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Analyzing Voter Support for California's Local Option Sales Taxes for Transportation

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ABSTRACT
Local and regional governments in the U.S. rely increasingly on voter-approved local option sales taxes (LOSTs) to fund transportation capital investments, maintenance, and operations. LOSTs typically present voters with lists of local transportation projects and programs to be funded by a ¼ to 1 percent sales tax increase. Most research on LOSTs are case studies, which make generalizations about LOSTs difficult. We conducted a comprehensive, multi-jurisdictional analysis of LOST measures in California, the U.S. state with the most of them. We examined 76 LOST measures put to voters between 1976 and 2016 to assess factors associated with voter support. LOSTs in California are enacted by counties, which we examined in addition to smaller intra-county geographies using both regression models and case studies. We tested several explanatory variables for association with voter support including macroeconomic and political context, planned measure expenditures, voter characteristics, and spatial distribution of proposed projects. We found that funding dedicated to public transit and returned to local jurisdictions predicts support at the county level, and that LOSTs that create new taxes—as opposed to extending or renewing existing taxes—are less popular with voters, all else equal. Our analyses of sub-county geographies revealed that political party affiliation is the strongest predictor of local voter support for LOSTs and that voters living adjacent to funded projects tended to be more supportive of LOSTs.

KEYWORDS
Local option sales taxes, LOST, transportation finance, voter support

INTRODUCTION

As the traditional sources of surface transportation funding in the U.S.—state and federal motor fuel taxes—wane in the face of inflation, increasing fuel efficiency, and (particularly at the federal level) political opposition to tax rate increases, many local and regional governments are taking transportation financing into their own hands. In many cases, local jurisdictions—most often counties—have put transportation finance measures directly to the voters in the form of local option sales taxes (LOSTs) for transportation. LOSTs have proven increasingly popular, with 55 sales taxes for transportation put before voters across the U.S. in 2018, of which 61.8 percent were approved to create an estimated $31.7 billion in revenue (Laska and Puentes 2019). Despite growing reliance on LOST revenues, these measures and support for them have been little studied, except for several case studies. In particular, there have been no systematic analyses of what explains voter support for or opposition to LOST measures, which is important given their waxing role in filling current lacunae of transportation funding.

We examined factors associated with voter support of LOSTs at both the county and local levels. We hypothesized that explanatory variables, ranging from macroeconomic and political context to resident characteristics, spatial proximity, and planned expenditures of the measures themselves, are associated with voter support for LOSTs. We studied California, the most populous U.S. state, home to the first LOST measure, and the state whose voters have enacted more LOSTs than any other. As of 2019, California counties had proposed 86 LOST ballot measures and 88 percent of the nearly 40 million Californians live a county subject to LOST transportation taxes (UCLA Institute of Transportation Studies 2020). We assembled and analyzed data from 76 elections to determine how political context, current economic conditions, and measure components relate to county-wide LOST support. We then used localized voter data and resident characteristics to untangle more fine-grained variation in voter support and examine how voter proximity to proposed LOST projects may influence voter support.

PREVIOUS RESEARCH

Characteristics of California Local Option Sales Taxes for Transportation

Conventional wisdom holds that voters do not like to tax themselves, yet LOST measures have proven remarkably popular with American voters. Since 1976, California counties have placed 86 LOST measures before voters, the vast majority (75) of which have received majority support (UCLA Institute of Transportation Studies 2020).

Each California LOST transportation measure is tailored to its local context, but all share a number of characteristics. All LOSTs levy small taxes on the sale of a broad base of consumer goods and services. The added levies range from $0.00125 per dollar (one-eighth cent) to $0.01 per dollar (one cent), but most are $0.005 per dollar (half-cent). The clear majority (93%) of California LOSTs run for a fixed period (20 years is common) and then expire; just five measures are permanent (Lederman et al. 2018).

Most LOST measures program the largest portion of expenditures to road projects, followed by public transit projects—with suburban and rural counties earmarking a higher share of revenue for roads, and urban counties devoting larger shares to transit. On average, about three-fifths of LOST expenditures fund road projects and about one-third of the revenues go to public transit projects (Lederman et al. 2018). A small (about 8% on average) remaining share of revenues in the average LOST measure fund projects dedicated to senior and disabled travel, pedestrian and bike infrastructure, safe routes to school programming, and other transportation related expenditures.

The Politics of Taxation

What influences voter turnout?

Previous research on voter attitudes toward taxes generally identify two categories of factors that influence voter turnout: those exogenous to specific elections or initiatives, such as the demographics of the voter population, and those endogenous to them, such as the closeness of the contest. Downs' (1957) "calculus of voting" theory posits that people vote if they expect the benefits of voting to outweigh the effort of voting. Voters must believe their vote makes a difference, a probability that falls as the size of the voting community rises. Consistent with this theory, larger jurisdictions have lower expected voter turnout (Geys 2006). Voter turnout is higher among longer-term residents, and stable populations have greater knowledge of issues and candidates (Filer, Kenny, and Morton 1993, Geys 2006). Voter turnout is positively associated with homeownership, since owners have a "supplementary stake" in the potential gains and losses from election outcomes (Filer, Kenny, and Morton 1993, Geys 2006). Also, "voting may be habit-forming" and previous turnout is a statistically significant predictor of future voting (Geys 2006).

