The Impact of the Tax Cuts And Jobs Act on Residential Housing Choices

Dena Lomonosov

August, 2022

Abstract

The US tax code contains provisions that significantly reduce homeownership costs. These benefits were reduced under the Tax Cuts and Jobs Act of 2017, raising the real cost of property taxes and mortgages for a subset of taxpayers. This paper examines how individual homebuyers and residential housing markets responded to these changes. Using a unique constructed dataset of home loan records matched to deeds, this paper shows that homebuyers responded by purchasing smaller homes with lower property tax burdens, with the level of response indicating that the price elasticity of housing demand is approximately unit elastic. Homebuyers also reduced the size of their home loans (relative to sale price) by the equivalent of the response to a two percentage point increase in interest rates.

1 Introduction

The US federal tax code contains significant tax benefits for homeowners. Homeowners are not taxed on the imputed rental income of their homes and yet are nonetheless able to deduct property taxes and interest on their home mortgage from their taxable income. Furthermore, homeowners are entitled to large exemptions on capital gains when they sell their homes. The often stated reasoning behind these benefits is that they encourage home-ownership and that there are substantial societal benefits from higher home-ownership rates and homeowners who are more invested in their communities. The Tax Cuts and Jobs Act of 2017 provides an opportunity to study the effect of tax incentives on the housing market, as it substantially

reduced homeowner tax benefits for a subset of taxpayers.

The Tax Cuts and Jobs Act of 2017 (TCJA) was one of the largest US federal tax reforms in the last hundred years. It reduced the tax benefits of home-ownership in two major ways. First, it approximately doubled the standard deduction, reducing the fraction of itemizing taxpayers from 30% to 13%. Since only itemizers benefit from deducting property taxes and interest on a home mortgage, this raised the after-tax costs of home-ownership for taxpayers who stopped itemizing. Second, TCJA capped total state and local taxes (known by the acronym SALT) deductions to a maximum of $10,000. This provision was politically contentious because the largest beneficiaries of SALT deductions were taxpayers in states primarily represented by the Democratic Party while the TCJA was passed by the Republican party with no support from Democrats. Since the passage of the TCJA, there have been several attempts by Congressional Democrats to repeal the SALT cap. New York, New Jersey, Connecticut and Maryland (all states with high property taxes and high pre-TCJA itemization rates) unsuccessfully sued the federal government on the grounds that the deduction cap was an "unconstitutional assault on the States' sovereign choices"*. A return to a pre-TCJA system would provide an estimated $171 billion in tax benefits (or approximately 6% of individual income tax revenue), 92% of which would accrue to taxpayers earning over $100,000 a year†. Understanding the effect of the tax code on the housing market is thus both a salient policy and economic question.

This paper measures the impact of the TCJA on housing markets in New Jersey. New Jersey has the highest real estate property tax levels in the United States, with the average household paying over $5,000 in property taxes per year‡. New Jersey also has some of the highest state income tax rates, which coupled with the fact that New Jersey has the second highest median income means that New Jersey residents have particularly large state income tax bills. In tax year 2017 (prior to the passage of TCJA) 42% of New Jersey tax filers itemized their deductions (compared to 32% of all US tax filers) and the mean property tax

*See Filing and Outcome

†According to the Joint Committee on Taxation

‡According to data from the 2019 American Community Survey

deduction for New Jersey itemized returns was almost $9,000 (compared to $4,750 for all US itemized returns)*. This means that if the TCJA did impact housing markets, New Jersey is one of the most likely places where such an impact would be observed.

To measure individual home-buyer response, it is necessary to actually observe the house purchasing choices of home-buyers as well as relevant characteristics which determine tax benefits. This paper uses loan level data from the Home Mortgage Disclosure Act matched to deed and mortgage documents in New Jersey's Middlesex County. This provides (among other things) features of a home-buyer's home loan, their income, marital status, sale price, home characteristics, and property taxes. The data-set creates a complete picture of the choices which are relevant for evaluating the impact of the TCJA. In particular, this paper estimates a difference in differences model which compares groups who did not experience changes to the tax treatment of their home expenses post-TCJA with those who did experience changes to the tax treatment of their home expenses post-TCJA.

The difference-in-differences analysis finds that those households which were induced to stop itemizing by TCJA purchased homes that were 8% less expensive, had 5% lower property taxes, and were 7% smaller. These taxpayers also originated home-purchase loans that were 4.3 percentage points lower as a fraction of their home price. This is roughly equivalent to home-buyers' responsiveness to a 2 percentage point increase in mortgage interest rates. Households that still itemized but are unable to fully deduct their state and local taxes due to the $10,000 cap purchased homes that were 7% less expensive, had 3% lower property taxes, and were 6% smaller. This papers finds no evidence that these taxpayers reduced their relative home loan sizes. This is consistent with the fact that these taxpayers were unable to fully deduct their property taxes but were still able to fully deduct the interest on their home loans. This paper finds that homebuyers are responsive to changes to the tax treatment of home-ownership, and that less generous tax benefits resulted in home-buyers opting for smaller homes with lower property tax burdens. They also used less debt to finance their home purchase in response to the increase in the (after-tax) interest rate.

*According to the IRS Statistics of Income

The rest of the paper proceeds as follows. Section Two discusses the effect of taxation on the housing market. Section Three discusses the specifics of the changes to the US federal tax code after the enactment of the Tax Cuts and Jobs Act. Section Four describes the details of real estate property taxation in New Jersey. Section Six presents the estimation strategy and main empirical results for the difference in differences analysis. Section Seven summarizes and concludes the results of the paper.

2 Related Literature

The preferential treatment of homeowners relative to renters by the United States federal tax code and the impact this has on the housing market has been a topic of discussion for decades. Aaron (1970) argued that the favorable tax treatment of homeowners in the United States lead to higher housing prices and that the benefits of the tax subsidies primarily accrued to upper income homeowners. Poterba (1984) contended that the favorable tax treatment of housing raises prices. Gyourko and Sinai (2003) demonstrated that the benefits of the deductibility of mortgage interest payments and property taxes are distributed highly unevenly throughout the United States. In 1990, New Jersey received $5,915 in net tax benefits per owner-occupied housing unit compared to the national average was $2,092 per owner-occupied housing unit. South Dakota had the lowest net tax benefit at $917 per owner-occupied housing unit, and Hawaii had the highest net benefit at $10,718 per owner-occupied housing unit. They argue that given that high-income high-tax-bracket homeowners tend to live in high-value homes with high property taxes, the deduction of property taxes and mortgage interest payments is at odds with an otherwise progressive tax code. Poterba and Sinai (2008) estimated that repealing the property tax deduction would increase the marginal user cost of housing by three percent, although they use the national average property tax rate so the impact may be expected to be much larger for high tax localities. In later work, Poterba and Sinai (2011) argued that a mortgage interest deduction cap would reduce demand for housing among high marginal income tax households but would largely have no effect for lower and middle income

households.

Engelhardt et al (2010) find that tax subsidies do increase homeownership rates among low income households, however this is not a group that sees many benefits from the tax treatment of US housing under consideration in this paper. However, Gruber et al (2021) find no effect on homeownership after an enactment of more favorable mortgage treatment in Denmark, although they do find that it increases housing demand and loan to value ratios. Ling and McGill (1998) and Dunsky and Follain (2000) examine the US Tax Reform Act of 1986 and find strong (up to unit elastic) responses to the increased cost of mortgage debt. Jappelli and Pistaferri (2007) look at a tax reform that reduced a mortgage interest deduction in Italy and find no evidence of change on either the intensive or extensive margin, which they attribute to borrowing constraints and lack of knowledge about the policy change. In the United States, Hilber and Turner (2014) argue that the mortgage interest deduction boosts homeownership rates only for higher income households in areas with elastic housing supply, Hanson (2012) finds no evidence of the mortgage deduction increasing homeownership but does find that it results in the purchase of larger homes. Using a general equilibrium framework Sommer and Sullivan (2018) estimated that eliminating the deductibility of mortgage interest payments for owner-occupied housing would lead to a reduction in home prices, a reduction in housing consumption by the wealthy, and an increase in homeownership overall.

Studies relating to the question of how to isolating the impact of property taxes on housing prices date back to Oates (1969). The central difficulty in identification in this literature relates to the fact that local public goods in the United States (particularly education) are funded through either local property or incomes taxes. As a result, it is very difficult to accurately estimate property tax capitalization using variation across municipalities, since higher property taxes will generally be correlated with a higher provision of local public goods. Palmon and Smith (1998) estimate property tax capitalization using localities which are in the same school district but have different funding schemes for other public goods, resulting in different property tax rates. They find a property tax capitalization rate of 62 percent. De Bartolome and Rosenthal (1999) include the itemization behavior of homeowners in estimating the capitalization of property taxes into housing prices. In order to correct for the simultane-

ity of home prices and property tax burdens, they use the structural attributes of the home from four years prior to the observed sale. They find a capitalization rate of approximately 40 percent. A number of papers have found evidence that lower taxation or increased outside funding raises house prices (such as in Ross and Yinger (1999), Sirmans et al (2008), Hilber et al (2011), Cabral and Hoxby (2012). There is also increasing evidence that the degree of capitalization is tied to the supply of housing (for instance in Lutz (2015), Hilber (2015), and Hilber and Vermeulen (2016). Elinder and Persson (2017) look at the impact of a national property tax reduction in Sweden on home prices. They find little effect for all but the top one percent by price of homes, and for the top one percent they find a 50 percent capitalization rate. Giertz et al (2021) find 70 percent capitalization of higher property tax rates into home prices in Dallas County, Texas, and Livy (2018) finds full capitalization in Franklin County, Ohio. It is important to note that these two papers papers consider reforms in areas that have relatively elastic housing supply. Bradley (2017) estimates an intra-jurisdictional model where new homeowners experience temporary property tax savings due to inheriting the previous owners' capped assessed taxable value for the remainder of the calendar year following a sale. Bradley finds an enormous overcapitalization of 2900-3700 percent which he argues is due to a misapprehension by the new homeowners that the tax savings are permanent rather than temporary. This is an important consideration for this paper as well, since it is unclear how aware homebuyers are of the change to the federal tax code treatment of property taxes.

This paper also broadly relates to literature on transaction real estate taxes, which has shown that that real estate transaction taxes reduce the sale price of homes (such as Besley et al (2014), Kopczuk and Monroe (2015), and Best and Kleven (2018)).

3 Tax Cuts and Jobs Act

The Tax Cuts and Jobs Act was signed into law on December 22nd of 2017. Features of the law which were relevant for home-owners went into effect starting in tax year 2018. Public awareness of a major bill and its contents started several months earlier*. Because the average time between making an offer and closing on a home is 47 days †, the paper assumes that only homebuyers who closed on their homes starting in January of 2018 were aware of the post-TCJA tax treatment of home-ownership.

The Tax Cuts and Jobs Act slightly lowered marginal tax rates for all income levels (see Table 3.1). It also substantially increased the standard deduction, from $6,500 to $12,000 for single filers and from $13,000 to $24,000 for joint filers. A federal income tax payer can choose between taking the standard deduction and then paying federal income taxes of (3.1) and itemizing their deductions and paying federal income taxes of (3.2).

(a) Marginal Tax Rates 2017

Rate	Single	Married Filing Separately	Married Filing Jointly	Head of Household
	Taxable Income Over:			
10%	$0	$0	$0	$0
15%	$9,325	$9,325	$18,650	$13,350
25%	$37,950	$37,950	$75,900	$50,800
28%	$91,900	$76,550	$153,100	$131,200
32%	$191,650	$116,675	$233,350	$212,500
35%	$416,700	$208,350	$416,700	$416,700
39.6%	$418,400	$235,350	$470,700	$444,550

(b) Marginal Tax Rates 2018

Rate	Single	Married Filing Separately	Married Filing Jointly	Head of Household
	Taxable Income Over:			
10%	$0	$0	$0	$0
12%	$9,525	$9,525	$19,050	$13,600
22%	$38,700	$38,700	$77,400	$51,800
24%	$82,500	$82,500	$165,000	$82,500
32%	$157,500	$157,500	$315,000	$157,500
35%	$200,000	$200,000	$400,000	$200,000
37%	$500,000	$300,000	$600,000	$500,000

Table 3.1: Marginal Tax Rates Before and After TCJA

$$\sum_{j=1}^{n} \tau_{f_j} \cdot \min\left[Y_{f_j,\max}, Y - \text{Std. Ded.}\right] \cdot \mathbb{1}[Y - \text{Std. Ded.} > Y_{f_{j-1},\max}] \tag{3.1}$$

$$\sum_{j=1}^{n} \tau_{f_j} \cdot \min\left[Y_{f_j,\max}, Y - \sum_{l=1}^{L} \text{Itemized Ded.}_l\right] \cdot \mathbb{1}[Y - \sum_{l=1}^{L} \text{Itemized Ded.}_l > Y_{f_{j-1},\max}] \tag{3.2}$$

*See Appendix Figure A.1 for Google Trends indices in the second half of 2017

†According to EllieMae, a mortgage application processor

Where τ_{f_j} is the jth marginal tax rate (ordered by the income tax schedule from lowest to highest relevant income threshold), $Y_{f_j,\max}$ is the last dollar of income that is taxed at the τ_{f_j} level, Y is the tax payer's income, Std. Ded. is the standard deduction, and $\sum_{l=1}^{L}$ Itemized Ded$_l$ is the sum of allowed deductions. By increasing the standard deduction the TCJA reduced the incentives to itemize deductions, as any taxpayer for whom $\sum_{l=1}^{L}$ Itemized Ded.$_l$ > Std. Ded. should optimally choose to take the standard deduction (ignoring the additional time cost of itemizing or the potential concerns about increased audit risk).

