Effects of Parcel Taxes on Fiscal Condition in the Post-Prop 13 Era in California: A Regression Discontinuity Approach

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Abstract

This paper examines whether adoption of a parcel tax improves fiscal conditions in California local governments. A parcel tax is commonly known as a lump-sum property tax on a unit of parcel. Because of the ad-valorem tax cap in the state constitution, a non-ad-valorem property tax is only way to extract tax revenues from real estate. Local governments can opt for a parcel tax when a two-thirds of supermajority approves it in a local referendum. Although the use of parcel tax becomes increasingly prevalent, the effect of a parcel tax adoption on local fiscal condition has not been well assessed. We fill this gap in the literature by examining the effect of parcel tax adoption on local fiscal conditions. We take the regression discontinuity approach by comparing local governments that gained favorable votes just above and below the two-thirds threshold to see whether parcel taxes improve local fiscal condition. Our results show that there has been an increase in revenue from local sources and in current expenditure in school districts where a parcel tax was approved with votes just above the supermajority requirement, but the results are not robust. In public-safety districts, we did not find any effect of parcel tax adoption on revenue or expenditure.

Keywords: parcel tax, property tax, local tax election, proposition 13.

1. Introduction

A parcel tax is a special type of property taxation adopted by local governments in California. Unlike the regular property tax that is based on assessed valuation of property, parcel tax is a non ad-valorem tax on real property. In that sense, it is an unusual form of property taxation to extract revenue from real property. A parcel tax is mostly a lump-sum tax, independent of a person's income, consumption or wealth including value of property. Despite the favorable efficiency considerations, lump-sum taxes are regressive since they are structured as a fixed amount charged on both the rich and the poor alike. A parcel tax needs to be approved by a two-thirds supermajority vote and needs to be used for a special purpose at the local level.

In California, Proposition 13 was proposed as a constitutional amendment to reform property taxation. Voters approved this constitutional amendment in 1978 and the authority to levy property taxes was transferred from local governments to the state government. The amendment also capped the ad valorem property tax at a one percent statewide rate, and prohibited ad valorem property taxation at the local level. This has eventually led to the first adoption of a parcel tax as a non ad-valorem tax in 1983. There has been a significant increase in parcel tax elections since then, particularly after the 2001 recession and even more visibly after the Great Recession. Generally, there has been substantially higher number of parcel tax elections in the even-numbered general election years. With few exceptions, the tax was approved in more than half of the parcel tax elections. By far, the most popular parcel tax purpose has been public safety, or more specifically, police, fire protection, and emergency medical services, which is followed by parks and recreation, library services, and road maintenance.

Although parcel taxes have supplemented local revenues for more than three decades, the state government did not know how many local governments raise how much parcel tax revenue to provide local public services until the state mandated local governments to submit a report on the use of parcel taxes. The first report came out in 2017 with the information for the fiscal year 2015-2016. Scholars studied local determinants of parcel tax adoption in *school districts* only recently (Lang and Sonstelie 2015; Lee 2019). Lee (2018) describe the parcel tax usage, structure, and election information in cities, counties, and special districts. Nonetheless, it is so far unknown how parcel taxes affect local finance in the short and long run and how the revenue changes the behavior of local jurisdictions, except for a vague expectation that it should improve fiscal condition of local governments.

In this paper, we examine the effect of parcel tax adoptions on local fiscal conditions using data on parcel tax elections in California school districts and other non-school local districts such as cities, counties and special districts for the 2003-2016 time period. It is difficult to identify a causal link by comparing local governments that have parcel tax revenues to those that do not have them because of a self-selection bias. To address this identification issue, we take the regression discontinuity design (RDD) approach to compare local governments that gained favorable votes just above and below the two-thirds threshold to see whether parcel taxes improve local fiscal outcomes including revenues and expenditures.

Our results show that there has been an increase in both government revenues and expenditures in districts that passed a parcel tax with votes just above the supermajority requirement but with one exception that increase is not significantly different from those districts that failed to pass the tax with votes just below the requirement. We also find that our results are

quite sensitive to the polynomial specifications in the RDD, the exclusion of renewal elections, and the use of three-year growth rates for the dependent variable.

The paper is structured as follows. In the next section, we describe the origins of the parcel tax, its structure and trends over time. This is followed by a description of our data and variables used in the regression analysis, and our empirical methodology in section 3. We present our empirical results and provide a discussion in section 4. This is followed by a summary of our results and our concluding remarks in section 5.

2. Parcel Tax, Its Institutional Origins and Trends

The average tax rate on real property was 2.67 percent before the passage of Proposition13 (Legislative Analyst's Office 2016). The newly adopted statewide one percent rule had an immediate consequence. Local governments experienced severe budget constraints to maintain the same level of public good provision. Right before the adoption of Proposition 13, the total property tax revenue in California was about 38.56 billion dollars (2016 constant). The next year, right after the passage of the Proposition 13, it fell down to 17.94 billion dollars (2016 constant). Local governments experienced a staggering 53.5 percent reduction in local property tax revenue. Figure 1 shows the significant drop in tax revenue after 1978. The figure also shows that the reduction in the general revenue from own sources amounts to the loss from property tax revenues.

[Figure 1 about here]

California local governments have sought alternative revenue sources to cope with the one percent rule. In the state constitution, however, taxes on real property are permitted as long as such a tax (1) is not ad-valorem, (2) is approved by a two-thirds supermajority, and (3) is used

for special purposes (special tax). A parcel tax must satisfy all three conditions. A parcel tax can be a per-parcel, per-size, per-bedroom or any other form of property tax that is not based on assessed value; it needs to be approved by a supermajority of the voters; and it needs to specify a special purpose of the tax revenue when it is proposed to the voters. For instance, voters in a school district can adopt a school parcel tax for teacher retention and STEM education programs. County service areas can use a parcel tax to fund specific purposes such as fire and police protection. A city can raise parcel taxes to maintain roads and sidewalks. But all these parcel taxes must be approved by a two-thirds of supermajority.[1]

Parcel taxes are usually understood as a lump-sum tax per parcel of land regardless of the size, value, or classification of a property.[2] For instance, a school district can propose a $600 per year per parcel. Since it is a lump-sum tax, a single-family home and a commercial property pay the same amount of parcel tax per parcel. Voters have complained that the lump-sum tax is regressive. Because any parcel tax proposal requires a high threshold of a supermajority vote, local officials innovate parcel taxes that can appeal to the voters. A size-based parcel tax is one of the examples. Many special districts and some school districts use a square footage-based parcel tax to increase the likelihood of parcel tax adoption.

While the first parcel tax adoption goes back to 1983, the available election results data starts from 1995. In Figure 2, we show the total number of parcel tax elections ever held in California local governments between 1995 and 2017. There were 1,033 parcel tax elections during that time period. The number grew slowly in the 1990s and the early 2000s, but there was

[1] General purpose parcel taxes are prohibited.
[2] Parcel taxes are previously understood as a lump-sum tax. However, Lee (2018) discovers that many local governments structure parcel taxes to mimic the ad-valorem property tax to avoid the criticism of regressiveness. For instance, districts impose parcel taxes per square footage of a building or per bedroom. See Lee (2018) for details.

a visible increase after the 2001 recession, particularly during the 2003-2005 time period. There

was a spike in 2008., which is (probably) due to the negative impact of the Great Recession that

reduced local government revenues. After 2008, there were roughly twice as many elections in

even-numbered general election years than in odd-numbered years. Our time period for analysis

(2003-2016) is appropriate since there were significantly higher number of parcel tax elections

during this period. This is also the time period when the Great Recession hit local governments

hard.