Endogenous influences, i.e., those related to specific ballot initiatives that impel people to vote, also generally follow the "calculus of voting." They tend either to increase the perceived benefit of voting—such as in close contests in which individual votes are perceived as decisive (Franklin 2004)—or to decrease the costs voters bear in acquiring information about candidates and initiatives. Cost-reducing influences include campaign expenditures that increase information and awareness levels (Dawson and

Zinser 1976, Chapman and Palda 1983), large ballots that include high-profile contests (such as a presidential election) that tend to attract media attention and popular awareness (Cox and Munger 1989), and the presence of "High-salience initiatives and popular referenda" on the ballot, which are estimated to increase turnout by about four percentage points during midterm elections (Smith 2001, 700). The association between message tone and voter turnout is more ambiguous. Some find that turnout is lower in negative-toned campaigns (Ansolabehere, Iyengar, and Simon 1999), while others find that most measured levels of negativity *increase* turnout, and that only the most extreme negativism deters voters from the ballot box (Lau and Pomper 2001).

What motivates people to tax themselves?

Research on the influences and motivations for self-taxation has identified two general factors relating to whether voters are directly affected by the specific tax measures' content (endogenous) or not (exogenous).

Exogenous influences on voting to tax oneself are all factors apart from the measure content such as the current economic climate, the manner by which current services are paid for (i.e., the status quo), the composition of current taxes, and partisanship. Voters are less likely to pass ballot initiatives in negative economic climates, such as during recessions (Donovan and Bowler 1998). Voters also consider their local jurisdiction's current tax situation to a significant degree: one study found people preferred taxes to user fees when similar goods or services were already paid for by taxes, and that they preferred fees to taxes when no similar taxes were in place (Franko, Tolbert, and Witko 2013). Tax composition also matters, and people are more willing to accept higher tax burdens if taxes are levied in small increments, such as they are with LOSTs, which add a few cents to each consumer purchase (McCaffery and Baron 2006). Voters are also more supportive of measures that present tax levies as a percentage rather than in monetary terms, and when the measure is said to impose a "tax" rather than a "payment" (McCaffery and Baron 2006). Party affiliation is a critical element of voter support and tends to be a stronger predictor of voter support than economic self-interest or attitudinal factors such as beliefs about inequality. Past research finds Democrats more supportive than Republicans of ballot-imposed taxes, and partisan effects hold even when controlling for demographics and homeownership (Franko, Tolbert, and Witko 2013).

Endogenous influences on voters' willingness to tax themselves include the content of the initiative, how much money is spent opposing the measure, how tax impacts are perceived, how taxes are named or labeled, what tax benefits are perceived, and how existing services are viewed. Measure content is critical to voter support and, generally, voters tend to be

risk-averse when voting on economic initiatives (Bowler and Donovan 1994) and in direct democracy elections (Bowler and Donovan 1994, Donovan and Bowler 1998). More spending on campaigns opposing an initiative or candidate increases the likelihood that voters will support the status quo, while spending in favor of a candidate or initiative is less effective in influencing voters (Donovan and Bowler 1998, Gerber 1999). Voters may also be swayed by loss aversion, meaning that people fear potential losses from some action more than they value potential gains (Kahneman and Tversky 1984). Loss aversion typically translates into voting for the status quo, particularly when it is difficult to identify winners or losers (Fernandez and Rodrik 1991).

Support for Local Option Sales Taxes for Transportation

Relatively few studies evaluated voter support for LOSTs. However, two national surveys of transportation taxes broadly, as well as several LOST case studies, collectively suggest that measure content and local context both influence voter support. In general, voter support for transportation taxes (including LOSTs) has grown since 2010, and Californians support transportation taxes more than residents of other states (Lewis, Herrman, and Bean 2017). Democrats, young voters, and transit supporters are generally more supportive of transportation taxes, although research finds that overall levels of support vary relatively little among different demographic groups (Nixon and Agrawal 2018). A study of transportation tax measures in two southern California counties found that a positive perception of existing transit service increased voter support for taxes, but a critical view of existing transit service did not diminish support in any significant way (Green et al. 2013). Voters may support LOST funding for public transit out of concern for collective benefits—such as concerns over traffic congestion or pollution—rather than personal intentions to ride transit (Manville and Cummins 2015). Similarly, researchers find that partisanship rather than personal relevance increasingly influences voter support for transportation (Manville 2019).

Proximity of a proposed project to a voter's home may also motivate voter support. In a case study of multiple LOST measures in Sonoma County, California, Hannay and Wachs (2007) found that proximity to enumerated projects was correlated with measure support. At the same time, also studying LOST measures in California, Haas et al. (2000) were unable to conclude whether or to what degree the geographic distribution of expended revenues affects LOST passage rates.

Support for a measure reflects voter perceptions of how much the proposed projects are needed in their community. Perceived need first shapes the expenditure plans put before the voters, and then influences their approval by voters. Measure expenditure plans are crafted to

encourage voter support and therefore reflect perceived local and countywide transportation needs. Expenditure plans are shaped by multiple rounds of vetting and bargaining among stakeholders and opinion leaders, and are subjected to focus group testing prior to being put on the ballot. Perceived need may also vary within a given county based on the proximity of a community to proposed projects. Local voter support for a measure may therefore vary with perceived need for proposed projects as well as the demographic characteristics and party affiliations of the voters. The mix of proposed expenditures in a LOST ballot measure may influence voter support to differing degrees. Research finds that voter support is highest for measures that fund bicycle or pedestrian projects (Lewis, Herrman, and Bean 2017), which could reflect positive attitudes toward measures with heterogeneous mixes of projects in the project lists. Other studies show mixed results, however, on whether multi-modal funding is critical to measure passage. Hannay and Wachs (2007) attributed the eventual passage of Sonoma County's Measure M (2004) (after multiple failures) in part to its incorporation of a multi-modal funding plan. In contrast, Haas et al. (2000) did not find that including both highway and transit funding increases the likelihood of voter approval. Instead, the authors attributed support to the influence of interest groups, such as environmentalists, who prefer specific modal expenditures. A possible explanation for the lack of consensus between these studies is that county context and experience—rather than the modal expenditure mix—affects LOST support. The eventual passage of Sonoma's County's Measure M (2004) could, for example, be due—not to the modal expenditure mix—but to the lessons learned by the measure sponsors from previous failed measures. The extensive vetting process LOSTs undergo before being put on the ballot bring together county transportation stakeholders and public officials, and typically incorporate feedback garnered from focus groups. The process aims to craft an appealing project list for voters, reflect county transportation needs, and develop a marketing strategy – which may over time reduce the number and intensity of measure opponents.