There is an additional caveat, which is that if an itemizing taxpayer ends up with a computed taxable income under equation (3.2) which is too low conditional on their income, then they will be subject to the Alternative Minimum Tax. Relative to the ordinary income tax schedule, Alternative Minimum Tax (AMT) provides taxpayers with lower marginal tax rates and an exemption but restricts deductions (including not allowing state and local tax deductions). Table 3.2 shows the Alternative Minimum Tax Schedule in 2017 and 2018.

Table 3.2: Alternative Minimum Tax Schedule

	Type of Filer			
	Single	Married Filing Jointly	Head of Household	Married Filing Separately
	Pre Tax Cuts and Jobs Act (2017)			
Exemption	$54,300	$84,000	$54,300	$42,250
26% Bracket Maximum	$187,800	$187,800	$187,800	$93,900
28% Bracket	>$187,800	>$187,800	>$187,800	>$93,900
Exemption Phaseout Threshold	$120,700	$160,900	$120,700	$80,450
	Post Tax Cuts and Jobs Act (2018)			
Exemption	$72,900	$113,400	$72,900	$56,700
26% Bracket Maximum	$197,900	$197,900	$197,900	$98,950
28% Bracket	>$197,900	>$197,900	>$197,900	>$98,950
Exemption Phaseout Threshold	$518,400	$1,036,800	$518,400	$518,400

The Tax Cuts and Jobs Act also reduced the generally tax preferred treatment of home-

ownership in the US federal tax code. Prior to the passage of the TCJA, a taxpayer could deduct all state and local taxes paid from their federal taxable income. This included state and local income taxes, state and local real estate taxes (including for non-primary residence homes) and any personal property taxes. Taxpayers could also choose to deduct all state and local sales taxes that they had paid, but only if they did not also deduct state and local income taxes (almost all itemizing taxpayers chose to deduct state and local income taxes instead of sale taxes). Following the passage of the TCJA, taxpayers could only deduct a total of $10,000 in state and local taxes. Additionally, the TCJA reduced the generosity of the mortgage interest deduction allowance. Previously, home-owners could deduct any interest they had paid on their first $1,000,000 of mortgage interest debt, but after the passage of the TCJA this was limited to the first $750,000 of mortgage interest debt for homes which were purchased in 2018 and later (interest on mortgage debt for non primary residences could also be applied to this total).

After the passage of the TCJA, the fraction of the New Jersey population which itemized their federal income tax returns fell sharply as evidenced in Table 3.3. Prior to the passage of the TCJA, 86% of filers with incomes between $100,000 and $200,000 itemized their deduction, after the passage this was reduced to 31%. Similar declines were observed across all income levels. Additionally, of those tax payers who still chose to itemize, a large fraction were unable to fully deduct their state and local taxes due to the $10,000 cap. In 2016, the mean state and local tax deduction for those with incomes between $100,000 and $200,000 was $14,800, and so unsurprisingly in 2018 93% of taxpayers in that same income range who itemized were unable to fully deduct their state and local taxes (see Table 3.4). Average total deductions are higher in 2018 than in 2016, which is consistent with an increase in the threshold at which it becomes optimal to itemize rather than take the standard deduction.

These less generous deductibility provisions (and more generous standard deductions) would raise the after tax cost of home-ownership for a large fraction of potential home-buyers in New Jersey. If these home buyers are aware and responsive to this change it may be reflected in the fall in home prices of homes which carry relatively high property tax burdens.

Table 3.5 shows a how a number of hypothetical returns would differ between 2017 and

Table 3.3: Tax Filing Status in New Jersey

	Income Range (In Thousands)				
	$50- $75	$75 - $100	$100 - $200	$200 - $500	$500 - $1,000
2016					
Number of Returns	587,690	398,770	700,750	270,290	42,280
Fraction Joint	32%	52%	76%	88%	89%
Itemized Deductions	47%	65%	86%	98%	98%
2018					
Number of Returns	607,790	416,100	754,470	315,040	49,700
Fraction Joint	29%	49%	73%	87%	89%
Itemized Deductions	17%	24%	31%	48%	65%

Source: IRS Statistics of Income

2018. Property taxes and mortgage interest were chosen on the basis observed property taxes and mortgage interest payments in the IRS Statistics of Income data for New Jersey. Federal income taxes and state income taxes were calculated using the NBER TAXSIM program, as was optimal deduction behavior. In the pre-TCJA period, all households find it optimal to itemize their returns. In the post-TCJA period, only the households filing single returns find it optimal to itemize. Even the household which files jointly and makes $250,000 while paying $23,100 in SALT and $13,000 in mortgage interest would find it optimal to take the standard deduction, because only the first $10,000 of SALT is deductible. Of course, this is a simple example which does not include other potential deductions, but given that the sum of SALT and mortgage interest payments comprised 75% of all deductions in New Jersey in 2016 (and this fraction was even higher for high income households) it is instructive to consider the difference in outcomes even with only these deductions. Additionally, all households in this hypothetical ultimately pay less in federal income tax in 2018 than they did in 2017, so even though home-ownership is less subsidized in the post-TCJA world, households are overall better off. This means that if housing and local public goods are normal goods, then any reduction in their consumption post-TCJA would be due to the substitution effect, and the observed change would be partially attenuated by the positive income effects of higher net

Table 3.4: Tax Deductions in New Jersey

	Income Range (In Thousands)				
Mean Deductions	$50- $75	$75 - $100	$100 - $200	$200 - $500	$500 - $1,000
2016					
Total Deductions	$19,400	$22,200	$28,200	$47,100	$93,300
State Income Tax	$1,900	$3,100	$6,200	$17,200	$52,000
Property Tax	$ 5,800	$6,800	$8,600	$12,500	$19,800
Interest on Mortgage	$ 4,200	$5,200	$7,000	$9,800	$13,300
2018					
Total Deductions	$23,200	$24,700	$29,000	$36,000	$51,700
State Income Tax	$2,000	$3,200	$6,300	$17,000	$48,200
Property Tax	$6,800	$7,600	$9,300	$13,400	$19,000
Interest on Mortgage	$6,100	$7,200	$10,200	$14,900	$18,000
SALT Deducted	$7,400	$8,400	$ 9,200	$9,600	$9,700

Source: IRS Statistics of Income

of tax earnings.

4 New Jersey Property Taxes

In New Jersey, taxes on real estate are levied only by municipalities, and represent a significant sources of revenue for municipalities. Municipalities in New Jersey received an average of 52% of their revenue from property taxes, compared to an average of 28% for municipalities in other states *.

Homes are taxed based on their assessed value as of October of the previous year, with some municipalities requiring quarterly tax payments and others biannual. Unlike in some states, the value on which homes can be taxed is not capped at the value at the time of purchase, so homes are taxed on the full current value of their home. Homes are regularly reassessed, with some municipalities reassessing all homes every year and all municipalities

*According to the New Jersey State League of Municipalities

Table 3.5: Hypothetical New Jersey Tax Returns Pre and Post TCJA

	Income					
	$100,000	$100,000	$150,000	$150,000	$250,000	$250,000
Return Type	Single	Joint	Single	Joint	Single	Joint
Property Taxes	$8,000	$8,000	$9,000	$9,000	$12,000	$12,000
State Income Taxes	$3,700	$2,200	$6,800	$4,900	$14,000	$11,100
Mortgage Interest	$7,000	$7,000	$10,000	$10,000	$13,000	$13,000
2017						
Optimal Deduction Behavior	Itemize	Itemize	Itemize	Itemize	Itemize	Itemize
Total Taxable Income	$77,000	$75,000	$120,200	$118,000	$208,000	$205,800
Federal Income Tax (Excluding FICA)	$15,000	$10,300	$ 26,600	$21,000	$52,000	$44,500
2018						
Optimal Deduction Behavior	Itemize	Std. Ded.	Itemize	Std. Ded.	Itemize	Std. Ded
Excess SALT	$1,700	NA	$5,800	NA	$16,000	NA
Total Taxable Income	$83,000	$76,000	$130,000	$126,000	$227,000	$226,000
Total Federal Income Tax (Excluding FICA)	$14,200	$8,700	$25,500	$20,000	$55,000	$42,800

Source: NBER TAXSIM

reassessing all homes at least every five years. As a result, the assessed value of a home does not change dramatically immediately after it is purchased. In the property tax data, the median reassessed home increased in assessed value by $6,800 if the home had not been sold in the last year, and $10,000 if it had been sold in the last year at fair market price *.

5 Data

All of the data used in this paper is publicly available data obtained from the New Jersey Department of the Treasury, the individual counties of New Jersey, and the Home Mortgage Disclosure Act. Yearly property tax records from 2012 to 2020 for all residential homes were

*Fair market price as determined by the assessor

obtained from the New Jersey Department of the Treasury. These yearly records include information on the location of the property, the value of the assessed property, the amount of property tax levied, any deductions or exemptions for the property, the total acreage of the property, as well as information on the name and address of the property owner, the most recent sale date, and the most recent sale price. Deed records for all deeds between 2014 and 2019 are also obtained from the New Jersey Department of the Treasury. These deeds include information on the location of the property, the square footage of the building, the deed date, the sale price, whether the sale was between related parties, whether the assessor considered the sale to be at fair market price, whether the property is a condominium, the year in which the home was built, as well as the names and addresses of both the seller and the buyer. All properties are assigned a unique identifier, which were used to link deed records to property tax records.

A publicly available walkability index from the EPA is also used to identify the extent to which a home is in an urban location. The National Walkability Index calculates for each Census group how easily residents can reach public transportation services, the mix of residential and business property in the block (including types of businesses), and the number of street intersections (more street intersections indicating a more walkable area).

For the difference in differences estimation this paper combines several sources of data in order to create a mortgage loan level data set consisting of households which purchased homes in New Jersey's Middlesex County between 2014 and 2019. This paper combines the deed and property tax data described above with mortgage documents and data from the Home Mortgage Disclosure Act. Mortgage documents are publicly available from the Middlesex County Clerk's office.Optical Character Recognition software was used to extract the mortgaged property location, the name(s) of the mortgagor(s), the marital status of the mortgagor, the name of the lender, the date on which the mortgage was signed, and the size of the loan. Mortgages were matched to deeds using the property location on the mortgage document and the property location in the deed, the name of the buyer and mortgagor (if there are multiple buyers or mortgagors, at least one of the names must appear in both documents), and the date of the home sale and mortgage (the mortgage could be signed no

later than two months after the deed date). This mortgage and deed data was then matched to the Home Mortgage Disclosure Act data set. The Home Mortgage Disclosure Act (HMDA) is a publicly available data set published by the Consumer Financial Protection Bureau. The Home Mortgage Disclosure Act requires all sufficiently large lending institutions (estimated to cover approximately 80 percent of the home loan market) to provide the federal government with information on every received home loan application. This includes, among other things, the census tract in which the property is located, the purpose of the loan, the gender and race of the applicant (and any co-applicants), the income of the applicant, the size of the loan, whether the property will be owner-occupied (and whether it will be a principle dwelling), and whether the loan application resulted in an originated loan. The HMDA data is matched to the mortgage and deed data on the name of the lender, the property location (using the census tract in the HMDA), and the size of the loan. This is sufficient to uniquely identify over 90 percent of originated loans in Middlesex County. This method is able to match approximately 50 percent of fair market home purchases to their corresponding HMDA record.

6 Difference in Differences Estimation

This paper employs a difference-in-differences strategy to determine the responsiveness of households who move to the changed tax incentives under the TCJA. The assumption is that households make the decision to move independent of changes to the tax treatment of property tax and mortgage interest, but that conditional on moving they will take into account these changes. The NBER TAXSIM software is used to determine optimal deduction behavior for each household under 2017 (pre-TCJA) and 2018 (post-TCJA) tax systems. Mortgage documents which were obtained from the county clerks office included the marital status of borrowers and assumption was made that individuals file jointly if they are married. Additionally, this paper assumes that the only sources of deductions are property taxes and state income taxes. This means that households with other substantial deductions that make them optimally itemize rather may be incorrectly classified as itemizers under the post TCJA tax regime (less than 3% of the sample was estimated to be a non-itemizer under the pre TCJA tax regime). This means that the estimates in this section represent a lower limit

to the responsiveness of households to the TCJA since some households will be classified as having been exposed to a larger change than the true change to the tax treatment of their home.