[Figure 2 about here]

As shown in Figure 3, parcel tax was approved in more than half of the elections, with a

predominantly strong election performance after 2008. The maps in Figure 4 and Figure 5 show

the geographical dispersion in parcel tax elections. While there have been many more parcel tax

elections in or around the two largest cities (Los Angeles and San Francisco) in California than

in other parts of the state, we see in Figure 4 that parcel tax elections have taken place in an

overwhelming majority of California counties. On the other hand, in Figure 5, there is a

particularly strong concentration of successful parcel tax elections in and around the San

Francisco Bay area.

[Figure 3 about here]

[Figure 4 about here]

[Figure 5 about here]

Table 1 shows a list of parcel tax purposes. Public safety, or more specifically, police, fire

protection, and emergency medical services was by far the most popular category in parcel tax

elections, making up about 51% of the total. Parks and recreation, library services and road

maintenance were also listed among other popular parcel tax purposes. Together, these purposes make up close to 27% of the total.

[Table 1 about here]

While there is an extensive literature on property taxation in the U.S., studies on the parcel tax are rare. Only a handful of studies on the parcel tax have been published recently. Lang and Sonstelie (2015) and Lee (2019) examine the likelihood of school parcel tax adoption in school districts. Land and Sonstelie (2015) focus on the district's characteristics such as income and tax price. Lee (2019) consider a parcel tax election as a two-step process where the likelihood of holding a parcel tax election by a school board and the likelihood of approving a parcel tax measure by voters. Her research indicates that there are different sets of determinates in each stage and that the regressivity of parcel tax significantly influences an electoral outcome. While the two papers focus on endogenous factors, Lee and Sun (2018) investigate the spatial aspect of parcel tax adoption in school districts by employing the spatial autoregression estimation. While all of those papers exclusively study parcel taxes in school districts, Lee (2018) provides the first comprehensive picture of parcel tax elections in non-school districts including cities, counties, and special districts to finance various local services other than public schools.

Nonetheless, the effects of the parcel tax adoption on local fiscal outcomes are not well understood. To our knowledge, this paper is the first and only attempt to estimate the causal effect of parcel tax adoption on local fiscal outcomes. Thus, we believe that this paper contributes not only to the literature on parcel tax but also to the literature on the consequence of local tax elections on fiscal outcomes. One strand of literature investigates fiscal effects of direct democracy—referendum—of on spending. Overall, existing literature

provides inconclusive conclusions (Nguyen-Hoang 2012). For instance, Nguyen-Hoang (2012) find that New York State's local referendum reduces instructional spending while preserving administrative expenditure.   (Funk and Gathmann 2005; Primo 2010; Nguyen-Hoang 2012). Primo (2010) and Funk and Gathmann (2005) show that direct democracy reduces spending at the state level while increasing local spending, which leads to zero combined effect on the size of spending at the state and local levels.

However, these studies focus on the effect of the existence of rules itself, but not the effects of the electoral results. Interestingly, it is little known as to the effect of pass-or-fail electoral outcomes on subsequent fiscal outcome. Recently, Kogan et al. (2017) shows that instructional spending and student achievement decreased in districts that failed to approve a local tax measure. The authors use the Ohio school districts' tax referenda and employ a regression discontinuity design for empirical identification. We take a similar strategy in this paper using parcel tax election data in both school- and non-school districts.

3. Methodology and Data

3.1. Identification

Suppose that district i proposes a parcel tax measure and that it receives vote share v_i that is relative to the required threshold 0.667 for parcel tax adoption. Fiscal outcome variable Y_{it} (current expenditure, for example) in district i at year t is a function of local characteristics X_{it} and a parcel tax τ_{it}, and it is expressed as $Y_{it} = f(X_{it}, \tau_{it})$. The identification issue is that τ_{it} is endogenous with Y_{it}, which makes it difficult to identify the causal effect of τ_{it} on Y_{it}. Also, a parcel tax can be endogenously determined by local factors, X_{it}, as previous literature has shown

that local social, economic, and political characteristics affect parcel tax adoption (Lang and Sonstelie 2015; Lee 2019).

To address the potential identification problem, we use the sharp regression discontinuity approach. Voters decide whether to adopt or reject a parcel tax measure τ_{it} which requires at least 66.7 percent of votes in favor. Let the percentage of votes in favor be v_i.

$$\tau_{it} = \begin{cases} 0 & if\ v_i < 2/3 \\ 1 & if\ v_i \geq 2/3 \end{cases}$$

X_{it} and Y_{it} are presumed to be correlated, but in Cellini et al. (2010) and Lee (2008) maintain that a narrowly decided election approximates a randomized experiment if there is some unpredictable random component of the vote. The key identifying assumption is that the district characteristics $E(X_{it}|\ Y)$ is continuous at $v = 0.667$. In other words, there is no discontinuity in the underlying characteristics of district i at the point. Any discontinuous change in the outcome variable at $v = 0.667$ should be caused by the parcel tax adoption. This way, we can identify the causal effect of parcel tax adoption on fiscal outcomes in subsequent years by comparing districts that barely passed a measure (the treatment group) with others that barely rejected a measure (the control group). If a parcel tax increases district's fiscal outcome (expenditure or revenue, for instance), we would expect a discontinuous improvement of fiscal outcomes at $v = 0.667$.

To test the effect of parcel tax adoption on local fiscal condition, we constructed two sets of panel data between 2003 and 2016, one for school districts and another for special districts for public safety including emergency medical services, fire and police protection.

3.2. Data

3.2.1. School districts

There were 402 parcel tax elections in 173 California school districts between 2003 and 2016. However, there are several institutional characteristics as to how districts are operated and how local tax elections are held. Two major issue arise. We address them below and as a result, the total number of elections included in the sample.

We excluded four of the school districts because they belong to the common administration districts where financial data for each district are indistinguishable. For instance, Santa Cruz elementary school district and Santa Cruz high school districts belong to a common administration district. The two districts are operated separately, but their financial data are reported as a common area, which means that their finances are not distinguishable. Petaluma elementary and joint high school districts have the same issue. We dropped the four districts for this reason. We ended up with 169 districts with 376 school parcel tax elections.

However, there is another issue we need to discuss about parcel tax elections. Some of the school districts held multiple elections during this time for a few reasons. School parcel taxes are adopted for a limited time period only. More than 95 percent of the school parcel taxes during the sample period have a sunset clause, and more than 50 percent of them proposed parcel tax collection effective less than 10 years. When a parcel tax is about to expire districts often hold another election to renew, extend, and increase the existing parcel tax. For instance, Acalanes Union High School District held four elections during this time (2005, 2009, 2010, and 2014). In the last election in 2014, voters in the school district adopted the parcel tax permanently. In this case, unless the renewal election also increases the amount of the existing parcel tax there would not be an increase in revenue holdings all things equal. If this is the case,

the renewal elections would bias the estimates of the effect of parcel tax adoption on fiscal outcomes. In the analysis, we show the estimates with and without these renewal elections.

Another reason for holding multiple elections is more than one failed attempt to adopt a parcel tax. After districts unsuccessfully held a parcel tax election, they often try again to succeed not long after the failed election. For instance, the Cabrillo Unified School District finally adopted a parcel tax in 2014 after four failed attempts with small margins. This can be interpreted as districts gaming the discontinuity by keeping on trying until they finally adopt (or never be able to adopt at all). We treated these elections as a new election and are included in our sample.