A substantial literature examines voter behavior on tax measures more generally, and several case studies investigate support of and opposition to LOST transportation measures specifically. But most LOST research has studied individual measures or multiple measures in the same or adjacent jurisdictions, making it very difficult to generalize beyond these individual cases. To address this shortcoming in the literature, we examined 76 LOST measures in California, the U.S. state home to the globe's fifth largest economy, in an effort to produce more generalizable findings regarding the factors associated with voter support of transportation sales tax ballot measures.

DATA AND METHODS

Although all measures studied in this research are from California, the state is both very large and highly varied – geographically, economically, culturally, and politically – allowing us more room to generalize from our findings than would an analysis of a smaller or more homogenous state. Analyzing large numbers of LOST measures and voting patterns at the county and census tract-level sheds light on an increasingly popular transportation finance instrument, and the factors associated with voter support of them. We first examine the determinants of county-level voter support because LOSTs pass or fail at the county level, and because the crafting of the measures and campaigns for their passage focus on countywide passage. Since 1995, a LOST transportation measure in California is approved only if two-thirds of voters support it,[1] so the path to county-level passage is a challenging one for measure advocates.

Table 1 lists the 76 LOST measures put before California voters between 1976 and 2016. With respect to the determinants of support at the county level, we used data to estimate multi-variate linear regression models, with the share of county voters supporting a LOST as the dependent variable. Our independent variables, shown in Table 2, include a mix of political, economic, and measure-specific characteristics that may be related to voter support. We selected variables to reflect elements identified in previous research as potentially influential to LOST voter support. For example, we included if the measure was held in a major election (presidential and senate) year and party affiliation because previous research found that both influence voter support (Nixon and Agrawal 2018, Hannay and Wachs 2007). We tested model specifications using different measures of similar election elements. For example, we measured political engagement alternatingly as a dummy variable for presidential and non-presidential elections and a continuous voter turnout variable. The different variables tested produced similar model results, giving us confidence in model specification presented here. The final model presented here incudes variables that are both conceptually aligned with the literature and produced a best-fit model based on Akaike and Bayesian Information Criteria (AIC/BIC) scores. Unfortunately, we had no choice but to exclude factors that defy quantification, such as the role of marketing and advertising in swaying voter support, despite past case study findings that marketing influences LOST outcomes (Haas et al. 2000).

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[1] In 1995, the California Supreme Court ruled in *Santa Clara County Local Transportation Authority v. Guardino* that LOSTs are a “special” purpose tax under Proposition 62, and therefore require approval by a two-thirds supermajority of voters (1995). Prior to this decision, LOSTs passed with a simple majority of votes.

Table 1 Measures Included in County and Tract-Level* Analyses

County	Year	Measure Name	Overall Support (Passed)[a]	
Alameda	1986	Measure B	57%	(Fail)
Alameda	1998	Measure B	58%	(Pass)
Alameda	2000	Measure B	82%	(Pass)
Alameda	2012	Measure B1	67%	(Pass)
Alameda	2014	Measure BB	71%	(Fail)
Contra Costa	1988	Measure C	58%	(Fail)
Contra Costa	2004	Measure J	71%	(Pass)
Contra Costa	2016	Measure X	63%	(Pass)
Fresno	1986	Measure C1	58%	(Pass)
Fresno*	2002	Measure C extension	54%	(Pass)
Fresno*	2006	Measure C Extension	78%	(Fail)
Humboldt	2016	Measure U	49%	(Fail)
Imperial	1989	Measure D	81%	(Pass)
Imperial	2008	Measure D	84%	(Pass)
Kern	2006	Measure I	56%	(Fail)
Los Angeles	1980	Proposition A	54%	(Pass)
Los Angeles	1980	Proposition A	43%	(Fail)
Los Angeles	1990	Proposition C	50%	(Pass)
Los Angeles	2008	Measure R	68%	(Pass)
Los Angeles	2012	Measure J	66%	(Pass)

Los Angeles	2016	Measure M	71%	(Pass)
Madera	1989	Measure A	62%	(Pass)
Madera*	2006	Measure T	73%	(Pass)
Marin	2004	Measure A	71%	(Fail)
Marin / Sonoma	2006	Measure R	57%	(Pass)
Merced	2006	Measure G	61%	(Fail)
Merced	2016	Measure V	71%	(Pass)
Monterey	2006	Measure A	57%	(Fail)
Monterey	2008	Measure Z	63%	(Fail)
Monterey	2014	Measure Q	73%	(Pass)
Monterey	2016	Measure X	68%	(Pass)
Napa	2006	Measure H	52%	(Fail)
Napa	2012	Measure T	75%	(Pass)
Orange	1990	Measure M1	54%	(Pass)
Orange*	2006	Measure M2	70%	(Fail)
Placer	2016	Measure M	64%	(Pass)
Riverside	1988	Measure A1	79%	(Pass)
Riverside	2002	Measure A2	69%	(Fail)
Sacramento	1988	Measure A1	57%	(Pass)
Sacramento	2004	Measure A2	75%	(Pass)
Sacramento	2016	Measure B	34%	(Fail)
San Benito	2016	Measure P	40%	(Pass)
San Bernardino	2004	Measure I2	80%	(Fail)