There is both a binary treatment estimation and a continuous treatment estimation. In the binary treatment estimation, households which optimally itemize their deductions in both the pre and post TCJA era and do not exceed the $10,000 limit on state and local taxes (which in New Jersey are comprised of property and income taxes) are the untreated group. There are two separate sets of treated groups. The first group is comprised of households which optimally itemize their deduction pre TCJA but not post TCJA. For these households, the real cost of both their property taxes and mortgage interest payments is higher in the post TCJA world because it is no longer reduced by a factor of $(1-\tau_f)$ as it was before TCJA was passed. The second group is comprised of households which optimally itemize their deductions both in the pre and post TCJA era, do not have home loans in excess of $750,000, would not have had any Alternative Minimum Tax Liability under the pre-TCJA tax regime, but whose state and local taxes exceed the $10,000 limit. For these households, the marginal cost of an additional dollar of property taxes equal to $1 in the post TCJA era but only equal to $(1-\tau_f)$ in the pre-TCJA era.

For the binary treatment, the estimated difference in differences equation is:

$$Y_{i,t} = \beta_0 + \beta_1 \text{Treatment}_i + \beta_2 \text{Treatment}_i \cdot \text{Post TCJA} + \beta_3 \text{Post TCJA} + \delta X_{it} + \varepsilon_{it} \quad (6.1)$$

The estimated outcomes of interest $Y_{i,t}$ are the home purchasing price, the home loan size, the home loan size as a fraction of sale price, and the yearly property tax. The treatment groups and the control group are as described in the previous paragraph.

In the continuous treatment estimation, this paper exploits variation in marginal tax rates within treated groups and employs a continuous difference in differences approach. The degree of property tax and mortgage subsidization is increasing in marginal tax rates, so a household in a higher tax bracket which is induced to stop itemizing by TCJA experiences a larger real increase in property tax and mortgage costs than a household in a lower tax bracket which also stops itemizing after TCJA. Additionally, households which continue to itemize and do not

have state and local taxes in excess of $10,000 experienced a small (on average 2%) decrease in marginal tax rates, slightly raising the real cost of deductible home expenses. The continuous difference in differences specification is

$$Y_{i,t} = \beta_0 + \beta_1 \Delta\tau_i + \beta_{3,t}\Delta\tau_i \cdot \text{Deed Year} + \beta_{4,t}\text{Deed Year} + \delta X_{it} + \varepsilon_{it} \tag{6.2}$$

Where $\Delta\tau_i$ is the change in the real marginal cost of property taxes (or interest on a home loan). A household which itemized before and after TCJA and did not exceed the SALT cap would have $\Delta\tau_i = \tau_{i,2017} - \tau_{i,2018}$. A household which itemized before TCJA but not after would have $\Delta\tau_i = \tau_{i,2017}$ since prior to TCJA they received a reduction in the real cost of their itemized deductions. Similarly, a household that itemized before and after TCJA but exceeded the SALT cap would when considering property taxes have $\Delta\tau_i = \tau_{i,2017}$ since the marginal dollar of property taxes would not be deductible (even though some portion of their property taxes may have been deductible).

Tables 6.1, 6.2, and 6.3 show summary statistics by treatment group. Compared to both of the treatment groups, the control group is unsurprisingly less wealthy, and purchases smaller, less expensive homes which carry lower yearly property taxes. This group is overwhelmingly single, because married couples who choose to itemize will almost certainly have more than $10,000 in SALT (otherwise, it is unlikely that they will find it optimal to itemize).

Figures 6.3 through 6.8 show pre and post TCJA trends for home-buyers who do not optimally itemize under TCJA (but would have before TCJA), home-buyers who optimally itemize before and after TCJA but who have SALT of less than $10,000, and home-buyers optimally itemize before and after TCJA and who have SALT of more than $10,000. In the first year after the passage of TCJA home-buyers who stop itemizing or exceed the SALT limit purchase less expensive, smaller homes with lower property taxes. Additionally, as can be seen in figure 6.2, homebuyers who do not optimally itemize post TCJA take out smaller loans (as a fraction of their sale price). This is consistent with the fact that the after-tax cost of home loans has risen for this group. Homeowners who continue to itemize appear to have no change in the relative size of their home loans, consistent with the after-tax cost of home

loans remaining the same for both homebuyers with SALT less than $10,000 and homebuyers with SALT in excess of $10,000.

These post-TCJA trends appear to somewhat reverse in 2019. Falling home loan interest rates in 2019 and rising stock values may be an explanatory factor. Higher stock values may be more beneficial for both the no longer itemizing group and the group with SALT greater than $10,000 than the itemizers with less than $10,000 in SALT. This is due to these two groups of homebuyers having significantly higher incomes than the itemizers with SALT less than $10,000 and higher incomes correlate in the general population with larger savings.

For the continuous difference in differences estimations, figures 6.9 to 6.14 show trends for home loans and property taxes decomposed by change in $\Delta\tau_i$ from equation (6.2) of home loans (figures 6.9 to 6.12) and property taxes (figures 6.13 and 6.14). For the purposes of graphically representing trends changes in costs, $\Delta\tau_i$ from equation (6.2) is rounded to the nearest 10%. In order account for the seasonality of the residential real estate market, figures 6.9 to 6.14 show a twelve month moving average. This has the downside that values for time periods within six months of the start of 2018 (when the Tax Cuts and Jobs Act was enacted) are dependent on transactions before and after the tax regime change. To somewhat remedy this, trends which only include the data from before the passage of the TCJA are also shown.

Table 6.1: Characteristics of Home Buyers

	Mean	Std. Dev.	10th Percentile	90th Percentile
Control Group:				
Itemizing, SALT $<$ \$10,000				
Income	\$69,767	\$17,025	\$50,000	\$92,000
Percent Married	3.7%			
Number of Observations	2,296			
Treatment Groups:				
No Longer Itemizing				
Income	\$107,393	\$77,555	\$57,000	\$164,000
Percent Married	60%			
Number of Observations	8,931			
Itemizing, SALT $>$ \$10,000				
Income	\$137,420	\$60,529	\$85,000	\$196,000
Percent Married	45%			
Number of Observations	5,963			

Table 6.2: Characteristics of Purchased Homes

	Mean	Std. Dev.	10th Percentile	90th Percentile
Control Group:				
Itemizing, SALT < $10,000				
Home Sale Price	$256,745	$58,047	$190,000	$335,000
Home Loan (in Dollars)	$223,981	$57,609	$159,125	$303,036
Yearly Property Tax Post Sale	$6,197	$1,205	$4,591	$7,779
Treatment Groups:				
No Longer Itemizing				
Home Sale Price	$310,925	$86,946	$213,000	$412,000
Home Loan (in Dollars)	$256,290	$64,044	$170,000	$334,650
Yearly Property Tax Post Sale	$7,731	$2,293	$5,193	$10,576
Itemizing, SALT > $10,000				
Home Sale Price	$454,273	$131,122	$300,000	$625,000
Home Loan (in Dollars)	$384,487	$102,707	$250,800	$512,800
Yearly Property Tax Post Sale	$10,966	$3,059	$7,540	$14,897

Table 6.3: Physical Characteristics of Purchased Homes

	Mean	Std. Dev.	10th Percentile	90th Percentile
Control Group:				
Itemizing, SALT < $10,000				
Square Feet	1316	328	924	1737
Age of Home (Years)	56	27	25	97
Acreage	0.14	0.44	0	0.23
Treatment Groups:				
No Longer Itemizing				
Square Feet	1574	497	1026	2171
Age of Home (Years)	50	25	20	86
Acreage	0.17	0.52	0	0.34
Itemizing, SALT > $10,000				
Square Feet	2157	658	1382	2998
Age of Home (Years)	41	24	14	68
Acreage	0.26	0.44	0	0.47