All summary statistics are presented in Table 2. We ended up with 223 elections for both new and renewal that do not have a prior history of parcel tax adoption before 2003. The average votes in favor is about 66 percent. Approximately 54 percent of them were approved. As a subset, we also identified 153 new elections during the time period of which average votes in favor is 63 percent. The overall passage rate was 43 percent

[Table 2 about here]

Parcel tax election data are obtained from Lee (2019) and the California Secretary of State. The data contain the year and month of parcel tax elections, the text of ballot measures, and the percentage of votes in favor of a parcel tax measure. We collected enrollment and financial data from the National Center for Education Statistics. We are interested in changes in fiscal behavior of school districts after parcel tax adoption. Our dependent variables are a one-year and three-year *percentage change* in five fiscal variables after parcel tax adoption: (1) total revenue per pupil, (2) total expenditure per pupil, (3) local revenue per pupil, (4) current expenditure per pupil, and (5) capital expenditure per pupil. To see the overall level of revenue and expenditure,

we first examine 1-year and 3-year percentage changes in total revenue and total expenditure per pupil. We also investigated subcategories of revenue and expenditure. Because parcel taxes are included in "other local revenues" it seems obvious to see whether parcel tax adoption increased local source revenues. This is a particularly important variable because if school districts are able to mobilize local revenue sources other than parcel taxes (e.g. donations through Parent-Teacher Associations) after a failed parcel tax election, then we would not be able to see a significant increase in "other local revenues." Additionally, we separately examined current (operational) and capital expenditures because parcel taxes almost exclusively finance current expenditure for instruction and academic programs. Then we should be able to see an increase in current expenditure after parcel tax adoption but no effect on capital expenditures. All fiscal variables are adjusted to the 2012 constant dollar.

3.2.2. Special districts for public safety

We obtained the list of parcel tax elections and their detailed information from Lee (2018). Lee (2018) complied year and month of the elections, amount proposed, effective years, number of votes cast, percentage of votes in favor, purpose of the parcel tax, and other information such as classification and tax base. There are 198 parcel tax elections in non-school district parcel taxes during the time period. However, we restrict our sample to 120 parcel tax elections for public safety only. Public safety includes emergency medical services, police, and fire protection. The reason for choosing public safety is that it is the most frequent among the purposes of parcel tax elections and keep homogeneity in the sample. As Table 1 shows, parcel taxes are proposed to finance various kinds of local public services. Some parcel taxes are proposed in a large geographic area covering multiple counties, and others cover only a small area or only one public

pool in a city. Restricting the sample to parcel tax elections for public safety will help us maintain some level of homogeneity. We identified 120 elections for public safety that consist of 62 percent of all non-school district elections during the time period.

For outcome variables, we use one-year and three-year growth of total government revenues and total government expenditures. They are the most obvious fiscal variables available for most of the districts. We obtained the data from the State Controller's Office website where raw financial reporting data are available since 2003. After total government revenues and government expenditures are adjusted to inflation, a one-year and three-year growth rates after a parcel tax election were computed. In the process, we lost a few observations due to leading the variables.

Table 2 provides summary statistics on the variables used in the regression analysis. Among the 100 parcel tax elections for the purpose of public safety between 2003 and 2016, there are two missing observations for the votes in favor of a parcel tax. Overall passage rate was 47 percent with the average percentage votes in favor of a parcel tax was 63.3 percent, slightly lower than the threshold.

4. Results

4.1. The Effect of parcel tax adoption on school finance in school districts

Before the RD analysis, we examined the density plot for the percentage of votes in favor of 153 parcel tax measures between 2003 and 2016. The median of the votes in favor is 64.5 percent, which is slightly less than the 66.7 percent threshold for approval. However, as Figure 6 shows, most of the elections obtained votes around the threshold. Approximately 70 percent of the measures received the percentage of votes in favor between 57 and 77 percent, within ten percent

around the threshold. Figure 6 also shows no sign of manipulation around the cut-point. A formal

RD manipulation test conducted in STATA also indicated that there is no self-selection issue

around the cut-point.

[Figure 6 about here]

Figure 7 show the effect of parcel tax adoption on various fiscal outcomes in school districts. It

shows only new elections between 2003 and 2016, excluding renewal elections.[3] There is a slight

"jump" around the cut-off point in Panel A, indicating an increase in total revenue growth one

year after parcel tax adoption. The increase in growth is more noticeable in Panel B for local

revenue and in Panel D for current expenditure growth. That seems obvious because parcel taxes

are categorized as a local source revenue and are usually spent on instructional and academic

operations in public schools. On the contrary, there is no visible discontinuity in Panel C for total

expenditure growth and in Panel E in capital expenditure growth.

[Figure 7 about here]

The point estimates are presented in Table 3 that shows estimates of the effect of parcel tax

adoption on a one-year revenue and expenditure growth in Panel A and on a three-year growth in

Panel B. The first three columns show results using new elections only. The last three columns

show estimates using new and renewal elections combined. Estimates using different local

polynomial specifications are used—linear, cubic and quadratic functions.

[Table 3 about here]

Parcel tax adoption does not seem to have any consistent and robust effect on any of the fiscal

variables. In Panel A where dependent variable is a one-year growth in revenues and

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[3] The patterns are similar when renewal elections are included. Graphs are available upon request.

expenditure, all coefficients are positive, as expected. However, there is weak evidence that parcel tax adoption significantly increases revenue or spending. With the linear specification, total revenue growth, local revenue growth, and current expenditure growth are statistically significant with the local linear function. They indicate that parcel tax revenues lead to an 8 percentage point increase in the growth rate of total government revenue and 14 percentage point increase in the growth rate of local government revenue, one year after the adoption. At the same time, parcel tax adoption leads to a 6 percentage point increase in the growth rate of current government expenditures. The results make sense because parcel tax revenues are categorized as a local revenue source and finance instructional items and academic programs—both of which are categorized as current expenditures. Nonetheless, the effects are not consistent with different local polynomial functions. We also find weak evidence on the effect of parcel tax adoption on fiscal outcomes in Panel B with the dependent variables with 3-year growth. The coefficient for a 3-year local revenue growth using a larger sample (new and renewal elections combined) is statistically significant. Oddly, the coefficient of the three-year current expenditure growth with a quadratic specification turns out to be negative and significant, indicating that current expenditure is significantly lower three years after parcel tax adoption. However, the overall results show little to no evidence that parcel tax adoption has significant effects on school districts' finances.

Since these results are only preliminary, we need further investigations with different specifications and subsamples. The null effect may have been driven by a small sample size, not enough to warrant any credible estimation. However, the results may suggest some interesting fiscal behaviors of school districts. It is obvious that parcel taxes add extra revenue if approved. Nevertheless, districts that fail to adopt a parcel tax may also have other ways to raise local

revenues because of the failed attempt. They may increase their effort to solicit donations, for instance.[4] At the same time, districts that adopted parcel tax may not vigorously try to seek out donations because of their anticipated parcel tax revenues in coming years. Similarly, those districts that failed to adopt a parcel tax may have also pursued more aggressively federal grants or other intergovernmental transfers relative to districts that passed a parcel tax. That could also explain the lack of significance in the local revenue results.

4.2. The Effect of parcel tax adoption in special districts for public safety

To minimize heterogeneity in parcel tax elections in non-school districts, we limited our sample to parcel tax elections for public safety and identified 98 elections between 2003 and 2016. The percentage of vote in favor of a parcel tax measure is presented in Figure 8. It does not appear that there is manipulation around the 0.667 cut-point. A formal local polynomial density test indicated that there is no evidence for manipulation.