San Diego	1987	TransNet1	53 %	(Pass)
San Diego	2004	TransNet2 (Proposition A)	67 %	(Pass)
San Diego	2016	Measure A	42 %	(Pass)
San Francisco	1989	Proposition B	66 %	(Pass)
San Francisco	2003	Proposition K	75 %	(Pass)
San Joaquin	1990	Measure K	60 %	(Pass)
San Joaquin	2006	Measure K	78 %	(Fail)
San Luis Obispo	2016	Measure J	65 %	(Pass)
San Mateo	1988	Measure A1	62 %	(Pass)
San Mateo	2004	Measure A2	75 %	(Pass)
Santa Barbara	1989	Measure D	55 %	(Pass)
Santa Barbara*	2006	D Renewal	54 %	(Fail)
Santa Barbara*	2008	Measure A	79 %	(Pass)
Santa Clara	1976	Measure A1	55 %	(Pass)
Santa Clara	1996	Measure A/B	77 %	(Fail)
Santa Clara	2000	Measure A	42 %	(Pass)
Santa Clara	2016	Measure B	72 %	(Pass)
Santa Clara*	2000	Measure A	70 %	(Pass)
Santa Clara*	2008	Measure B	67 %	(Pass)
Santa Cruz	2016	Measure D	68 %	(Fail)
Solano	2002	Measure E	60 %	(Fail)
Solano	2004	Measure A	64 %	(Fail)
Solano	2006	Measure H	46 %	(Fail)

Sonoma	2000	Measure B	59 %	(Pass)
Sonoma	2000	Measure C	60 %	(Fail)
Sonoma	2004	Measure M	67 %	(Pass)
Sonoma	2015	Measure A	37 %	(Fail)
Sonoma/Marin	2008	Measure Q	70 %	(Fail)
Stanislaus	2006	Measure K	57 %	(Pass)
Stanislaus	2008	Measure S	66 %	(Fail)
Stanislaus	2016	Measure L	72 %	(Fail)
Tulare	2006	Measure R	67 %	(Pass)
Ventura	2004	Measure B	40 %	(Fail)
Ventura	2016	Measure AA	42 %	(Fail)

[a] As of 1995, California law requires a supermajority (two-thirds) of voter support for a LOST to pass; earlier measures required a majority. Asterisks (*) indicate measures included in the tract-level analysis.

In addition to the countywide voter support models, we also examine voter support at finer levels of geography. LOST counties in California tend to be large (Los Angeles is the most populous county in the U.S. with over 10 million residents, and eight other counties are home to over 1 million residents), heterogeneous places. Given that LOST-funded projects can be crafted to appeal to voters in particular areas, we hypothesized from the case study literature that support can vary substantially across a given county. A measure may pass due to broad support in all parts of a county, or it may pass due to high levels of support in some parts of a county (that are, for example, politically liberal or adjacent to a popular LOST-funded project) outweighing opposition in other parts. To examine variation in LOST support within counties and in relation to LOST-funded projects, we estimate a second set of tract-level models for eight LOST counties for which we have precinct-level voting data. We also conducted case studies of two counties as well, which we describe further below.

To this end, we conducted an analysis of neighborhood-level voter support using a subset of eight California LOSTs, designated by asterisks in Table 1. We selected these eight measures from among counties that had available disaggregated voting data, had placed at least one LOST

transportation measure on the ballot prior to the analyzed measure, and included a mix of urban, suburban, and rural counties to capture California's substantial development diversity.[2]

We analyzed local voter support at the census tract level (n=1,979 census tracts) using aggregated precinct-level voter data from the Statement of Votes published by each county's registrar of voters office. We estimated a multilevel mixed-effects linear regression model to examine the association between voter support and local context including built environment and socioeconomic characteristics, shown in Table 3. We included economic context and ballot measure characteristics in the model as random effects; all other variables, such as median household income and population density, are measured at the census tract level. As with the inter-county analysis described above, we selected independent variables based on the LOST and voting behavior literatures as well as best-fit AIC/BIC scores. We omitted some LOST characteristics (such as LOST measure duration) and macro political variables (such as presidential election year) that were included in the county-level analysis because there was little variation in these variables across the eight measures analyzed.

The census-tract level analysis does not include a measure of voters' spatial proximity to projects, though we initially planned to include such a variable because past research has associated LOSTs support with the benefits conferred on specific communities (Hannay and Wachs 2007). To this end, counties may craft measures to garner sufficient political support for passage in one of two ways: 1) geographically distributing investments across the county to garner widespread support, or 2) geographically concentrating investment on locally popular projects in order to secure concentrated support in more populous areas. We excluded a quantitative measure of spatial proximity because LOST projects' scopes and scales proved too variable and spatially asymmetric to reliably quantify their spatial effects.

[2] Limited availability of historical voting data precluded our ability to capture the temporal range of California LOSTs, and limit the local analysis to LOSTs placed on the ballot in the past twenty years.