Figure 6.1: Pre TCJA Trends in Loan to Sale Price Ratios

Figures are twelve month rolling averages

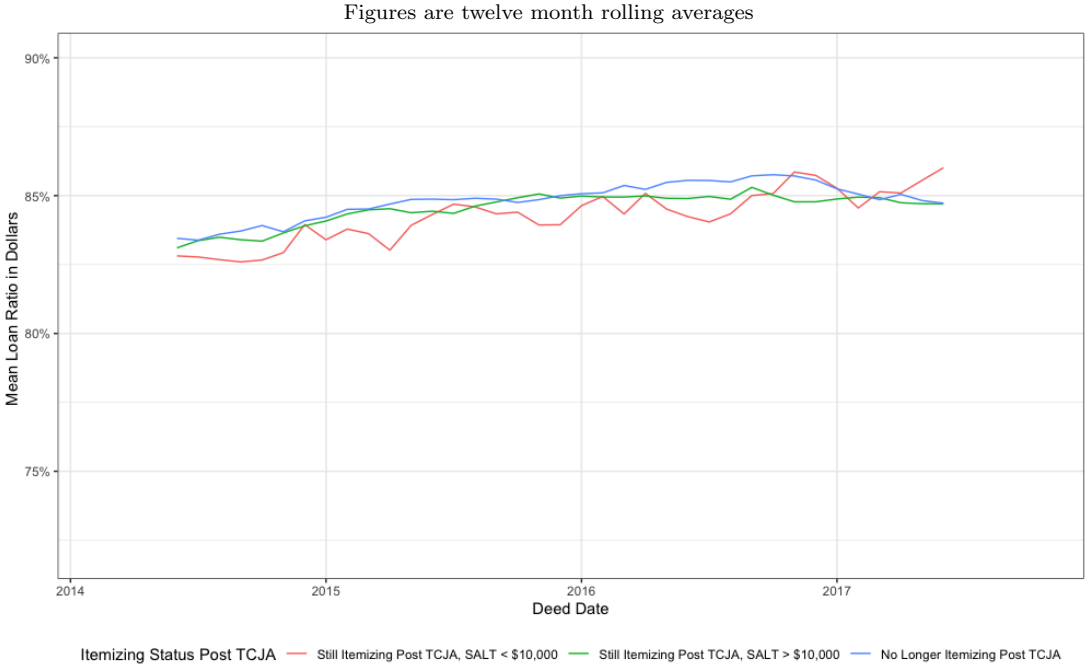


Figure 6.2: Pre and Post TCJA Trends in Loan to Sale Price Ratios

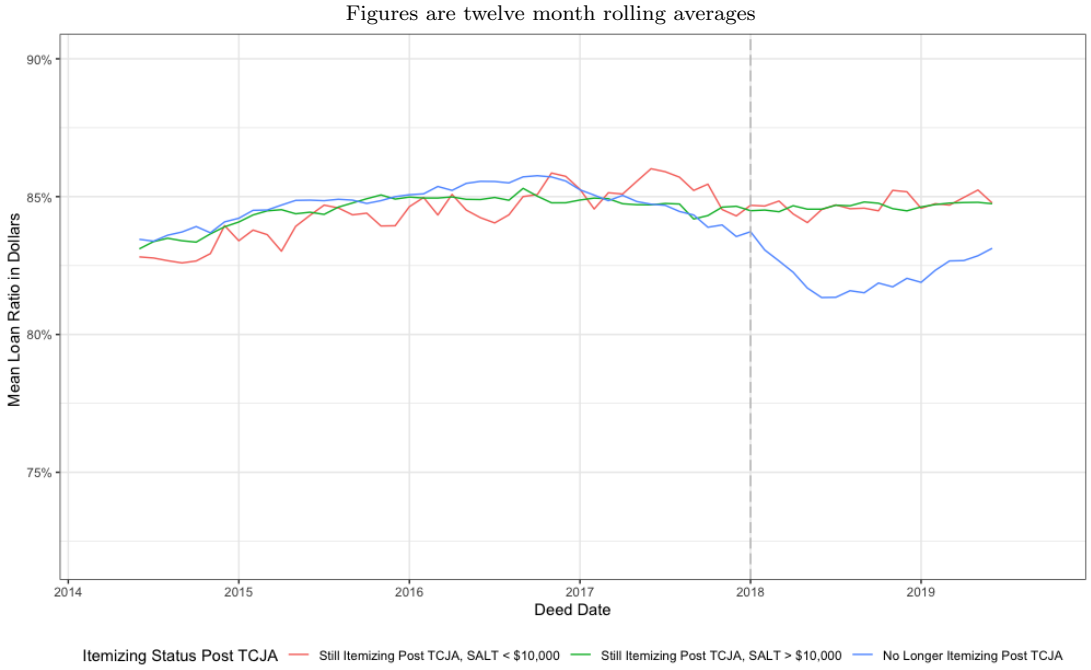


Figure 6.3: Pre TCJA Trends in Yearly Property Tax Bills

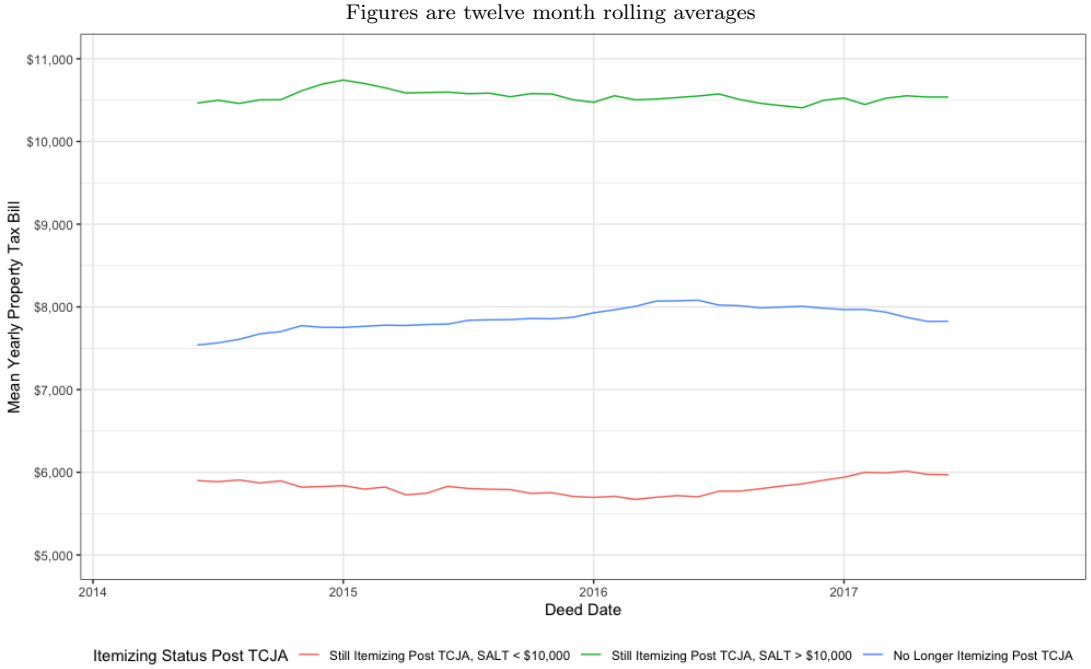


Figure 6.4: Pre and Post TCJA Trends in Yearly Property Tax Bills

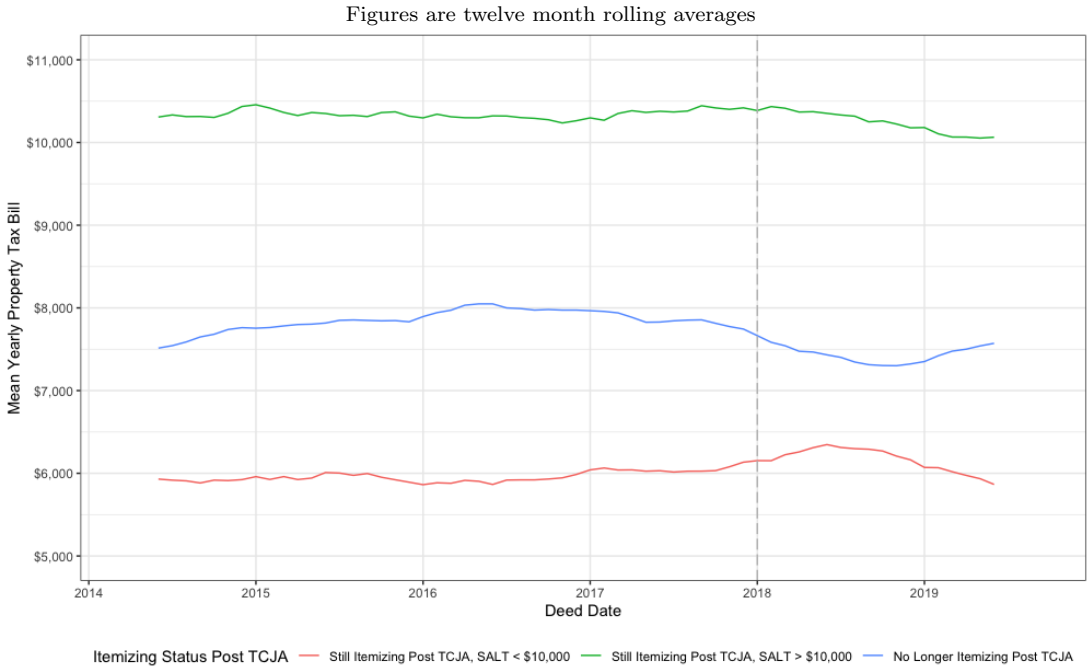


Figure 6.5: Pre TCJA Trends in Sale Prices

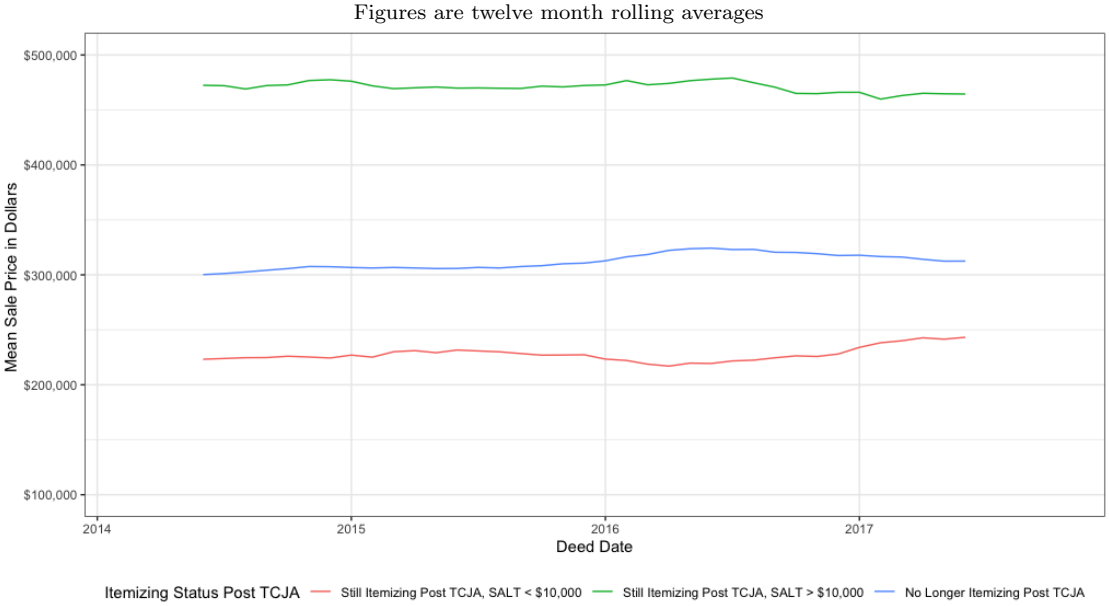


Figure 6.6: Pre and Post TCJA Trends in Sale Prices

Figures are twelve month rolling averages

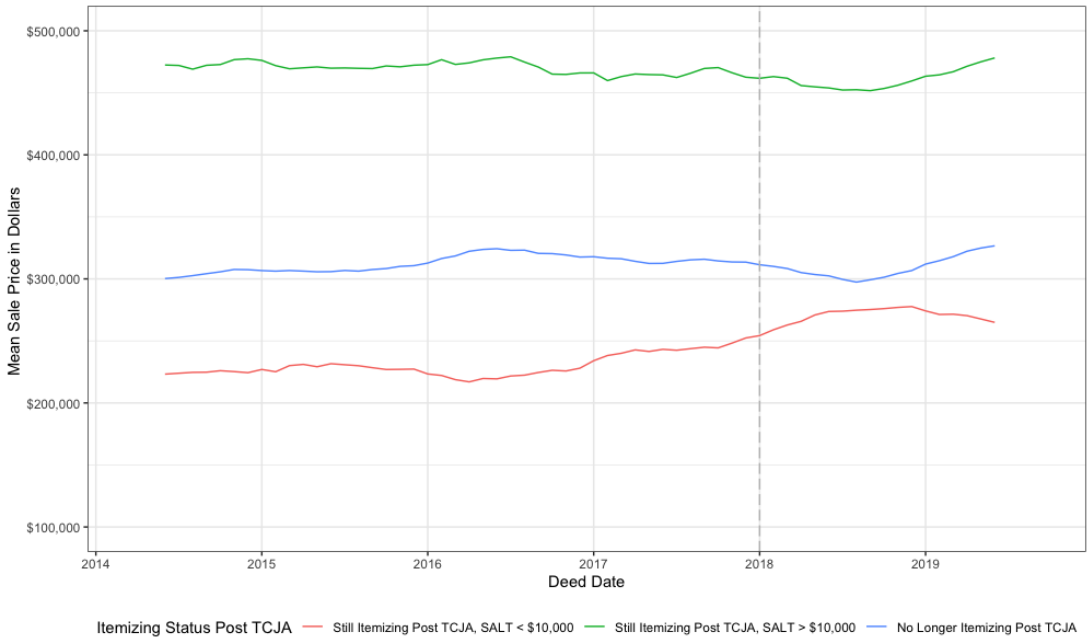


Figure 6.7: Pre TCJA Trends in Square Footage of Homes

Figures are twelve month rolling averages

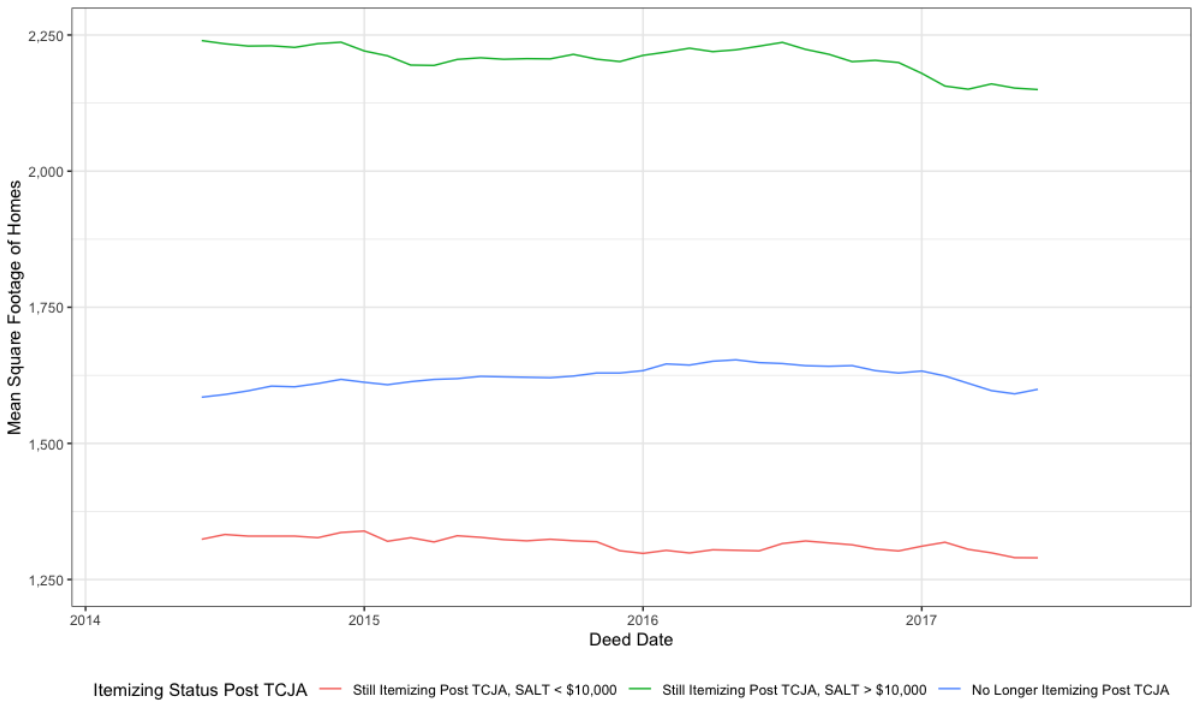


Figure 6.8: Pre and Post TCJA Trends in Square Footage of Homes

Figures are twelve month rolling averages

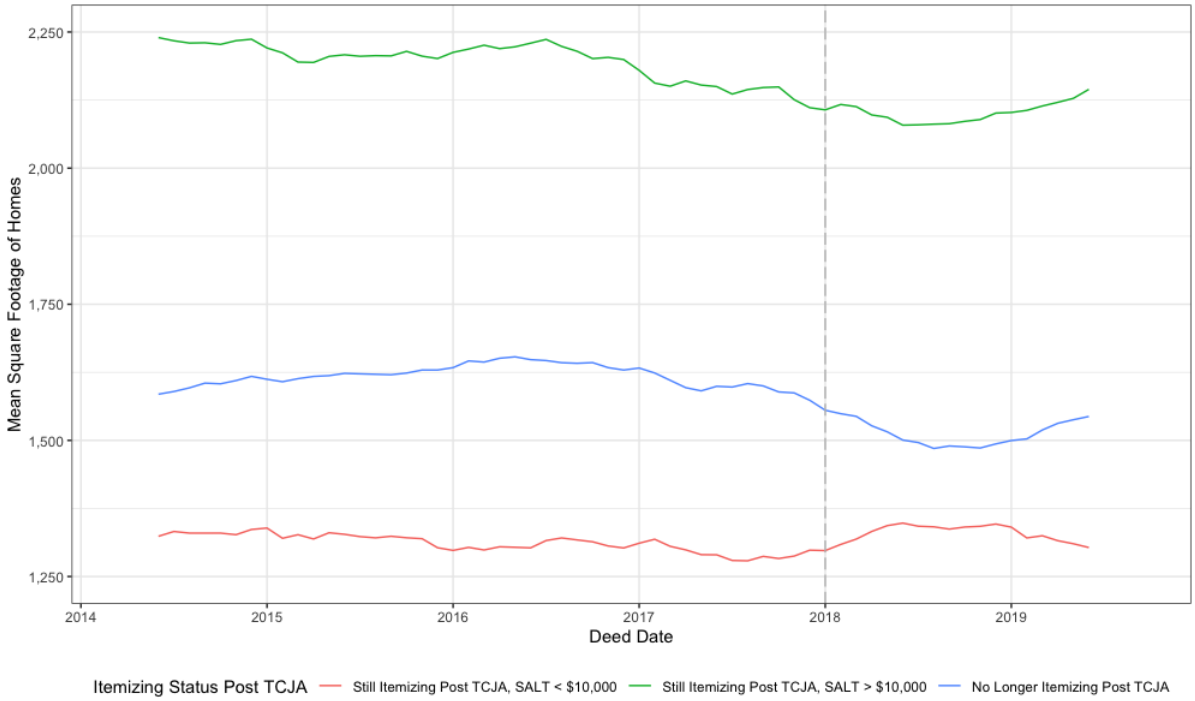