[Figure 8 about here]

The following plots in Figure 9 show indications of discontinuity for one to three-year revenue and expenditure growth after parcel tax adoption. There seems to be a discontinuity in all graphs with the second order polynomial function. However, RDD estimates show no statistically significant effect of parcel tax adoption on the fiscal variables.

[Table 4 about here]

Table 4 shows RDD estimates for special districts for public safety. It shows that parcel tax adoption has no impact on revenue or expenditure growth one and three years after parcel tax

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[4] Local donations are part of the local revenue. Those donations could be sizeable in some school districts.

adoption. The results are consistent with different functional forms. Again, this also has to do with a relatively small sample or there might be a compensating mechanism for districts after a parcel tax measure was failed to be approved. The evidence shown above is inconclusive at most.

5. Summary and Concluding Remarks

In this paper, we examined the effect of parcel tax adoptions on government revenues and expenditures in California school districts and other non-school districts including cities, counties and special districts. We have used data on parcel tax elections and fiscal outcome variables for the 2003-2016 time period. We made use of the regression discontinuity design (RDD) where the local governments that passed the parcel tax with votes just above the two-thirds threshold are compared to those that rejected with votes just below the threshold. We examined one-year and three-year growth rates in government revenues and expenditures after parcel tax adoption. We also conducted robustness checks using linear, cubic and quadratic polynomial specifications and compared results with new elections only to a broader dataset that included renewal elections. To our knowledge, this is the first study on the effect of parcel tax adoption on local fiscal outcomes.

Our results for the linear specification show an eight-percentage point increase in the growth rate of total government revenue and 14 percentage point increase in the growth rate of local government revenue one year after the adoption of the parcel tax in school districts. We also find a six-percentage point increase in the growth rate of government expenditures one year after adoption. While these results make sense since parcel tax revenues provide additional revenue to school district which, in turn, would be used for instructional and academic programs,

they are sensitive to alternative polynomial specifications, the exclusion of the renewal elections, and the use of the three-year growth for the dependent variable. We also find no significant evidence of a positive or negative effect on fiscal outcomes in non-school districts.

Overall, we are not able to state that there has been a positive and significant impact of parcel tax elections on local fiscal outcomes. While this could be due to data limitations, there may be other reasons that could explain these results. First, districts that failed to pass the parcel tax with a small margin may have engaged in seeking donations to generate revenue for the school districts whereas the districts that passed with a small margin may have been rather passive about that. Second, those districts that failed to pass may have also pursued aggressively federal and state sources through grants and other transfers. We would think that those districts that passed the parcel tax didn't have to follow the same approach.
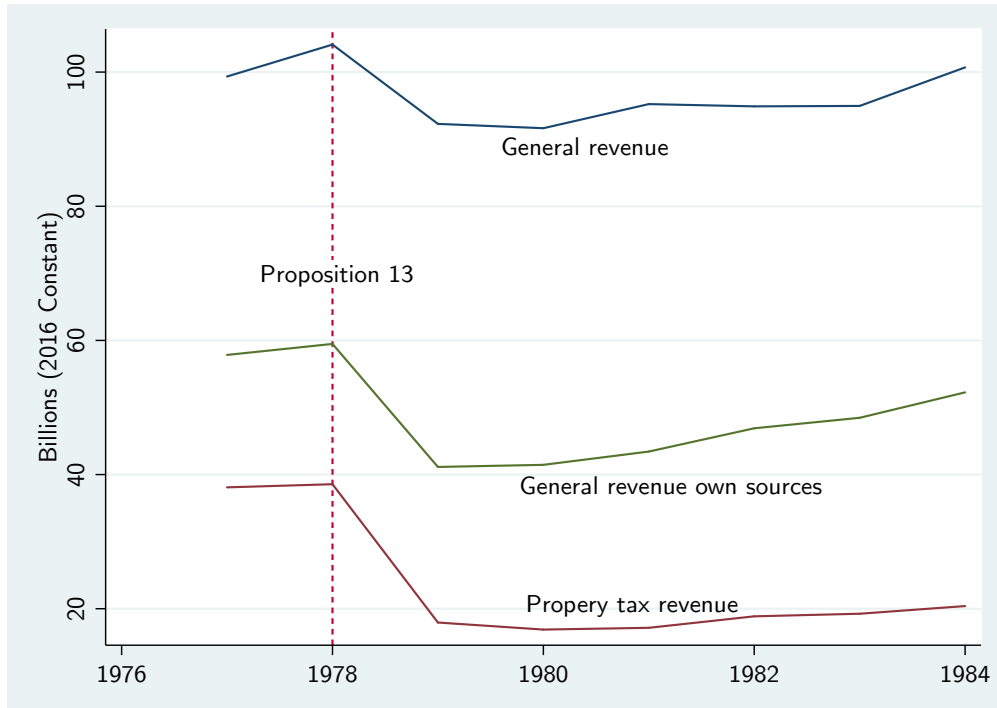
As future extensions, we are in the process of expanding our data to include more fiscal variables such as long-term debt in school districts and non-school districts, and further breakdown of government expenditures. We will also be examining the effect of parcel tax elections in non-school districts that use the revenue for purposes other than public safety. In addition, we plan to examine other local behavioral responses to parcel tax adoption such as change in business activity, mobility of individuals, and student enrollments in school districts.[5]

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[5] Enami, Reynolds and Rohlin (2018) examine the response of business activity to property tax elections in Ohio using the RDD approach and find a negative effect from property tax increases.
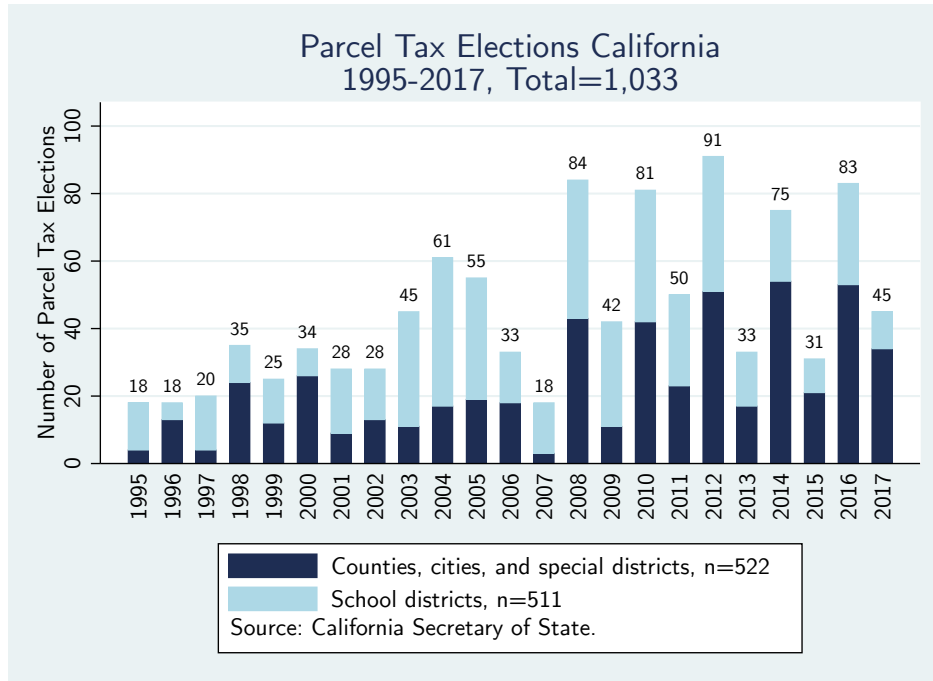
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Figure 1.
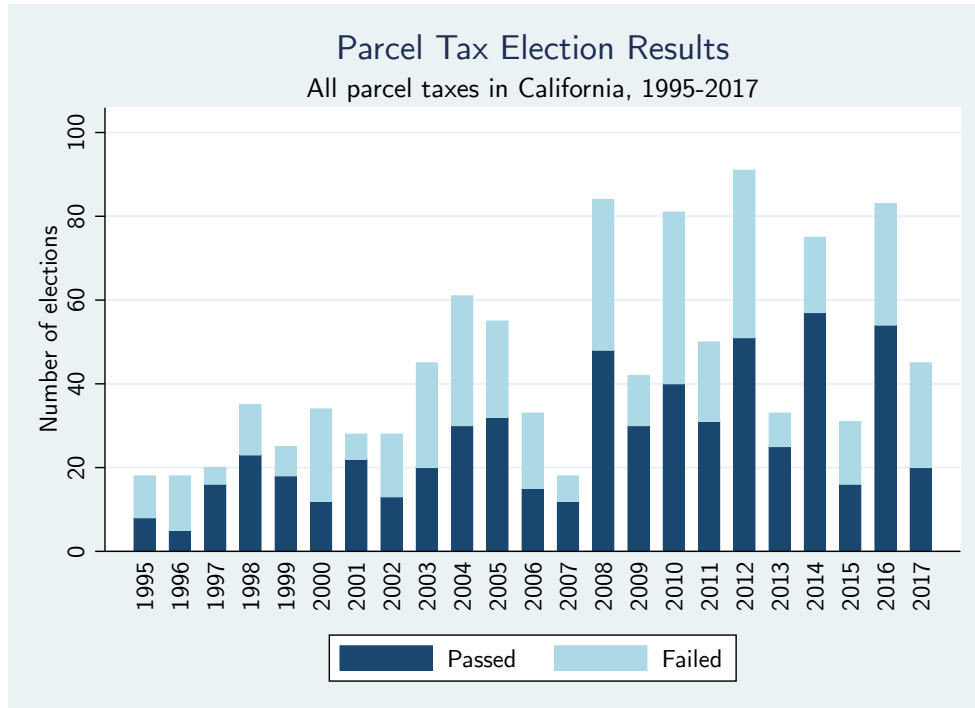**Property tax loss after California's Proposition 13 in 1978**