Table 2 Model Variables, County Analysis

	Median [Range]	Data Source
Dependent variable		
% of voters in support of measure	64% [34% - 84%]	Voter Registrars, County websites
Independent variables		
Measure Variables		
% of expenditures, transit[1]	28% [2% - 100%]	Measure Expenditure Plans
% of expenditures, highways	28% [0% - 63%]	Measure Expenditure Plans
% of expenditures, local return[2]	23% [0% - 100%]	Measure Expenditure Plans
Measure duration[3]	25 yrs [8 – 99 yrs]	Measure Expenditure Plans
First ever LOST on the ballot in county (yes)	46.70%	Measure Expenditure Plans
LOST increases overall sales tax paid (yes)	72%	Measure Expenditure Plans
County context		
County unemployment rate in year of the election	5.8% [3.1 - 22.6%]	State of California Employment Development Department (2017)[4]
Total sales tax rate in year prior to election	7.5% [6% - 9%]	State of California Employment Development Department (2017)[4]
Population density (1,000s per sq. mile)	0.51 [0.38 - 22.55]	1970, 1980, 1990, 2000 Census;[5] 2005-2009 5-year American Community Survey
Political context		
% of registered voters, Democrat	47% [29% - 63%]	Voter Registrars, County websites[4]
% of registered voters, Other	23% [7% - 54%]	Voter Registrars, County websites[4]
Presidential race year (yes)	56%	
U.S. Senate race year (yes)	71%	

Table 3 Model Variables, Tract Analysis

	Median [Range]	Data Source
Dependent variable		
% of voters in support of measure	70% [54% - 79%]	Voter Registrars, County websites
Independent variables		
Measure Variables		
% of expenditures, transit	35% [2% - 100%]	Measure Expenditure Plans
% of expenditures, highways	35% [0% - 51%]	Measure Expenditure Plans
County context		

County unemployment rate in year of the election	3.4% [3.1% - 11.4%]	State of California Employment Development Department (2017)[4]
Sales tax rate in year prior to election	7.9% [7.3% - 8.3%]	State of California Employment Development Department (2017)[4]
Political context		
% of registered voters, Democrat	41% [12% - 82%]	Voter Registrars, County websites[4]
% of registered voters, Other	18% [0% - 44%]	Voter Registrars, County websites[4]
Census tract characteristics		
Population density, 1000/sq. mile	6.3 [0.1% - 48.5%]	2000 US Census, 2005-2009 5-year American Community Survey
% of commuters taking transit to work	1.8% [0% - 24.7%]	2000 US Census, 2005-2009 5-year American Community Survey
Mean commute time (minutes)	24 [9 - 43]	2000 US Census, 2005-2009 5-year American Community Survey
Median household income (in $10,000s)	$7.2 [$2.1 - $22.7]	2000 US Census, 2005-2009 5-year American Community Survey
% of households owning zero vehicles	2% [0% - 87%]	2000 US Census, 2005-2009 5-year American Community Survey
% of households, renters	24% [4% - 100%]	2000 US Census, 2005-2009 5-year American Community Survey
Median age	35 [17 - 80]	2000 US Census, 2005-2009 5-year American Community Survey

[1]Omitted categories include funding for: Safe Routes to School, seniors, bikes and pedestrians, and other funding.
[2]Local return funding includes LOST revenue that are allocated to individual local jurisdictions. Local return funds are flexible and allow jurisdictions to dedicate funding to local projects as they see fit.
[32]Permanent measures coded as 99 years. [4]Data year varies to reflect measure years. [5]County population data match the measure year. Year-specific county populations are interpolated by the US Census based on decennial censuses (see Census tables E8089CO, CO-2000-8, and E7079CO). We then calculated population density by dividing county population by county land area.

To address this issue of project proximity, we conducted case studies of four LOST measures in two counties to visually explore the role that proximity and project geography may play in voter support. We selected four LOST measures in Santa Clara and Santa Barbara Counties because each county put two LOST measures on the ballot in a span of ten years, and all four measures dedicated a majority of funding to significant capital projects hypothesized to produce substantial localized benefits that might have garnered the support of voters residing near the proposed projects. Critically, both counties dramatically revised their expenditure plans between the first and second measures by, among other things, altering the balance of local and regional expenditures. This allowed us to analyze how project support changed in response to changing project geographies. The counties also differed in their approaches to distributing projects across space. Santa Barbara sought greater geographical balance in its second measure, scattering projects throughout the county, while Santa Clara's second measure concentrated the largest investments in the county's two biggest cities.

RESULTS

In the following sections, we discuss LOST transportation measure voter support observable at the county and sub-county levels. Overall, we found that measure composition—specifically the allocation of funding to public transit and returns to local governments—is the strongest predictor of voter support in countywide models. With respect to census-tract level voter support within a county, the strongest predictors are local resident characteristics and political affiliations. Proximity to big-ticket projects that deliver localized benefits also appear related to voter support.

Countywide Analysis of LOST Voter Support

Table 4 shows that, among the 76 California LOST measures analyzed, transit funding, local return expenditures, and whether or not a measure enacted a new (rather than renewed or extended) LOST sales tax, were the significant predictors of measure support. Consistent with previous research (Manville 2019), spending on public transit is particularly popular with voters. Measures that returned more money to local jurisdictions also enjoyed greater voter support, all else equal. Apart from transportation expenditures by mode in the measure, only a LOST's effect on the sales tax rate was associated with voter support. LOSTs that increased the countywide sales tax —as opposed to maintaining an existing sales tax by renewing or extending a current LOST—were less popular among voters, *ceteris paribus*. Contrary to our expectation, no county or political context variables were significantly associated with voter support for LOSTs at the county level. We discuss

potential explanations and implications of this finding in the discussion section.

