median) price-to-rent ratio between the metropolitan statistical areas (MSAs) in the blue states and those in the red states
- We focus on the price-to-rent ratio for three key reasons
  - (1) It obviously affects households' tenure choice between owning and renting, and hence the homeownership rate
  - (2) It has been regarded as the analogy of the price-to-dividend ratio in the stock market and viewed as an indicator of valuation in the housing market (for example, Case and Shiller, 1989; Galin, 2008)
  - (3) Previous studies suggest that assessing the effects of tax policies on the price-to-rent ratio is the prerequisite to assess their effects on the other aspects of the housing market (for example, Sommer and Sullivan, 2018)

Introduction

- The extensiveness of the TCJA makes it difficult to identify the differential impact, and also suggests that its magnitude is theoretically ambiguous
  - (1) The TCJA has changed the individual tax base by, among other things, limiting the SALT (state and local property, income and sales taxes) deductibility to $10,000
    - It is widely accepted that these tax changes will have a disproportionate effect on the blue states characterized with higher home prices and higher taxes (for example, Tax Foundation, 2017)
  - (2) The TCJA has cut individual tax rates and changed the bracket breakpoints. The highest individual income tax rate fell from 39.6% to 37%
    - The results of prior distributional analyses of the TCJA (for example, the Tax Policy Center, 2017; the Congressional Budget Office, 2017; the Joint Committee on Taxation, 2017; Auerbach et al., 2018) consistently suggest that these tax changes will disproportionally benefit the blue states characterized with generally higher-income households
  - (3) The TCJA has cut the corporate income tax
    - A range of estimates suggests that the law is likely to increase US capital investment and cause wages to rise (Auerbach, 2018), which could also contribute to the differential impact

Introduction

- The qualitative analysis sketched in the last slide drives us to explore and take a reduced-form approach
  - (1) We base on Altig et al. (2019) to classify the top 50 MSAs into two groups, namely, a blue group (20 MSAs) and a red group (30 MSAs)
  - (2) We explore the trend of the average price-to-rent ratio of the two groups around the legislation period (2017Q1~2018Q4), namely, four post- and pre-reform quarters respectively and symmetrically
    - The parallel trend assumption is practically satisfied prior to the TCJA
    - It is reasonable to use a difference-in-differences approach to estimate the differential impact
  - (3) We implement the difference-in-differences approach to estimate the differential impact
  - (4) We find that the differential impact is positive and statistically significant, and that its magnitude increases with time
    - Our findings suggest that taxation plays an important role in the housing market

Introduction

- We are confident in our difference-in-differences identification strategy as well as our estimation results
  - Slemrod (2018): "it (*the TCJA*) is a wonderfully generous gift because it provides scores of natural experiments that could help provide credible estimates of the causal effects of tax policy," and "several aspects of the process leading to the new law render it an especially promising laboratory."
    - (1) There is little, if any, concern about the potential endogeneity of timing that has plagued many empirical studies of fiscal policy (for example, Romer and Romer, 2010)
      - There was nothing about the state of the business cycle that precipitated the passage of the TCJA, and the law passed largely thanks to a close election tipped in one direction
    - (2) The post-reform counterfactual is plausibly to be also fairly placid
      - The macro economy was well-behaved in the few years leading up to the TCJA

Literature Review

- Tax policies play an important role in the housing market
- The impact of tax policies on the housing market has been widely studied.
  - Early seminal contributions include, for example, Aaron (1970), Rosen (1985), and Poterba (1984 and 1992)
  - Following the influential work by Gervais (2002), more recent studies have employed theoretical dynamic models in the quantitative macroeconomic tradition to investigate these issues (for example, Diaz and Luengo-Prado, 2008; Chambers et al., 2009; Nakajima, 2010; Sommer et al., 2013; Floetotto et al., 2016; Sommer and Sullivan, 2018)