Figure 6.9: Pre TCJA Trends in Ratio of Home Loan to Sale Price

Figures are twelve month rolling averages, change in marginal costs are rounded to nearest 10%

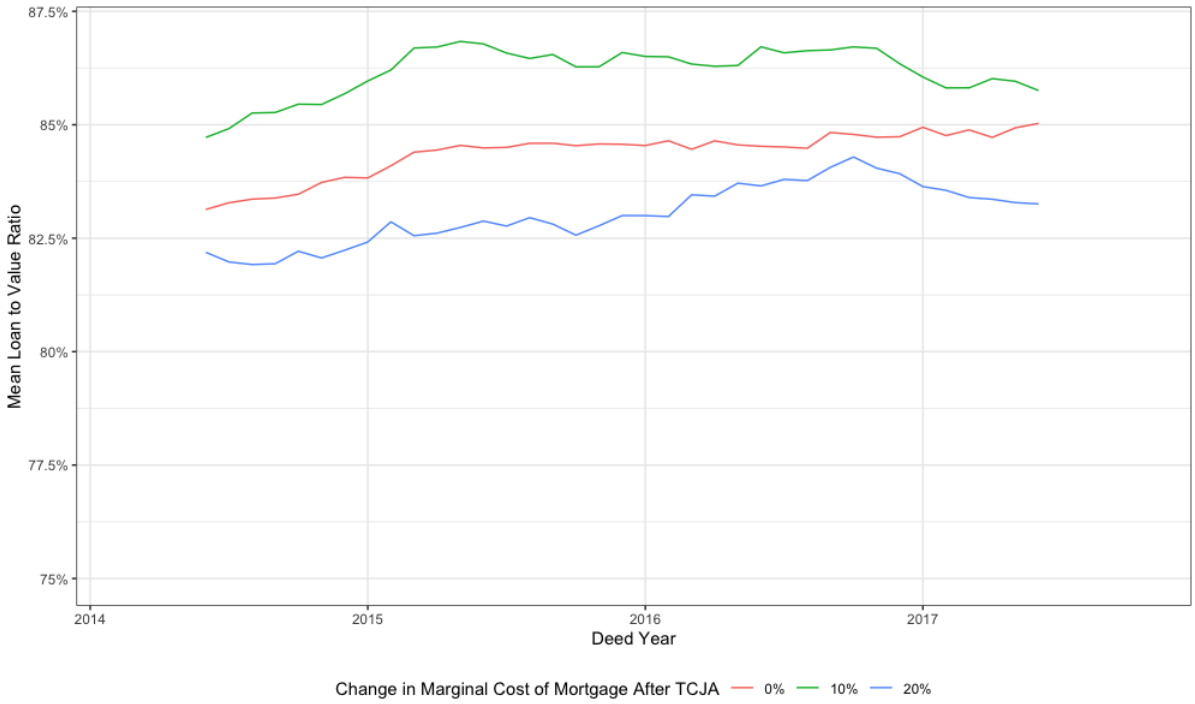


Figure 6.10: Pre and Post TCJA Trends in Ratio of Home Loan to Sale Price

Figures are twelve month rolling averages, change in marginal costs are rounded to nearest 10%

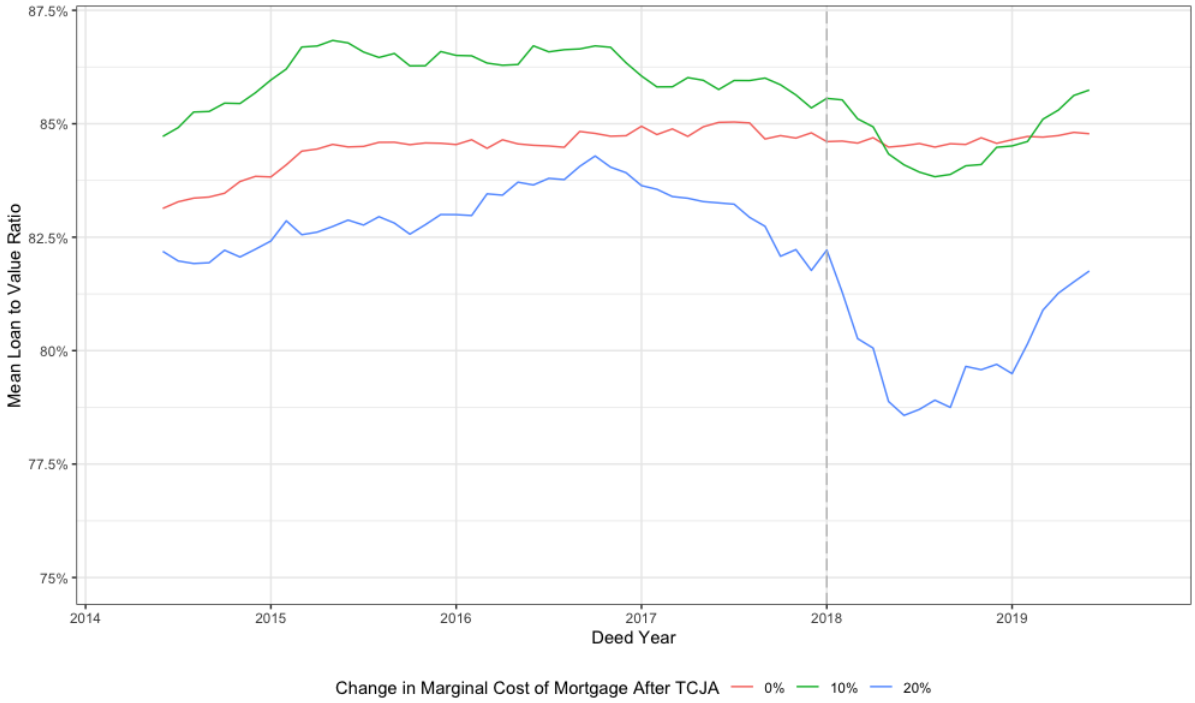


Figure 6.11: Pre TCJA Trends in Home Loan Size

Figures are twelve month rolling averages, change in marginal costs are rounded to nearest 10%

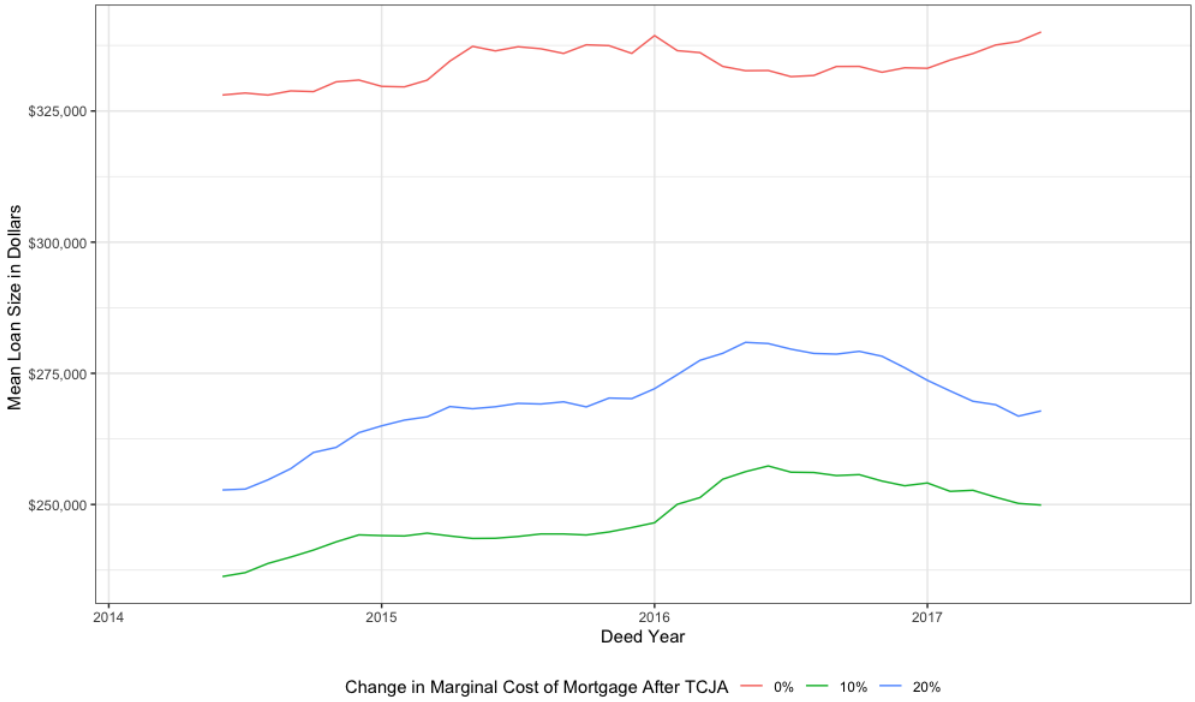


Figure 6.12: Pre and Post TCJA Trends in Home Loan Size

Figures are twelve month rolling averages, change in marginal costs are rounded to nearest 10%

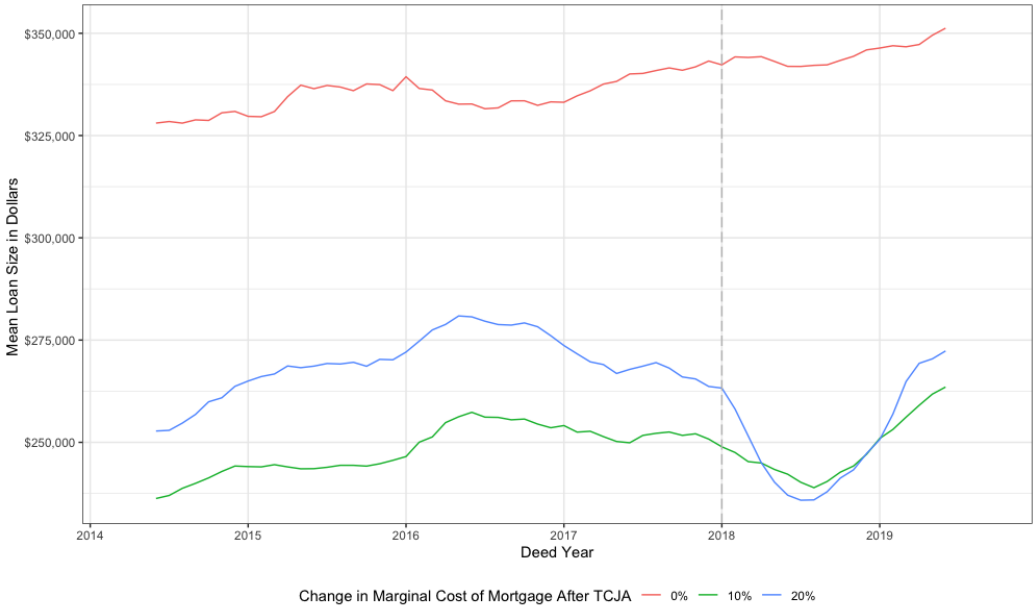


Figure 6.13: Pre TCJA Trends in Property Tax Size

Figures are twelve month rolling averages, change in marginal costs are rounded to nearest 10%