On the other hand, variables not statistically significant in our models run counter to conventional wisdom in several cases. First, most of the measures have explicit "sunset dates" when they expire and must be renewed, on the assumption that voters will be less likely to support a long-term or permanent sales tax increase. But while the measures in our dataset range from just eight years in length to permanent, we observe no statistically significant relationship between measure duration and voter support. Second, conventional wisdom also suggests that voters will be less likely to support sales tax increases in places where the sales tax is already relatively high. But here too, we observe no statistically significant relationship. Third, those crafting LOSTs are cognizant of the economic climate when voters go to the polls, on the assumption that a low unemployment rate will encourage voters to support a tax increase, while a high unemployment rate will discourage passage. But we observe no significant relationship here either. Finally, and perhaps most surprisingly, overall county political lean has no statistically significant relationship to passage either – measured here by the percentage of voters who register as Democrats, which varies greatly (from 29 to 63%) across the LOST counties.

Table 4 County-level Voter Support Results

	Coeff.	St. Error	Beta	Sig.
Measure				
Expenditures				
% Transit	31.758	15.173	0.696	**
% Highway	26.409	17.246	0.409	NS
% Local Return	27.104	13.798	0.552	*
Measure Duration (years)[1]	-0.137	0.108	-0.211	NS
Tax increase (1), continuation (0)	-8.408	4.357	-0.339	*
First LOST (1)	-6.896	5.267	-0.225	NS
County Context				
Unemployment Rate	0.630	0.696	0.160	NS

Total Pre-Election Sales Tax	0.709	4.853	0.027	NS
Population Density (1,000/sq. mile)[2]	0.593	2.828	0.045	NS
Political Context				
Presidential Election (1)	2.187	4.628	0.079	NS
Senate Election (1)	2.818	5.377	0.096	NS
% Registered Democrat	18.134	30.596	0.108	NS
% Registered Other	12.665	29.753	0.069	NS
Constant	24.548	40.896	-	NS
R^2 0.42, Adjusted R^2 0.17, AIC 356 BIC 382				

NS Not Significant, *p<0.1, **p<0.05, ***p<0.01. Model specification: linear.
[1]Permanent measures coded as 99 years.
[2]All density variables updated to reflect year-specific population for all measures before 2000.

Analysis of LOST Voter Support at the Census Tract Level

A LOST's countywide passage rate presents a single uniform metric of support across the voting jurisdiction; yet, previous case study research suggests that local, intracounty support for LOSTs is far from homogenous (Hannay and Wachs 2007). Table 5 shows that, in contrast to our countywide models, local resident characteristics and, especially, political affiliations strongly predict support for LOST measures at the neighborhood (census tract) level. Neighborhoods that are home to higher shares of registered Democrats and "Other" (non-Republican and non-Democrat) voters were more supportive of LOSTs, all else equal, consistent with previous survey research on taxes for transportation (Agrawal and Nixon 2018, Manville 2019). The importance of political affiliation at the tract level contrasts to the county level model, where partisanship across larger, and presumably more heterogeneous, county geographies is not statistically significantly related to overall countywide support. We suspect that this may result from 1) the greater observed variance in political affiliation at across census tracts (see Table 3) than across counties (see Table 2) in California that have put LOSTs on the ballot, and/or 2) that both liberal and conservative counties have passed *and* failed measures in our sample. We explore each of these explanations in greater depth in the discussion section. Compared with political affiliation, other local demographic and socioeconomic variables are weakly associated with voter support. This suggests that, apart from voter

identity, relatively small differences separate voter support across different population groups.

Table 5 Tract-level Voter Support Results

	Coeff.	St. Error	Sig.
Measure			
Expenditures			
% Transit	14.29	26.07	NS
% Highway	3.61	52.76	NS
Tax increase (1)	-19.77	12.42	NS
County Context			
Unemployment Rate	3.31	1.55	**
Preexisting Sales Tax	-8.40	17.84	NS
Political Context			
% Registered Democrat	26.17	1.41	***
% Registered Other	47.35	2.87	***
Voter Turnout (% eligible voters)	0.14	0.47	NS
Tract Characteristics			
Population Density	0.10	0.03	***
% Commuting by Transit	0.12	0.04	***
% of Households with Zero Vehicles	-0.02	0.03	NS
Mean Commute Time	-0.06	0.03	***
Median Household Income ($10,000s)	0.30	0.05	***
% of Households, Renter	0.06	0.01	***
Median Age	0.09	0.02	***
Constant	80.68	154.38	NS
Random Effects (County-Year)	5.93	1.49	
AIC 11397 BIC 11497			

Residential interclass correlation (ICC): 0.644 [0.40 to 0.83, 95% confidence interval]. NS Not Significant,

*p<0.1, **p<0.05, ***p<0.01. Model specification: multi-level mixed.

Beyond neighborhood partisan lean, voter support for LOSTs within counties tends to be higher in more central, urban, transit-oriented neighborhoods. Controlling for measure composition and political/election measures, LOST voter support is positively associated with neighborhood population density, the share of households that rent their homes, and the share of workers who commute via public transit; and it is negatively associated with commute time. With respect to the latter, while commute speeds are typically fastest for drivers, overall commute times in our sample are positively correlated with the share of those who drive alone to work, and solo auto commuting tends to be highest in outlying tracts that are typically more distant from the measures' large capital investments.