Literature Review

- The studies in the aforementioned literature have, in general, focused on a specific aspect of tax policies
  - For example, both Floetotto et al. (2016) and Sommer and Sullivan (2018) concentrate on the impact of mortgage interest deduction on the housing market
  - This limitation makes it difficult, if not impossible, to employ their models to assess the effects of the TCJA, representing the most significant change in U.S. taxation since the Tax Reform Act of 1986, on the housing market
- Our work contributes to and advances the aforementioned literature by using a reduced-form approach, more specifically, a difference-in-differences method to identify and estimate the differential impact of the TCJA on the housing market, in particular, on the price-to-rent ratio between the MSAs in the blue states and those in the red states
  - To our best knowledge, we are the first to make this endeavor

Group Assignment

- Altig et al. (2019) estimate the differential effect of the TCJA on red- and blue-state taxpayers
  - (1) They designate states, including the District of Columbia, as blue, red or purple based on the average voter margin over the past five presidential elections.
    - States where the Democratic share of total votes was, on average, five percentage points higher than the Republican share of total votes over the past five presidential elections are classified as blue
    - States where the Republican share of total votes was, on average, five percentage points higher than the Democratic share of total votes over the past five presidential elections are classified as red
    - The remaining states are classified as purple
  - (2) They use a life-cycle consumption-smoothing program called The Fiscal Analyzer (TFA) to calculate the effect of permanent implementation of the TCJA on households state by state
  - (3) They find a small but important difference in the effects on households across red- and blue-states

Group Assignment

- Group Assignment: Benchmark
  - If a MSA is located in a blue state designated by Altig et al. (2019), then we assign it to the blue group; Otherwise, we assign it to the red group

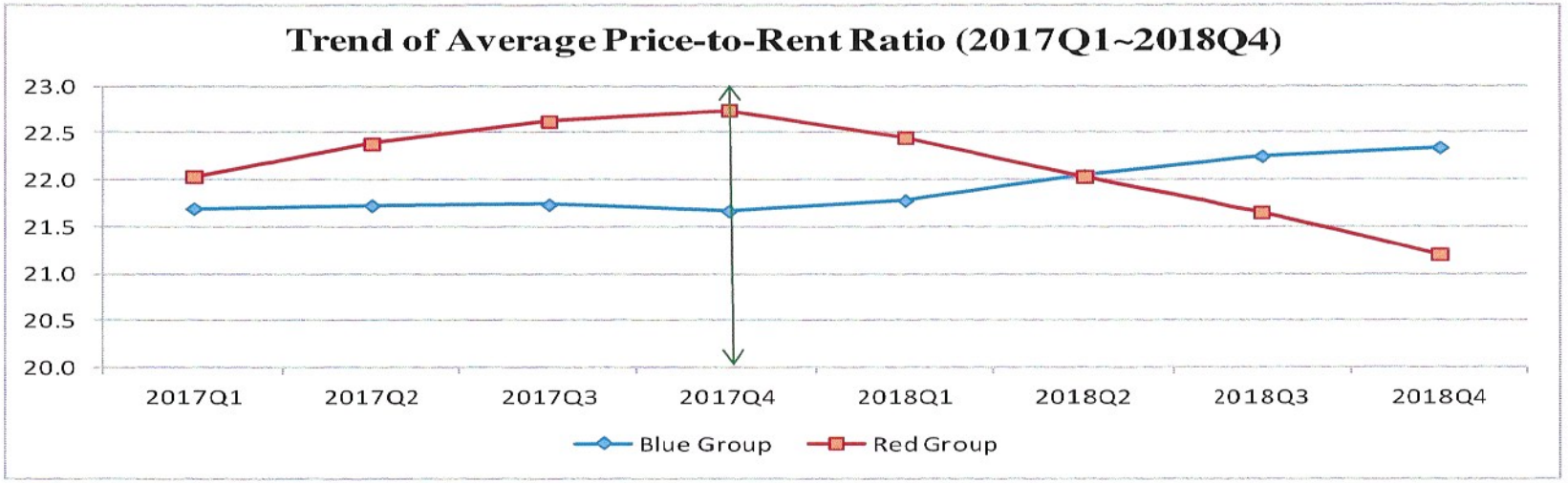
- Group Assignment: Robustness Check
  - (1) Switch Washington from the blue group to the red group
    - Washington is adjacent to both VA (a purple state) and MD (a blue state)
  - (2) Repeat our analysis
  - (3) Produces little impact on the analysis results
    - We choose not to report the results of the robustness check to save some space, but they are available upon request