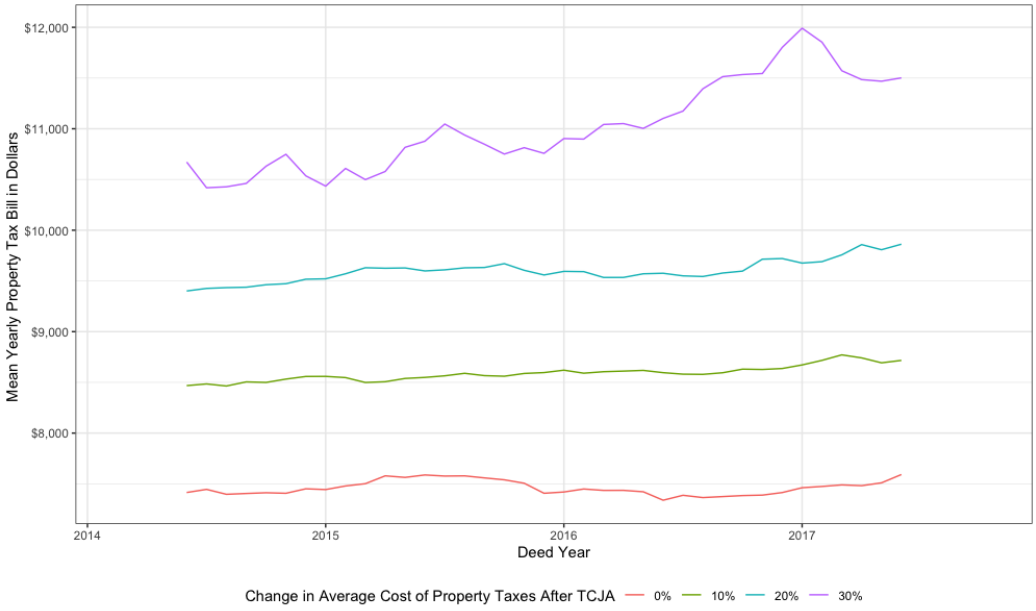
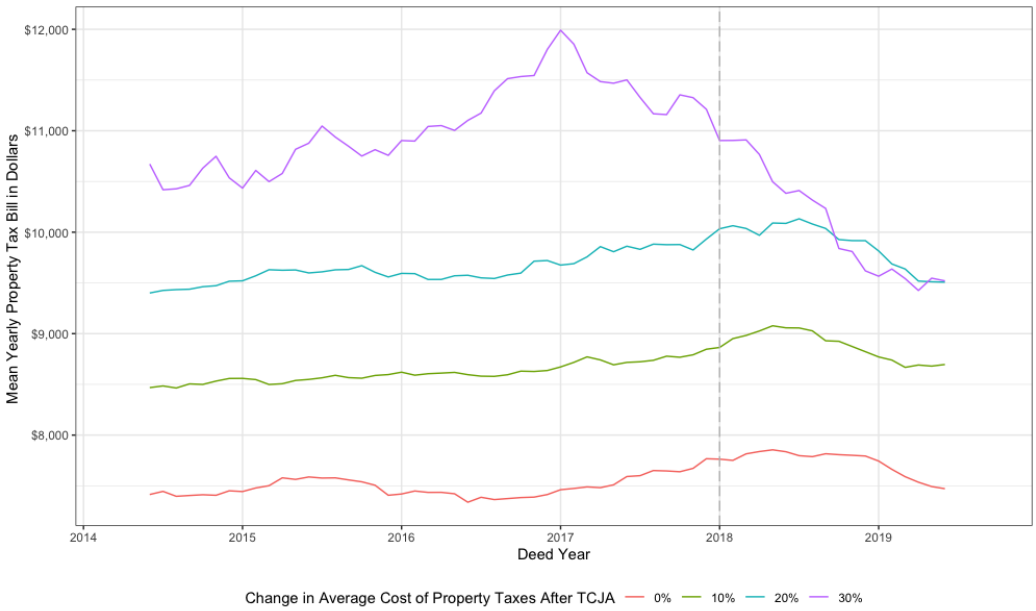


Figure 6.14: Pre and Post TCJA Trends in Property Tax Size

Figures are twelve month rolling averages, change in marginal costs are rounded to nearest 10%



Tables through show the results of the difference in differences estimation. Households which were induced to stop deducting reduced their home loan size by approximately 4.3% as a fraction of home price. This result is roughly the same as the impact of a 2% increase in the 30 year fixed mortgage rate which suggests that home buyers are highly responsive and aware of changing tax incentives. That the effect is not large in overall magnitude may by due to the fact that even with reduced tax preferential treatment, home loans are relatively less expensive or more accessible than other sources of household financing. This may be in part due to particularly low home loan interest rates and high rates of return on other investments during the time period that is being studied. Households who do not optimally itemize under TCJA also take out loans which are approximately $19,000 lower as a result of TCJA, even when accounting for their home purchase price. Households also purchase homes with slightly smaller property tax bills. For households which have SALT in excess of $10,000, there is no evidence that they change the relative size of their home loans. This is consistent with the fact that their tax benefits for home loans have not changed. Additionally, while they purchase homes which are between $15,000 and $38,000 lower (depending on the specification), there is no change in their property tax bills. This seems to be because essentially all other potential home-buyers for a given property would also be unable to fully deduct their property taxes, and so while home prices fall there is no readjustment in terms of yearly property tax bills.

Figures 6.15 through 6.18 show the difference in differences coefficient and 95% confidence intervals from estimating equation 6.2. In particular, figures 6.15 and 6.16 estimate

$$\log(\text{Sale Price}) = \beta_0 + \beta_1 \Delta\tau_i + \beta_{3,t} \Delta\tau_i + \beta_{4,t} \text{Deed Year} * \text{Deed Month} + \log(\text{Income}) + \text{Muni}_j + \varepsilon_{it} \quad (6.3)$$

The estimation shows that after the passage of TCJA, homebuyers who experienced higher marginal costs of previously deductible expenses significantly reduced their home prices. These results are partially explained by homebuyers purchasing smaller homes with lower property tax burdens. Estimates are approximately 58% larger for taxpayers who no longer itemize compared to taxpayers who itemize but have SALT in excess of $10,000. This is consistent with the fact that the latter group is both able to partially deduct their property taxes and are still able to deduct the interest on their home loan. Figures 6.17 and 6.18 estimate

$$\text{Loan To Sale Price Ratio} = \beta_0 + \beta_1 \Delta\tau_i + \beta_{3,t} \Delta\tau_i + \beta_{4,t} \text{Deed Year} * \text{Deed Month} + \log(\text{Income}) + \text{Muni}_j + \varepsilon_{it} \quad (6.4)$$

The estimation shows no change in the home loan choices of homebuyers who still itemize, consistent with the fact that they are still able to deduct the interest on their home loan. Homebuyers who stopped itemizing have large responses to the size of their home loan. Given that both groups purchased less expensive homes, it appears that this is not a liquidity response.

Table 6.4: Difference in Differences Estimation Of Home Loan Size For Homebuyers Who No Longer Optimally Itemize

	Dependent Variable: Loan Amount (Dollars)			
	(1)	(2)	(3)	(4)
Post 2018, Opt. Not Item. Post TCJA	-$32,575***	-$19,755***	-$19,747***	-$19,723***
	($3,989)	($3,046)	($3,047)	($2,974)
Post 2018	$37,958***	$17,904***	$17,905***	$17,902***
	($3,706)	($2839)	($2,839)	($2,775)
Opt. Not Item. Post TCJA	$43,978***	$13,282***	$13,304***	$13,299***
	($2,574)	($2,008)	($2,016)	($1,975)
30 Year Fixed Mortgage Rate	-$34,466***	-$18,029***	-$18,030***	-$18,848***
	($2,325)	($1,787)	($1,787)	($1742)
Home Sale Price		Yes	Yes	Yes
Income			Yes	Yes
Municipality F.E.				Yes
Constant	$349,560***	$165,237***	$165,254***	$173,058***
	($9,432)	($7,634)	($7,636)	($8,040)
R2	0.07176	0.4608	0.4608	0.4910
Number Of Observations	7155			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6.5: Difference in Differences Estimation Of Home Loan Size For Home-buyers Who Still Optimally Itemize But With SALT>$10,000

	Dependent Variable: Loan Amount (Dollars)			
	(1)	(2)	(3)	(4)
Post 2018, SALT>$10,000	-$31,355***	-$4,902	-$4,691	-$4,315
	(6109)	(3005)	(2998)	(3007)
Post 2018	$33,445***	$8,622**	$8,622**	$8,160**
	(5522)	(2716)	(2710)	(2719)
SALT>$10,000	$184,820***	$29,865***	$27,456***	$27,083***
	(4054)	(2357)	(2405)	(2443)
30 Year Fixed Mortgage Rate	-$22,070***	-$8,751***	-$8,945***	-$9,217***
	(4204)	(2065)	(2061)	(2058)
Home Sale Price		Yes	Yes	Yes
Income			Yes	Yes
Municipality F.E.				Yes
Constant	300918.7887***	78539.1269***	77537.3710***	93537.5675***
	(16868.6930)	(8472.9703)	(8455.8793)	(10218.5718)
R2	0.4038	0.8565	0.8572	0.8593
Number of Observations	4756			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6.6: Difference in Differences Estimation Of Ratio of Home Loan to Sale price For Homebuyers Who No Longer Optimally Itemize

	Dependent Variable: $\frac{\text{Home Loan Size}}{\text{Sale Price of Home}}$			
	(1)	(2)	(3)	(4)
Post 2018 and Opt. Not Item. Post TCJA	-0.0241**	-0.0435***	-0.0432***	-0.0455***
	(0.0092)	(0.0083)	(0.0083)	(0.0081)
Post 2018	0.0051	0.0355***	0.0355***	0.0376***
	(0.0085)	(0.0077)	(0.0077)	(0.0076)
Opt. Not Item. Post TCJA	-0.0234***	0.0230***	0.0238***	0.0250***
	(0.0059)	(0.0055)	(0.0055)	(0.0054)
30 Year Fixed Mortgage Rate	-0.0185***	-0.0434***	-0.0434***	-0.0457***
	(0.0053)	(0.0049)	(0.0049)	(0.0048)
Home Sale Price		Yes	Yes	Yes
Income			Yes	Yes
Municipality F.E.				Yes
Constant	0.9427***	1.2217***	1.2223***	1.2528***
	(0.0217)	(0.0208)	(0.0208)	(0.0219)
R2	0.0134	0.1932	0.1935	0.2362
N	7155			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6.7: Difference in Differences Estimation Of Ratio of Home Loan to Sale price For Homebuyers Who Still Optimally Itemize But With SALT>$10,000

	Dependent Variable: $\frac{\text{Home Loan Size}}{\text{Sale Price of Home}}$			
	(1)	(2)	(3)	(4)
Post 2018, SALT>$10,000	0.0056	-0.0053	-0.0049	-0.0062
	(0.0074)	(0.0071)	(0.0071)	(0.0071)
Post 2018	0.0035	0.0138*	0.0138*	0.0146*
	(0.0067)	(0.0064)	(0.0064)	(0.0064)
SALT>$10,000	-0.0172***	0.0467***	0.0415***	0.0412***
	(0.0049)	(0.0055)	(0.0057)	(0.0057)
30 Year Fixed Mortgage Rate	-0.0140**	-0.0195***	-0.0199***	-0.0209***
	(0.0051)	(0.0049)	(0.0049)	(0.0048)
Home Sale Price		Yes	Yes	Yes
Income			Yes	Yes
Municipality F.E.				Yes
Constant	0.9252***	1.0170***	1.0148***	1.0685***
	(0.0204)	(0.0199)	(0.0199)	(0.0240)
R2	0.0054	0.0934	0.0970	0.1131
Number of Observations	4756			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6.8: Difference in Differences Estimation Of Yearly Property Tax Bill For Homebuyers Who No Longer Optimally Itemize