Two socio-economic tract variables, median household income and median age, are each positively associated with LOST voter support. This is not consistent with the literature that, for example, finds that younger voters tend to be more supportive of increased taxes for transportation (Nixon and Agrawal 2018). However, both income and age are negatively correlated (albeit not excessively so) with the share of tract voters registered as Democrats. So it may be that poorer and younger voters are more likely to support LOSTs because they are more likely Democrats, and not because of their age or income or age *per se* – and once party affiliation is accounted for, LOST support actually increases with income and age. Indeed, when the share of voters who are Democrats is removed from the model, the model fit declines, but the signs for both income and age flip and conform with previous research finding that neighborhoods having higher shares of young adults and lower-incomes are more supportive of LOSTs (Nixon and Agrawal 2018).

The Geography of LOST Voter Support

The analyses above consider, among other things, how voter support varies by *what* measures fund, but not *where* measure dollars are spent. Yet another element to understanding voter support for LOSTs may be voters' proximity to LOST-funded investments. As noted above, we were not able to reliably measure the location of planned LOST expenditures in our models because, while the location of some expenditures (like on a new highway interchange) are clear, many others (such as expenditures on transit service, services for seniors, or funding returned to local governments) are not. We therefore supplement our statistical analyses with two case studies that examine the spatial distribution of voter support to investigate whether areas proximate to large proposed capital expenditures tend to be more supportive of LOSTs.

Santa Clara

Santa Clara County, located in the San Francisco Bay Area, is divided between largely urban/suburban areas—including a significant portion of Silicon Valley—to the northwest, and mostly agricultural and rural lands in the southern and eastern portions of the county. Santa Clara County placed two LOST measures before voters, in 2000 and again in 2008. Measure A (2000) passed with 70 percent of the vote and Measure B (2008) was approved with 67 percent of the vote. Both measures were sponsored by the Santa Clara Valley Transportation Authority and both exclusively fund public transit improvements.

Figure 1 shows voter support across Santa Clara County in 2000 and 2008; each map highlights in red the major transit improvement—a San Francisco Bay Area Rapid Transit (BART) District rail transit extension—funded by each measure. In each case, voter support appears to be related to major project proximity. We discuss specific patterns of voter support in each measure below.

Measure A (2000). Measure A imposed a 30-year half-cent tax to replace a previously-expired LOST and focused spending on transit projects in the largest cities in the county: San Jose and Santa Clara. Measure A dedicated $2.9 billion—44 percent of total projected measure revenues and by far the largest single expenditure—to extending the BART heavy rail system from its then current terminus in Fremont in Alameda County through downtown San Jose and the Santa Clara Caltrain commuter rail station. The second largest expenditure category was $1.4 billion for countywide bus, light-rail, and paratransit operations and maintenance. The measure also dedicated funding to expand the Santa Clara Valley Transportation Authority light-rail system, improve express bus service between Palo Alto and San Jose (parallel to Highway 101), and increase connections to transit centers in Santa Clara and Palo Alto.

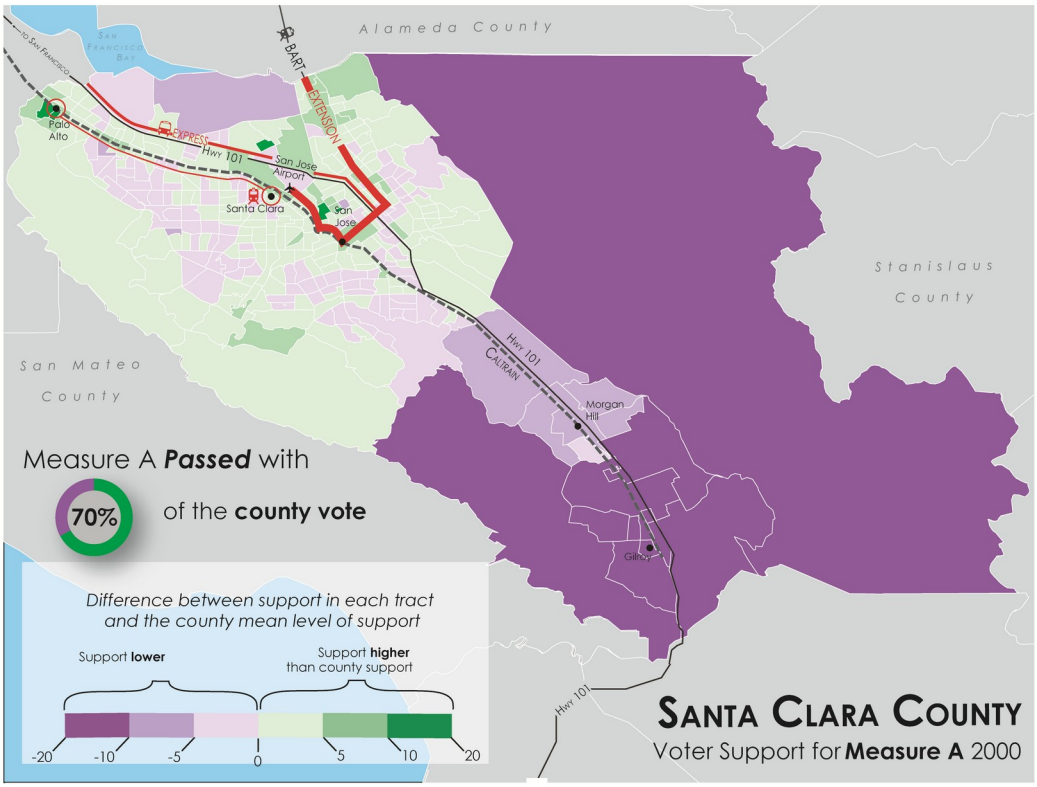
The spatial distribution of voter support for Measure A in 2000 largely mirrors the locations of proposed transit investments, which is consistent with the findings by Hannay and Wachs (2007). The transit improvements funded by the measure were predominantly located in the northern—and most urban—portion of the county and voters in tracts there were more supportive, particularly in City of San Jose and areas where BART stations were planned. Voters in Palo Alto, where Stanford University is located, also strongly supported the measure. Conversely, the majority of voters in the rural southern portion of the county—farther from the rail projects—voted against it. The map shows that there was slightly more voter support in the smaller, but rapidly growing southern city of Morgan Hill, which is home to a Caltrain commuter rail stop.