Group Assignment

MSA	Blue (Benchmark)	Blue (RobustnessCheck)
Atlanta	0	0
Austin	0	0
Baltimore	1	1
Birmingham	0	0
Boston	1	1
Bridgeport	1	1
Charlotte	0	0
Chicago	1	1
Cincinnati	0	0
Cleveland	0	0
Columbus	0	0
Dallas	0	0
Denver	0	0
Detroit	1	1
Hartford	1	1
Honolulu	1	1
Houston	0	0
Indianapolis	0	0
Jacksonville	0	0
Kansas City	0	0
Las Vegas	0	0
Los Angeles	1	1
Memphis	0	0
Miami	0	0
Milwaukee	0	0
Minneapolis	1	1
Nashville	0	0
New York	1	1
Orlando	0	0
Oxnard	1	1
Philadelphia	0	0
Phoenix	0	0
Pittsburgh	0	0
Portland	1	1
Providence	1	1
Raleigh	0	0
Richmond	0	0
Riverside	1	1
Sacramento	1	1
Salt Lake City	0	0
San Antonio	0	0
San Diego	1	1
San Francisco	1	1
San Jose	1	1
Seattle	1	1
St. Louis	0	0
Tampa	0	0
Tucson	0	0
Virginia Beach	0	0
Washington	**1**	**0**

Parallel Trend Assumption

Figure 1. Visual Check of the Parallel Trend Assumption



- The parallel trend assumption is almost satisfied prior to the TCJA
  - (1) The trend of the blue group is basically flat before the TCJA, and becomes upward-sloping after the TCJA
  - (2) The trend of the red group is merely slightly upward-sloping before the tax reform, but becomes downward-sloping after the tax reform

Parallel Trend Assumption

- We conduct a formal statistical test of the parallel trend assumption by following the approach of Autor (2003) and Beatty and Shimshack (2011)

$$
\begin{aligned}
PtoR_{i,t} = \alpha_i + \lambda_t + \delta_{-3} * \left(Blue \times YQ2017Q1\right)_{i,t} + \delta_{-2} * \left(Blue \times YQ2017Q2\right)_{i,t} + \\
\delta_{-1} * \left(Blue \times YQ2017Q3\right)_{i,t} + \delta_1 * \left(Blue \times YQ2018Q1\right)_{i,t} + \\
\delta_2 * \left(Blue \times YQ2018Q2\right)_{i,t} + \delta_3 * \left(Blue \times YQ2018Q3\right)_{i,t} + \\
\delta_4 * \left(Blue \times YQ2018Q4\right)_{i,t} + \varepsilon_{i,t}
\end{aligned}
, \qquad (1)
$$

Parallel Trend Assumption

Independent Variable	Column 1
(Blue*YQ2017Q1)	0.74**
	(2.33)
(Blue*YQ2017Q2)	0.42
	(1.32)
(Blue*YQ2017Q3)	0.19
	(0.61)
(Blue*YQ2018Q1)	0.41
	(1.29)
(Blue*YQ2018Q2)	1.09***
	(3.44)
(Blue*YQ2018Q3)	1.67***
	(5.30)
(Blue*YQ2018Q4)	2.21***
	(7.00)
Number of Observations	392
R_Square	97.08%

**: statistically significant at the 5% level.
***: statistically significant at the 1% level.
The t-statistics are in parentheses.
The estimated coefficients of the MSA dummies and the YQ dummies are omitted.