General revenue

Proposition 13

General revenue own sources

Propery tax revenue

Billions (2016 Constant)

1976   1978   1980   1982   1984

Reproduced from Lee (2014).

Figure 2.
Number of Parcel Tax Elections in California (1995-2017)

Reproduced from Lee (2018).

Figure 3.
Parcel Tax Election Results (1995-2017)

Reproduced from Lee (2018).

Figure 4.
California Counties with Parcel Tax Elections by Counties, Cities and Special Districts:
County-level Aggregation
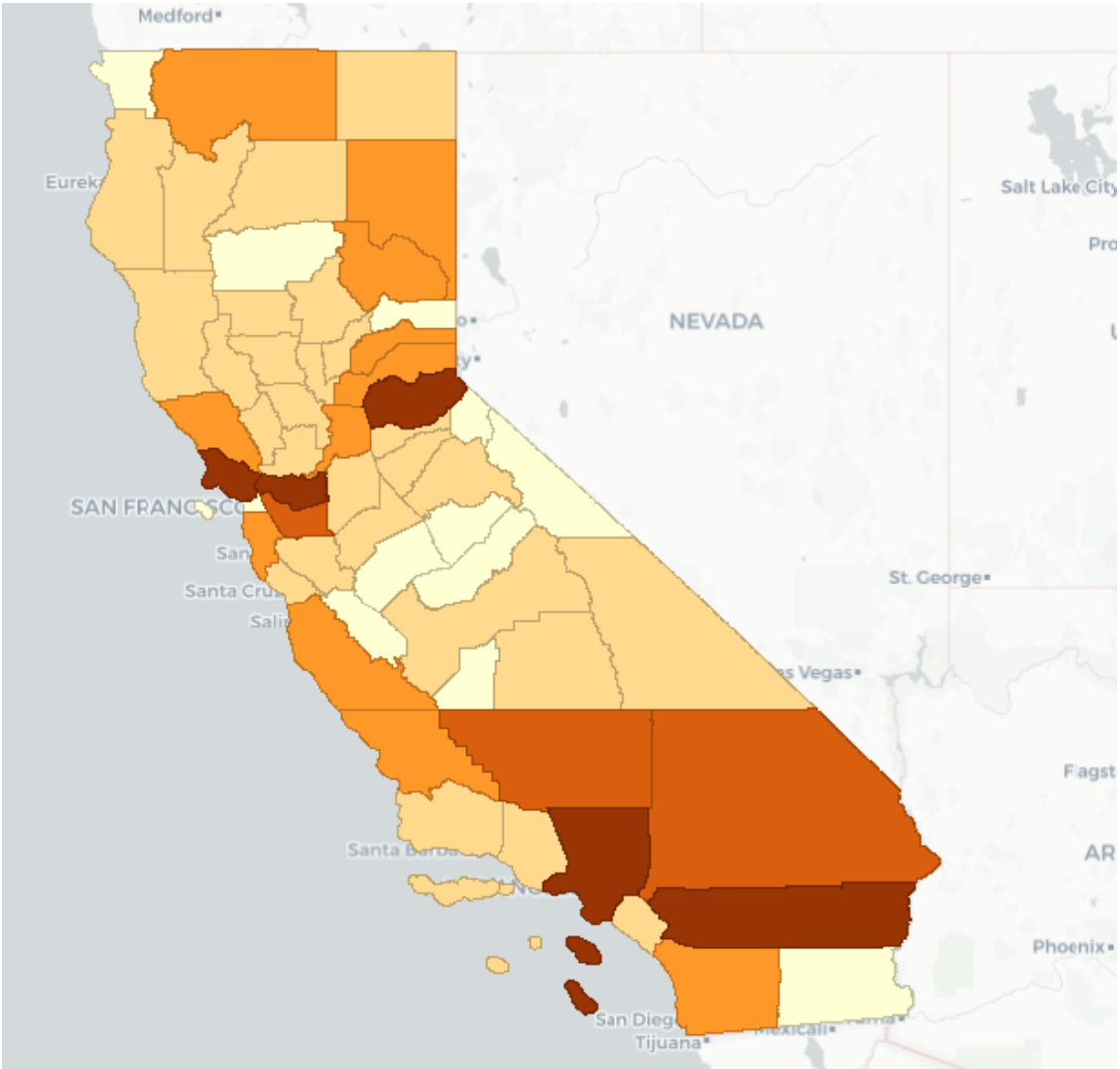