	Dependent Variable: Yearly Property Tax Bill			
	(1)	(2)	(3)	(4)
Post 2018, Opt. Not Item. Post TCJA	-$358*	-$373**	-$342**	$105
	(140.82)	(138.97)	(130.52)	(72.430)
Post 2018	$235	$195	$225	-$484***
	(130.84)	(129.14)	(121.50)	(67.574)
Opt. Not Item. Post TCJA	$1,679***	$1,511***	$1,334***	$273***
	(90.857)	(90.465)	(85.446)	(48.094)
30 Year Fixed Mortgage Rate	-$571***	-$537***	-$523***	$111**
	(82.082)	(81.038)	(75.990)	(42.416)
Income		0.004503***	0.004319***	0.00006628
		(0.0003241)	(0.0003058)	(0.0001728)
Home Sale Price				0.02173***
				(0.0001714)
Municipality F.E.			Yes	Yes
Constant	$8,412***	$7,973***	$7,110***	$63
	(332.92)	(330.05)	(338.66)	(195.77)
R2	0.07785	0.1021	0.2166	0.7594
Number Of Observations	7155			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6.9: Difference in Differences Estimation Of Yearly Property Tax Bill For Homebuyers Who Still Optimally Itemize But With SALT>$10,000

	Dependent Variable: Yearly Property Tax Bill			
	(1)	(2)	(3)	(4)
Post 2018, SALT>$10,000	-$272	-$274	-$123	$259**
	(184)	(184)	(176)	(91)
Post 2018	$26	$107	$12	-$512***
	(160)	(166)	(159)	(82)
SALT>$10,000	$5174***	$5180***	$4016***	$497***
	(122)	(122)	(129)	(74)
30 Year Fixed Mortgage Rate		-$222	-$216	$173**
		(126)	(121)	(62)
Income			$0.0158***	-$0.0009*
			(0.0008)	(0.0004)
Home Sale Price				$0.0221***
				(0.0002)
Municipality F.E.			Yes	Yes
Constant	$6,168***	$7,041***	$5,948***	-$276
	(105)	(508)	(489)	(311)
R2	0.3915	0.3919	0.4426	0.8531
Number of Observations	4756			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6.10: Difference in Differences Estimation Of Home Sale Price For Home-buyers Who No Longer Optimally Itemize

	Dependent Variable: Home Sale Price		
	(1)	(2)	(3)
Post 2018, Opt. Not Item. Post TCJA	-$26,506***	-$27,234***	-$20,597***
	(5340)	(5215)	(4999)
Post 2018	$41,461***	$39,498***	$32,689***
	(4961)	(4847)	(4652)
Opt. Not Item. Post TCJA	$63,465***	$55,070***	$48,832***
	(3445.5)	(3395.4)	(3272.6)
30 Year Fixed Mortgage Rate	-$33,983***	-$32,282***	-$29,229***
	(3112.7)	(3041.6)	(2910.5)
Income		0.2262***	0.1957***
		(0.01217)	(0.01171)
Constant	$381,101***	$359,071***	$324,253***
	(12625.0)	(12388.0)	(12971.0)
Municipality F.E.			Yes
R2	0.07437	0.1171	0.1979
Number Of Observations	7155		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 6.15: Continuous Difference in Differences Estimation of Home Sale Price For Homebuyers Who No Longer Optimally Itemize

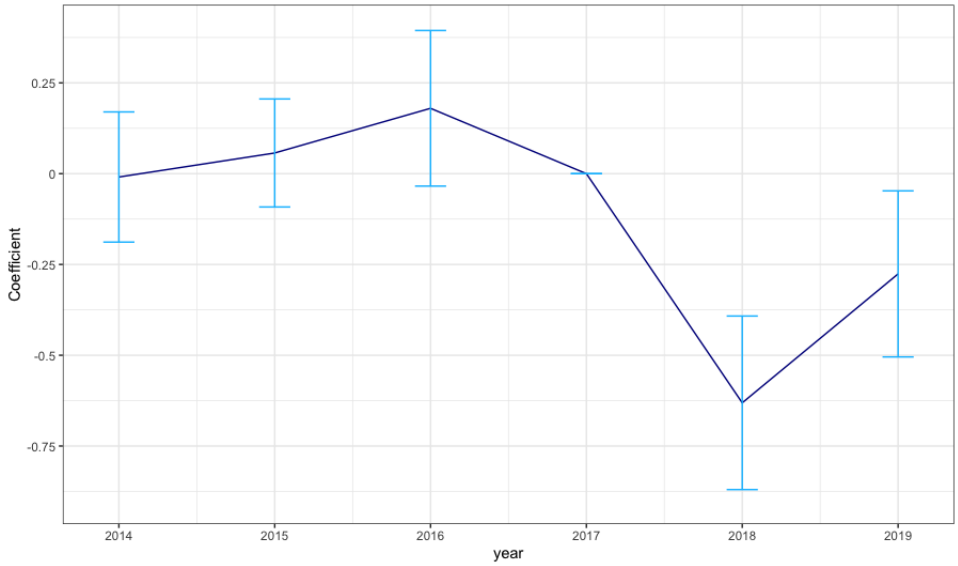


Figure 6.16: Continuous Difference in Differences Estimation of Home Sale Price Home-buyers Who Still Optimally Itemize But With SALT>$10,000

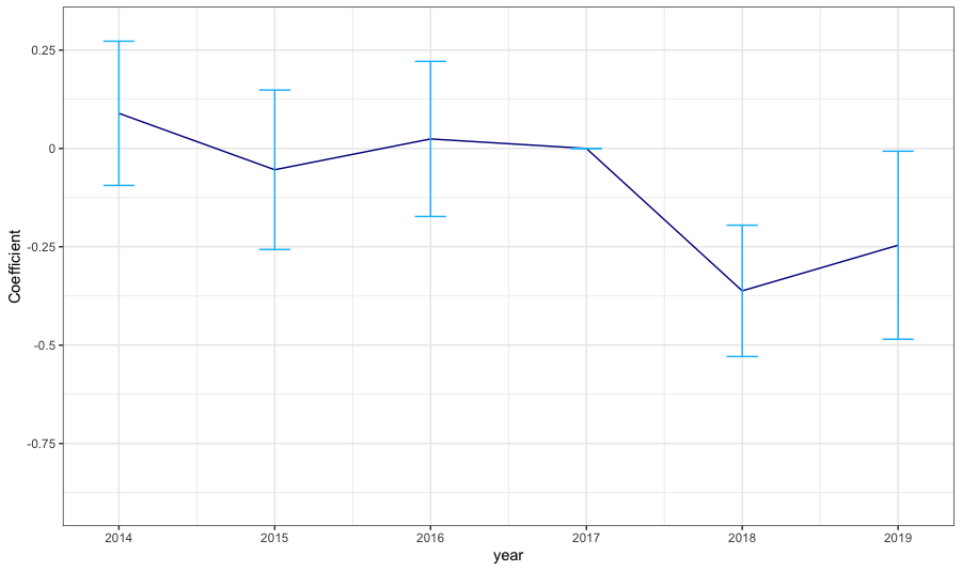


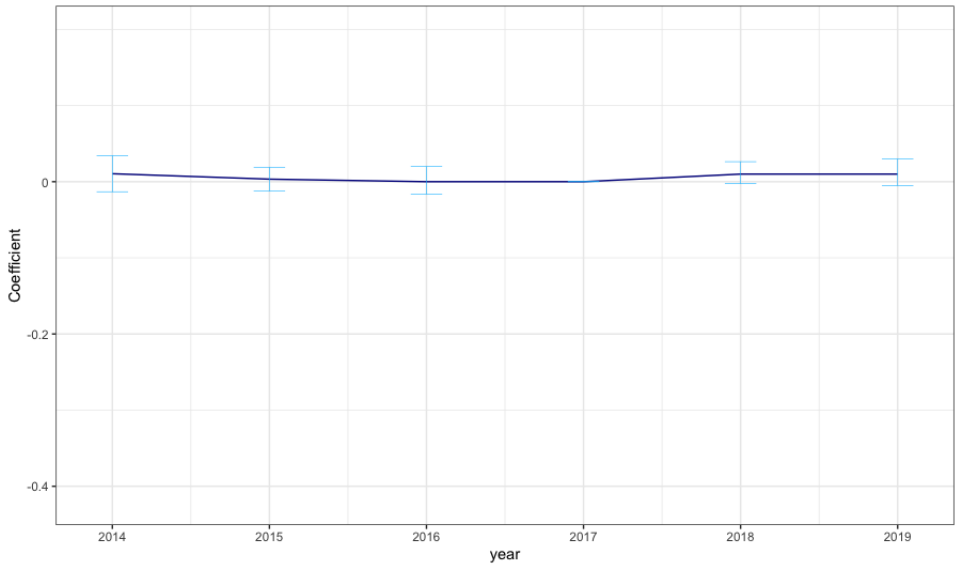
Figure 6.17: Continuous Difference in Differences Estimation of Home Loan Ratio For Home-buyers Who No Longer Optimally Itemize

Table 6.11: Difference in Differences Estimation Of Home Sale Price For Home-buyers Who Still Optimally Itemize But With SALT>$10,000

	Dependent Variable: Home Sale Price		
	(1)	(2)	(3)
Post 2018, SALT>$10,000	-$38,525***	-$30,006***	-$15,233*
	($7,753)	($7,160)	($6,523)
Post 2018	$36,151***	$30,768***	$21,238***
	($7,008)	($6,469)	($5,893)
SALT>$10,000	$225,672***	$160,232***	$142,240***
	($5,145)	($5,263)	($4,883)
30 Year Fixed Mortgage Rate	-$19,397***	-19081***	-$15,043***
	($5,336)	($4,923)	($4,461)
Income		0.8868***	0.6885***
		(0.0308)	(0.0286)
Municipality F.E.		Yes	
Constant	$323,866***	$262,423***	$243,919***
	(21407.9082)	(19867.8375)	(21893.1169)
R2	0.3844	0.4760	0.5750
Number of Observations	4756		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 6.18: Continuous Difference in Differences Estimation of Home Loan Ratio For Homebuyers Who Still Optimally Itemize But With SALT>$10,000



7 Conclusion

This paper examines the impact of the TCJA on homes and home buyers. The TCJA reduced tax benefits for homeowners, both by explicitly capping property tax and mortgage interest deductions, and by doubling the standard deduction which discouraged taxpayers from itemizing their deductions. This paper estimates the response from individual home-buyers in terms of the types homes that they purchased and their home financing choices. Understanding how homebuyers and housing markets responded to these changes is relevant for determining the ways in which government policy can shape housing markets.

This paper estimates the responsiveness of individual homebuyers by creating a unique data set that matches deed and mortgage records to data from the Home Mortgage Disclosure Act, a publicly available mortgage loan-level data set that covers the overwhelming majority of mortgages in the United States. This paper finds that homebuyers who would have itemized under the pre-TCJA tax system but who take the standard deduction under the post-TCJA tax system responded to the change by purchasing smaller, less expensive homes with lower property taxes and financed less of their purchase using mortgage debt (even after conditioning on home price). Homebuyers that itemized under both the pre and post TCJA tax systems but that had SALT deductions in excess of $10,000 also responded by purchasing smaller, less expensive homes with lower property taxes but did not change the fraction of their purchase which was financed by mortgage debt. This lack of response in the dimension of mortgage debt is consistent with the fact that this second group was still able to fully deduct the interest on their home loan. In the short run, despite these adjustments on the part of homebuyers, there was no change in municipalities' property tax revenues because of the process by which New Jersey property taxes levels are determined. However, in the long run, homeowner preferences for lower post-TCJA property taxes may manifest themselves in lower municipality budgets and a corresponding lower provision of local public goods. This may be welfare reducing given that many public schools are primarily funded by property taxes and that education is generally believed to have positive externalities. How concerning this is will also depend on the degree of economic segregation between municipalities. If a municipality has a high

degree of income variance then subsidizing the property tax cost of a high income taxpayer may benefit lower income households in the form of more funding for schools (and other local public goods). However, if municipalities are more homogeneous in terms of income, then such subsidies for high income taxpayers will not have positive benefits for lower income households.

This paper finds that homebuyers had strong responses to changes to the tax treatment of homeownership under the TCJA. The magnitude of these responses indicate that tax policy has a real impact on housing decisions, and suggests that reducing such benefits may in the long run reduce housing consumption. It also suggests that reducing tax benefits for homeownership will also lead to lower property taxes and therefore a lower provision of local public goods.