- The parallel trend assumption is narrowly satisfied prior to the TCJA

Parallel Trend Assumption

- Both the visual check and the formal statistical test have reached a consistent conclusion that the parallel trend assumption is practically satisfied prior to the TCJA
- Hence, it is reasonable to use a difference-in-differences approach to estimate the differential impact of the TCJA on the price-to-rent ratio between the blue and red groups

Econometric Models

- Benchmark Difference-in-Differences Model:

$$PtoR_{i,t} = \alpha_i + \lambda_t + \gamma * X_{i,t} + \eta * \left(Blue \times PostReform \right)_{i,t} + \varepsilon_{i,t}, \quad (2)$$

- Augmented Difference-in-Differences Model:

$$\begin{aligned} PtoR_{i,t} = \alpha_i + \lambda_t + \gamma * X_{i,t} + \eta_1 * \left(Blue \times PostReform \right)_{i,t} + \\ \eta_2 * \left(Blue \times PostReform \times YQ2018Q2 \right)_{i,t} + \\ \eta_3 * \left(Blue \times PostReform \times YQ2018Q3 \right)_{i,t} + \\ \eta_4 * \left(Blue \times PostReform \times YQ2018Q3 \right)_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (3)$$

Data Description

- Two Data Sources
  - (1) Fannie Mae: a major mortgage company in the US with significant presence in both single- and multi-family markets
    - Price-to-rent ratio
  - (2) the IHS Markit® (https://ihsmarkit.com)
    - All the other variables including real GMP, unemployment rate, number of households, and median household income

Data Description

Variable	N	Mean	Median	Standard Deviation
Price-to-Rent (Red Group & PreReform)	120	22.45	22.24	2.95
Price-to-Rent (Red Group & PostReform)	120	21.83	21.70	3.10
Price-to-Rent (Blue Group & PreReform)	76	21.71	21.03	5.04
Price-to-Rent (Blue Group & PostReform)	76	22.1	21.68	5.71
RealGMP_GrowthRate (Red Group & PreReform)	120	0.54%	0.51%	0.53%
RealGMP_GrowthRate (Red Group & PostReform)	120	0.79%	0.80%	0.49%
RealGMP_GrowthRate (Blue Group & PreReform)	76	0.59%	0.60%	0.73%
RealGMP_GrowthRate (Blue Group & PostReform)	76	0.76%	0.80%	0.44%

- (1) For the red group, both the mean and median of the price-to-rent ratio in the post-reform period are less than their counterparts in the pre-reform period
- (2) For the blue group, both the mean and median of the price-to-rent ratio in the post-reform period are greater than their counterparts in the pre-reform period
- (3) For both groups, both the mean and median of real GMP growth rate in the post-reform period are higher than their counterparts in the pre-reform period, which is consistent with our general impression of the US macro economy

Estimation Results

Independent Variable	Column 1	Column 2	Column 3	Column 4
(Blue*PostReform)	1.01***	0.99***	0.07	0.07
	(6.06)	(5.99)	(0.28)	(0.30)
(Blue*PostReform*YQ2018Q2)			0.68**	0.63**
			(2.14)	(2.01)
(Blue*PostReform*YQ2018Q3)			1.27***	1.22***
			(3.99)	(3.90)
(Blue*PostReform*YQ2018Q4)			1.81***	1.79***
			(5.69)	(5.71)
RealGMP_GrowthRate		-0.29***		-0.28***
		(-3.02)		(-3.07)
Number of Observations	392	392	392	392
R_Square	96.71%	96.80%	97.03%	97.11%

**: statistically significant at the 5% level.

***: statistically significant at the 1% level.

The t-statistics are in parentheses.

The estimated coefficients of the MSA dummies and the YQ dummies are omitted.

- (1) The differential impact is positive and statistically significant
- (2) The magnitude of the differential impact increases with time

Conclusion

- The TCJA presents a great opportunity to study the impact of taxation on the housing market
- We identify and estimate its differential impact on the housing market, in particular, on the price-to-rent ratio between the MSAs in the blue states and those in the red states by using a difference-in-differences approach
- Employing the relevant data from 2017Q1 to 2018Q4 for the top 50 MSAs to implement the analysis, we find that the differential impact is positive and statistically significant, and that its magnitude increases with time
- Our findings suggest that taxation matters a lot for the housing market

Thank you for your attention!!!