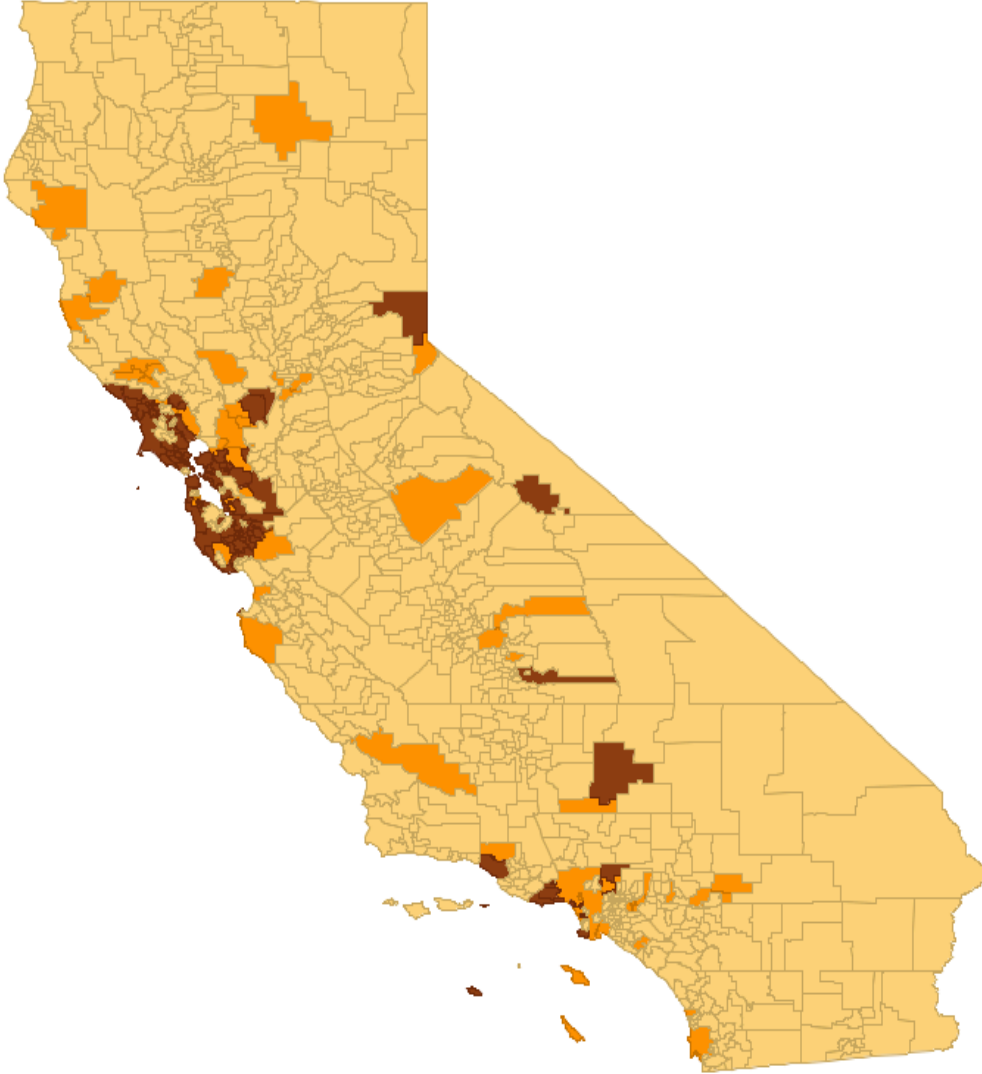Number of parcel tax elections by county

- 0 (12)
- 0-9 (27)
- 10-19 (11)
- 20-29 (3)
- 30 or more (5)

Figure 5.
Parcel Tax Elections in California School Districts

Election outcomes in California School districts

- failed parcel tax election (93)
- successful parcel tax election (126)
- no parcel tax election (767)

Figure 6.
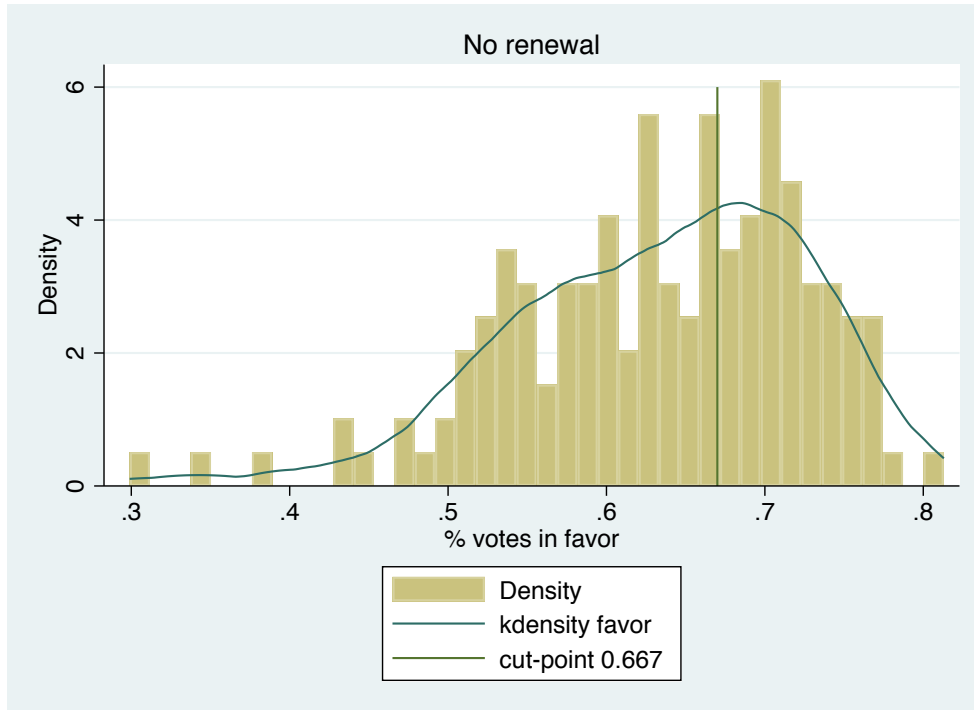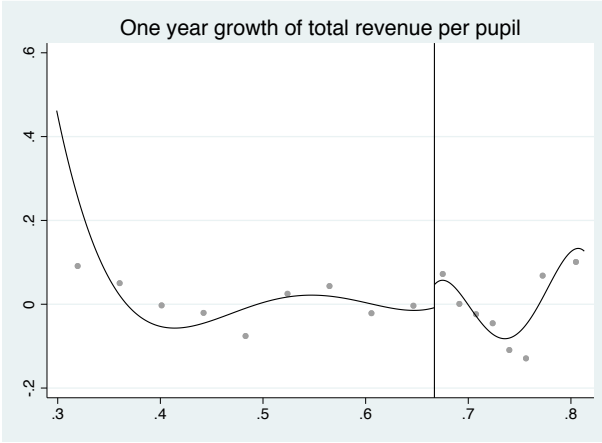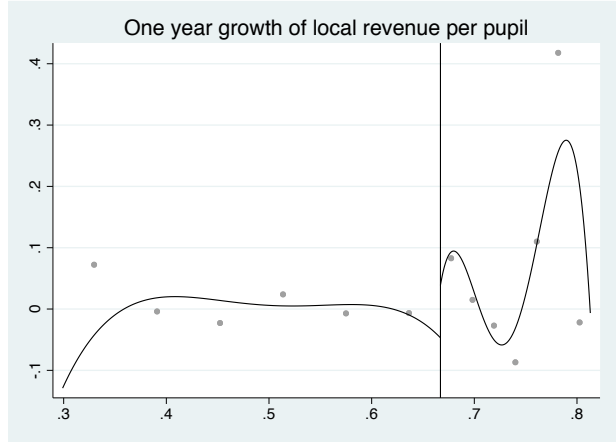**Density Plot: Percentage of Votes in Far of School Parcel Tax Measures**

Figure 7.
Estimates of the Effect of Parcel Tax Adoption on Fiscal Behavior in School Districts