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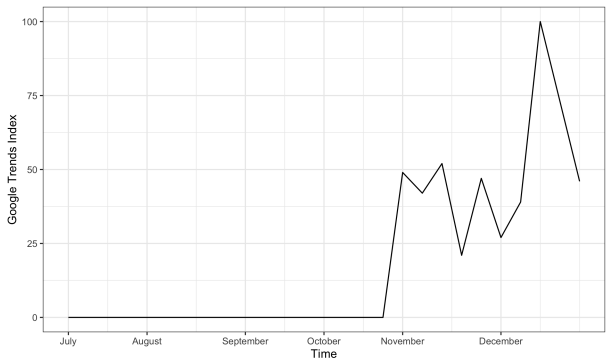
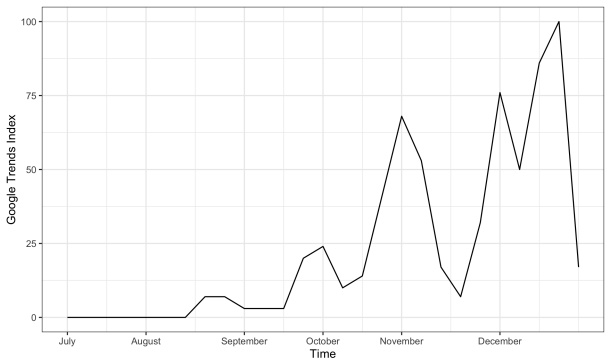
A Appendix Figures

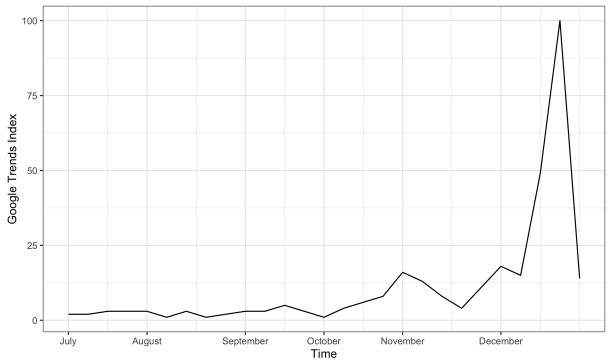
(a) Searches For "Tax Cuts and Jobs Act"



(b) Searches For "State and Local Tax Deductions"



(c) Searches For "Property Tax Deduction"



(d) Searches For "Home Mortgage Interest Deduction"

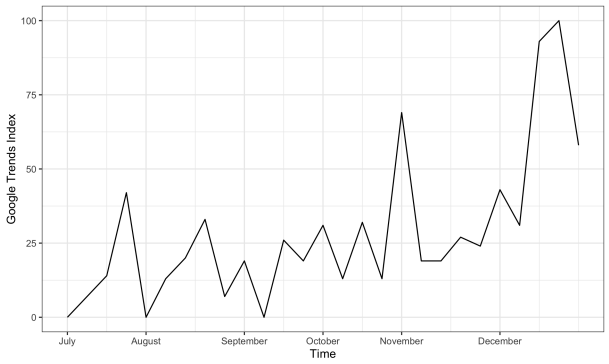
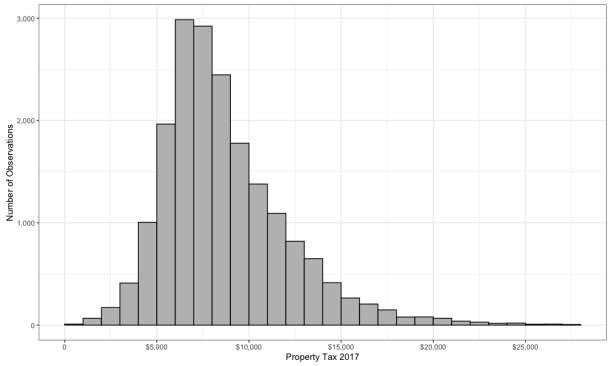


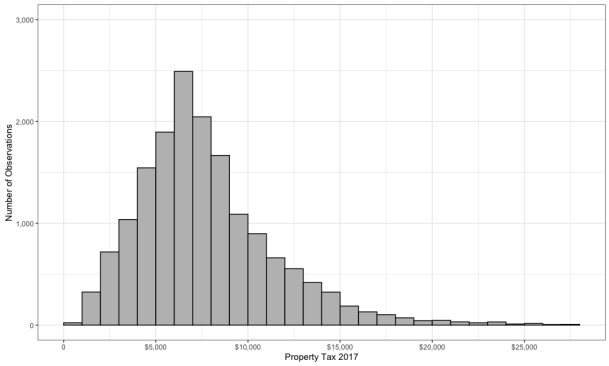
Figure A.1: Google Trends Searches in 2017

Figure A.2: Yearly 2017 Property Tax Bills

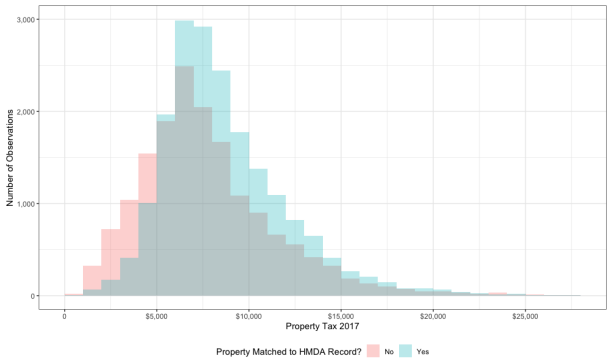
(a) Deed Matched to HMDA Record



(b) Deed Not Matched to HMDA Record



(c) Overlay Matched and Unmatched Deeds



(d) All Residential Properties in Middlesex County

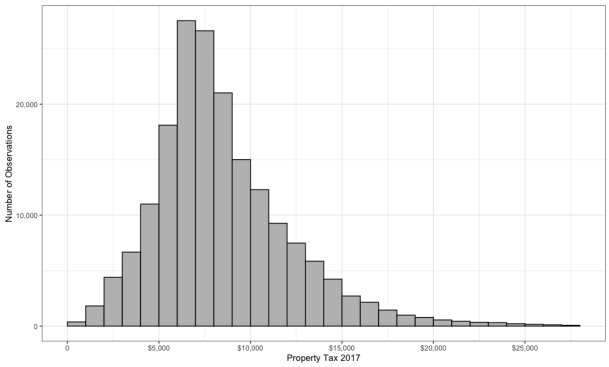
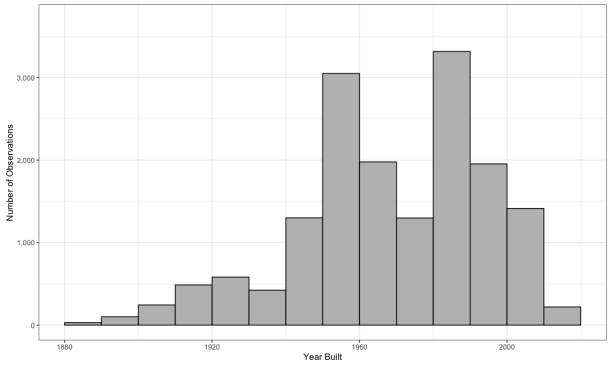
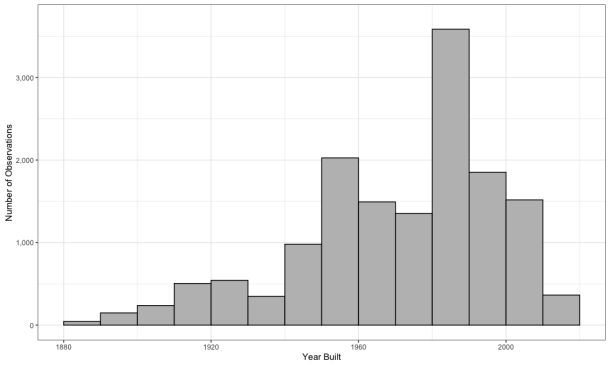


Figure A.3: Year in Which Home was Built

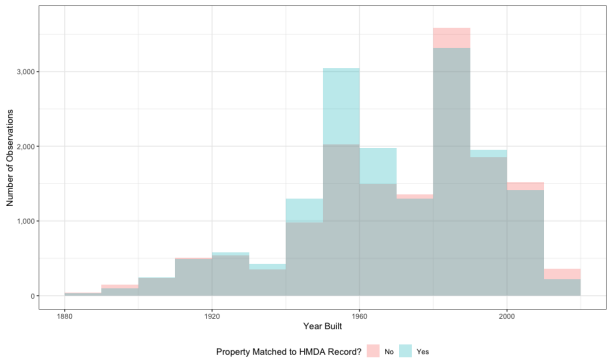
(a) Deed Matched to HMDA Record



(b) Deed Not Matched to HMDA Record



(c) Overlay Matched and Unmatched Deeds



(d) All Residential Properties in Middlesex County

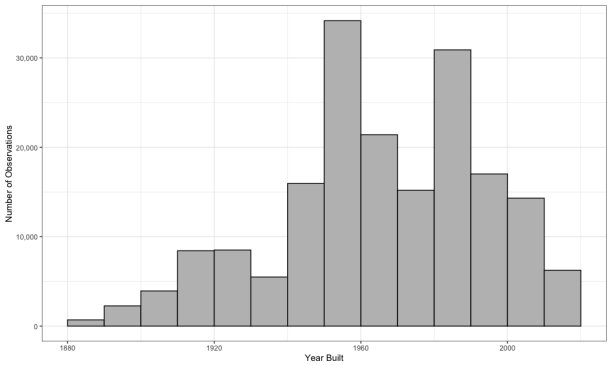
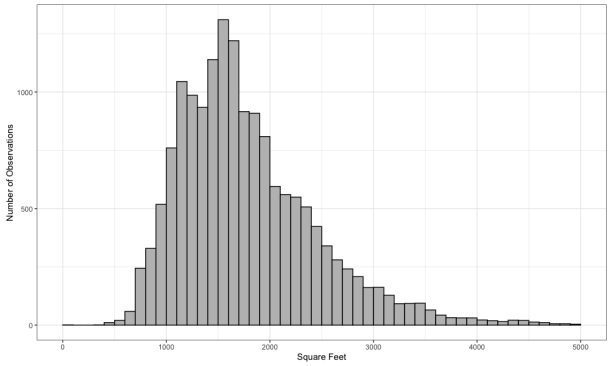
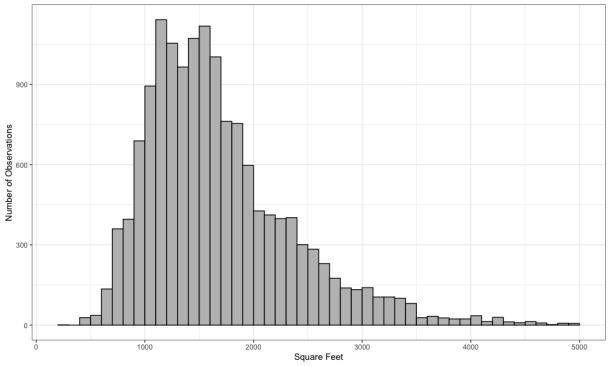


Figure A.4: Square Footage of Homes Sold Between 2014 and 2019 in Middlesex County

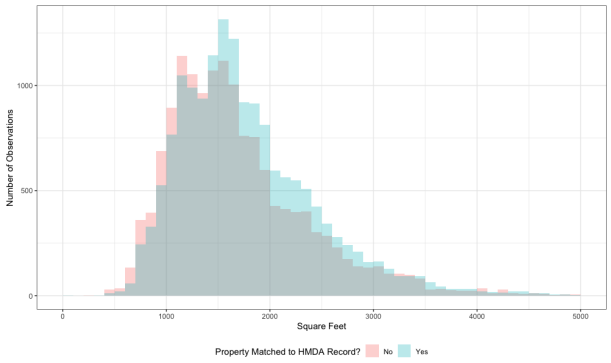
(a) Deed Matched to HMDA Record



(b) Deed Not Matched to HMDA Record



(c) Overlay Matched and Unmatched Deeds



Note: Square footage for residential properties in Middlesex County not recently sold is not available, square footage appears in the deed data but not in the property tax data.

B Appendix Tables

Table B.1: Number of Sales and HMDA Loans in Middlesex County by Year

Deed Year	Total Sales	Total Fair Market Sales	Home Purchase HMDA Loans	Home Purchase HMDA Loans Owner Occupied	$\frac{\text{HMDA Loans}}{\text{Total Sales}}$
2014	8,057	5,093	6,159	5,679	0.76
2015	8,376	5,323	6,847	6,357	0.81
2016	9,537	5,915	7,747	7,173	0.82
2017	10,319	6,609	8,394	7,683	0.81
2018	9,852	6,558	7,969	7,267	0.81
2019	9,217	6,502	7,885	7,259	0.85

Total sales excludes sales which likely did not result in a new residential occupant for the property (such as transfers between immediate family members, transfers between a corporation and its subsidiary, transfers where the property was sold for less than $100.00, or transfers to a bank due to foreclosure). It does include sales where the assessor believes that the property was not sold at a fair market price (such as sales by estate executors, the first sale following a foreclosure, sales where the proceeds pay debts, or sales where significant improvements have been made since the last assessment). Home purchase HMDA loans excludes refinancing and home equity loans.