A. Total Revenue growth

One year growth of total revenue per pupil

B. Local revenue growth

One year growth of local revenue per pupil

C. Total expenditure growth

One year growth of total expenditure per pupil

D. Current expenditure growth

One year growth of operational expenditure per pupil
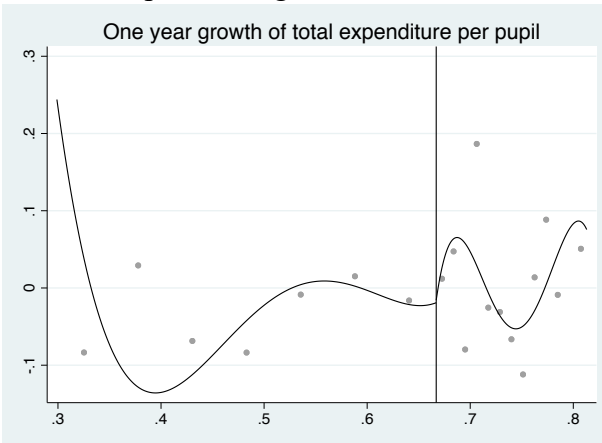
E. Capital expenditure growth
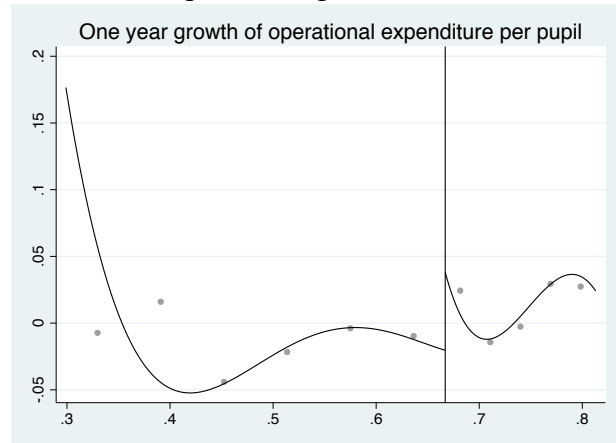
One year growth of capital expenditure per pupil
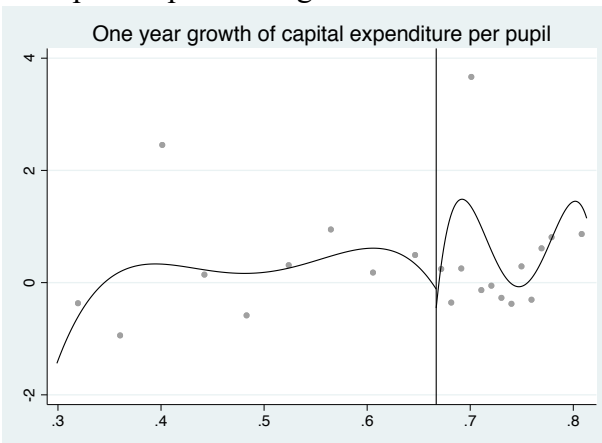
Notes: Dots represent the average changes in the growth of fiscal variables one year after parcel ta adoption for all new parcel tax elections. The vertical lines indicate the two thirds supermajority requirement to pass a parcel tax measure in our regression discontinuity design. All fiscal variables are inflation adjusted. The sample does not include renewal elections. Patterns are similar with the inclusion of renewal elections.

Figure 8.
Density of Votes in Favor of a Parcel Tax Measure for Public Safety: 2003-2016
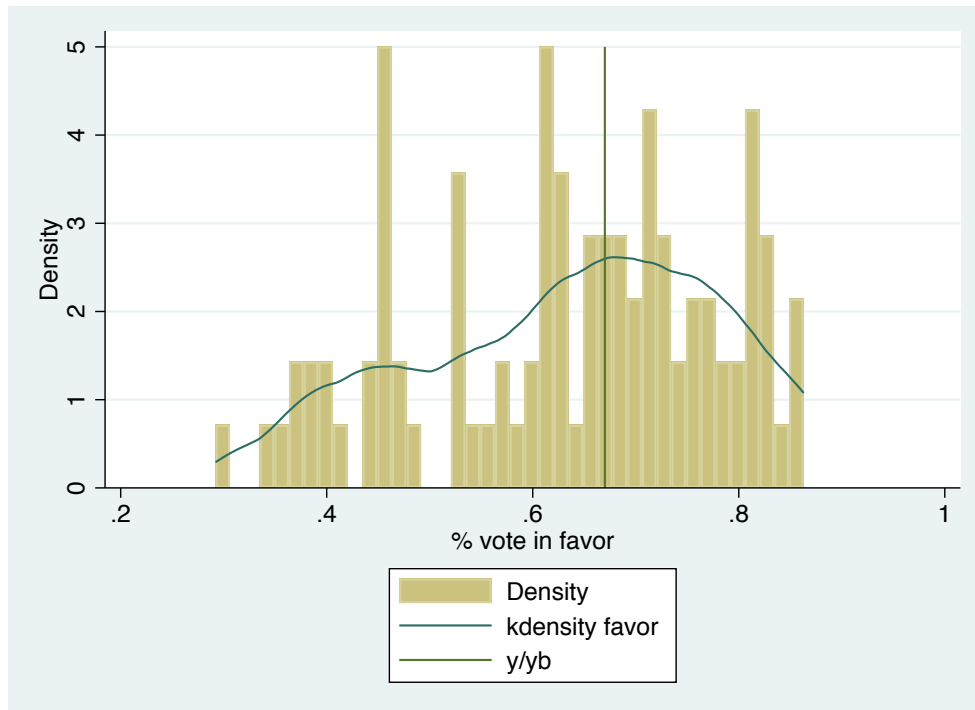
Figure 9.
Regression Discontinuity Plots:
The Effect of Parcel Tax Adoption
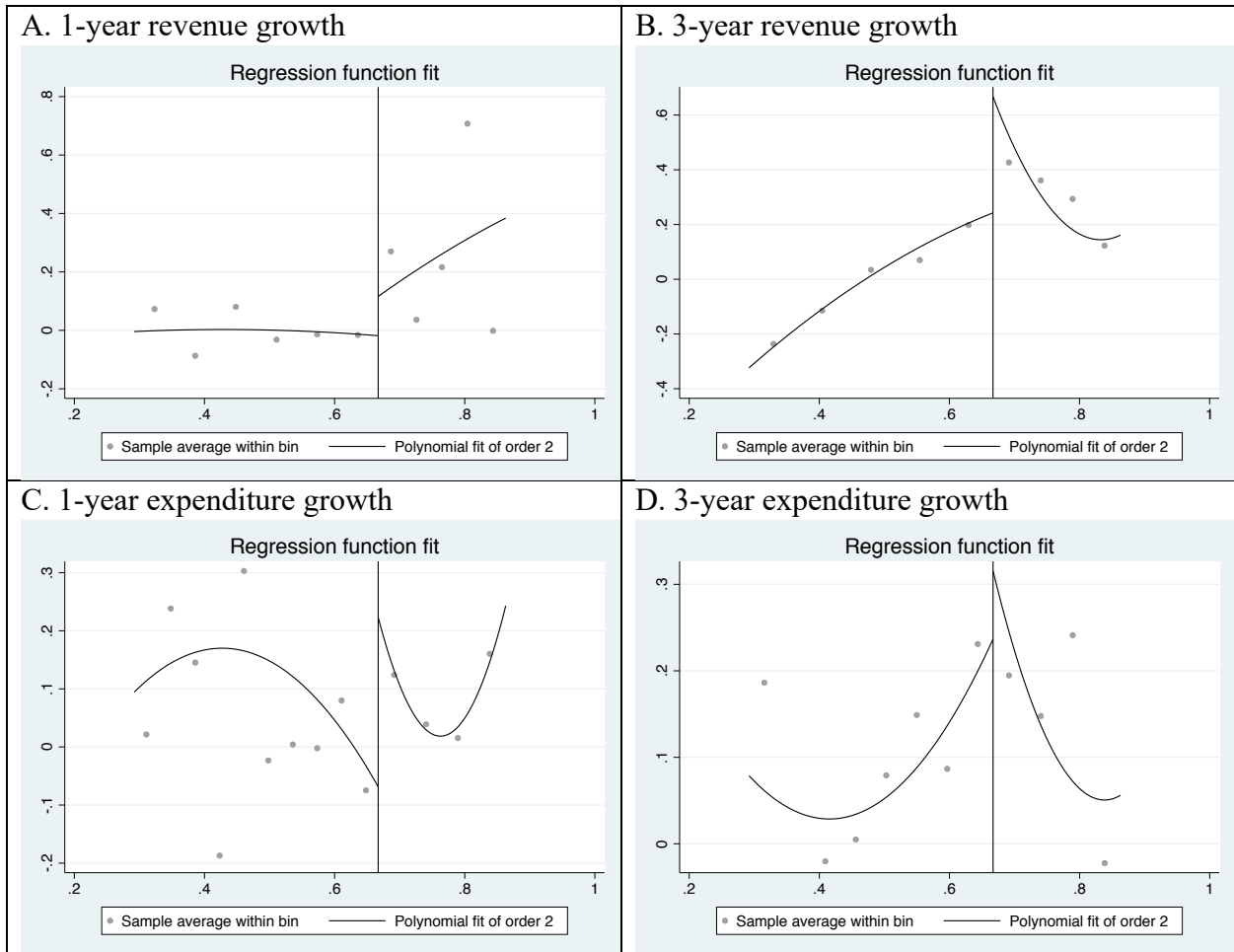
Table 1.
Local services that parcel taxes are proposed to finance
In non-school districts between 1995 and 2016.
(Cities, counties, and special districts)

Purpose of parcel tax measures	Frequency	Percent
Public Safety	206	51.24
Parks/Recreation	40	9.95
Library	34	8.46
Roads Maintenance	33	8.21
Public Health	26	6.47
Open Space	11	2.74
Other	11	2.74
Revenue	9	2.24
Water Management	8	1.99
Flood Control	5	1.24
General Service	5	1.24
Landscaping/Lighting	4	1.00
Water Supply	4	1.00
Facilities	3	0.75
Not Specified	3	0.75
Total	402	100.00

Source: Lee (2018).

Table 2.
Summary Statistics

A. School Districts

Variable	N	Mean	SD	Min.	Max.
School Districts					
New elections only					
Percentage of votes in favor	153	.633	.092	.299	.813
Passage (1=yes, 0=no)	153	.431	.497	0	1
1-year growth of total revenue per pupil	150	-.004	.150	-.424	.843
1-year growth of local revenue per pupil	150	.012	.198	-.648	1.445
1-year growth of total expenditure per pupil	150	-.005	.190	-.420	1.718
1-year growth of current expenditure per pupil	150	-.005	.057	-.156	.238
1-year growth of capital expenditure per pupil	148	.503	2.565	-1.00	21.413
3-year growth of total revenue per pupil	147	0.039	0.165	-0.448	0.750
3-year growth of local revenue per pupil	147	0.051	0.199	-0.667	0.554
3-year growth of total expenditure per pupil	147	0.019	0.211	-0.518	0.874
3-year growth of current expenditure per pupil	147	0.036	0.124	-0.434	0.397
3-year growth of capital expenditure per pupil	145	1.115	4.271	-1.000	30.755
Including renewal elections					
Percentage of votes in favor	223	.661	.096	.299	.869
Passage (1=yes, 0=no)	223	.547	.499	0	1
1-year growth of total revenue per pupil	207	0.007	0.142	-0.424	0.843
1-year growth of local revenue per pupil	207	0.018	0.192	-0.648	1.445
1-year growth of total expenditure per pupil	207	0.010	0.193	-0.420	1.718
1-year growth of current expenditure per pupil	207	0.001	0.059	-0.156	0.238
1-year growth of capital expenditure per pupil	204	0.465	2.286	-1.000	21.413
3-year growth of total revenue per pupil	187	0.035	0.157	-0.448	0.750
3-year growth of local revenue per pupil	187	0.045	0.186	-0.667	0.554
3-year growth of total expenditure per pupil	187	0.007	0.202	-0.518	0.874
3-year growth of current expenditure per pupil	187	0.027	0.122	-0.434	0.397
3-year growth of capital expenditure per pupil	187	0.924	3.924	-1.000	30.755
Special Districts for Public Safety					
Percentage of votes in favor	98	0.633	0.144	0.292	0.863
Passage (1=yes, 0=no)	100	0.470	0.502	0.000	1.000
1-year growth of total revenue	87	0.111	0.424	-0.608	1.915
1-year growth of total expenditure	87	0.090	0.334	-0.520	1.822
3-year growth of total revenue	62	0.224	0.463	-1.000	1.927
3-year growth of total expenditure	62	0.133	0.346	-1.000	1.248

Notes: All variables are computed using financial data adjusted to inflation ($2012 constant)

Table 3.
School Districts:
RDD Estimates of the Effect of Parcel Tax Adoption

Local polynomial specifications	New elections only			Including renewal elections		
	Linear	Cubic	Quadratic	Linear	Cubic	Quadratic
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. 1-year growth						
Total revenue	.105	.024	-.083	.080*	.148	.148
	(.096)	(.081)	(.742)	(.037)	(.128)	(.132)
Local revenue	.169	.031	.026	.140*	.152	.172
	(.073)	(.184)	(.195)	(.070)	(.211)	(.208)
Total expenditure	.018	.023	.022	.026	.058	.063
	(.110)	(.147)	(.208)	(.075)	(.125)	(.149)
Current expenditure	.056	.025	.-070	.060*	.040	.036
	(.038)	(.077)	(.118)	(.026)	(.044)	(.057)
Capital expenditure	.361	.223	2.869	.254	.910	.570
	(.074)	(1.488)	(1.835)	(.728)	(.936)	(1.385)
Panel B. 3-year growth						
	(7)	(8)	(9)	(10)	(11)	(12)
Total revenue	.035	-.133	-.124	.0675	.054	.008
	(.087)	(.118)	(.108)	(.0495)	(.089)	(.089)
Local revenue	.056	-.027	-.038	.208*	-.006	.015
	(.116)	(.163)	(.271)	(.072)	(.123)	(.131)
Total expenditure	-.009	-.095	-.161	.058	.029	.019
	(.176)	(.277)	(.350)	(.105)	(.19016)	(.218)
Current expenditure	-.010	.002	-.301*	.009	.053	.023
	(.075)	(.120)	(.164)	(.063)	(.089)	(.088)
Capital expenditure	-.723	-5.7212	-10.041	.505	1.568	-3.581
	(5.146)	(8.399)	(11.826)	(3.607)	(4.937)	(7.633)

Note: Coefficients are robust estimates. Robust standard errors are in parentheses. * $p < 0.05$.

Table 4.
Special Districts for Public Safety:
RDD Estimates of the Effect of Parcel Tax Adoption

Local polynomial specifications	Linear	Cubic	Quadratic
	(1)	(2)	(3)
Revenue growth 1 year	-.159	-.302	-.380
	(.354)	(.384)	(.358)
Revenue growth 3 year	.648	-.403	-1.7522
	(.759)	(1.791)	(1.959)
Expenditure growth 1 year	.425	.194	-.268
	(.339)	(.361)	(.752)
Expenditure growth 3 year	.339	.662	-.934
	(.589)	(.919)	(1.827)

Note: Coefficients are robust estimates. Robust standard errors are in parentheses. * $p<0.05$.