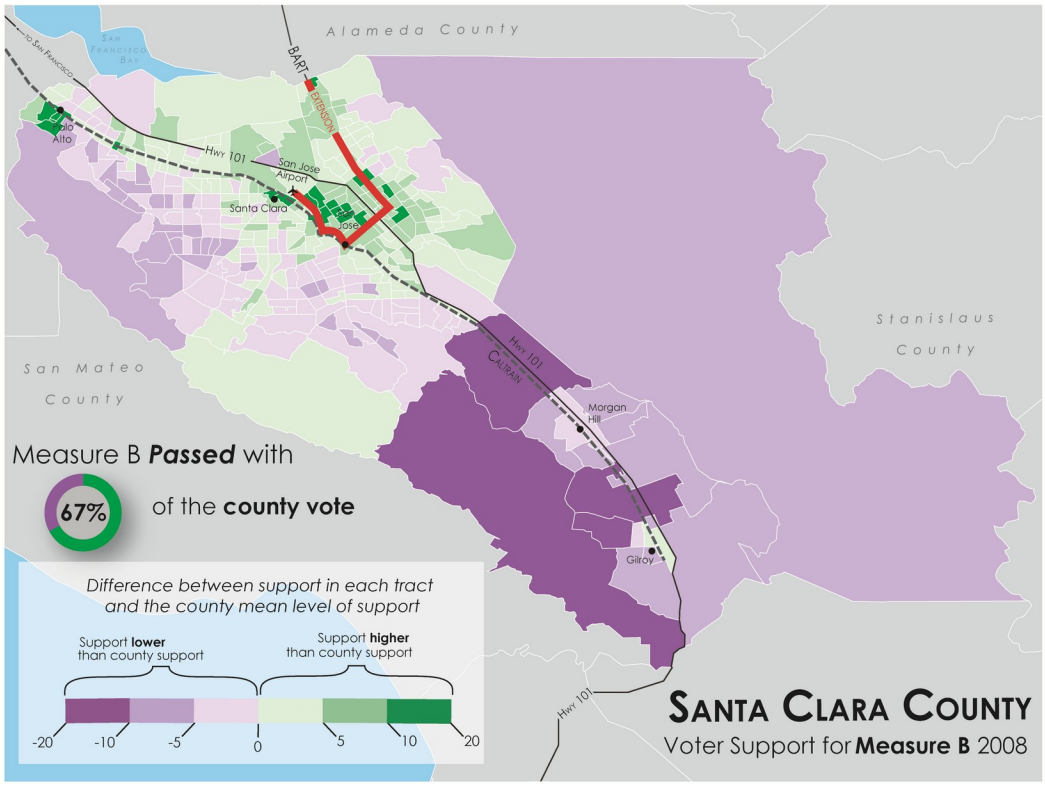
Measure B (2008). In 2008, Santa Clara County again took transportation sales tax funding to voters. Measure B dedicated an additional one-eighth cent sales tax solely to funding operations and maintenance of the BART rail expansion (funded under Measure A) for 30 years—in contrast to the comparatively geographically and modally diverse investments under Measure A.[3] Figure 1 shows the distribution of voter support throughout the county by census tract. The figure shows each census tract colored according the percentage it deviates from the overall countywide passage rate. Census tracts contain roughly the same population; therefore, smaller census tracts represent the denser areas of the county while larger ones represent less dense locations. As with Measure A, support was most pronounced in San Jose and along the planned BART route. Support for Measure B, however, was more spatially varied than Measure A, and more heavily concentrated in San Jose compared to support for Measure A. This may reflect the fact that Measure A funded transit throughout the county, while Measure B dedicated all revenue to operating and maintaining the planned BART extension.

Voter support increased in Morgan Hill and Gilroy in the southern part of the county between 2000 and 2008, although few south county census tracts garnered the two-thirds voter support needed to pass the measure. One possible explanation for higher support in these southern cities in 2008 than in 2000 is that employment opportunities in Silicon Valley increased, particularly in proximity to Caltrain commuter rail. Another possibility is that southern county commuters were looking to ease congestion on the State Route 85 freeway, which connects southern Santa Clara County commuters to Silicon Valley (Forestieri 2017).

[3] Measure B only goes into effect if the BART rail expansion funded by Measure A is completed.

Figure 1 Spatial Distribution of Voter Support, Santa Clara County for Measure A (2000) and Measure B (2008)


Alameda County
BART
EXTENSION
Palo Alto
EXPRESS
Hwy 101
San Jose Airport
Santa Clara
San Jose
Stanislaus County
San Mateo County
Hwy 101
CALTRAIN
Morgan Hill
Gilroy
Hwy 101
Measure A Passed with
70%
of the county vote
Difference between support in each tract and the county mean level of support
Support lower
Support higher than county support
-20
-10
-5
0
5
10
20
SANTA CLARA COUNTY
Voter Support for Measure A 2000

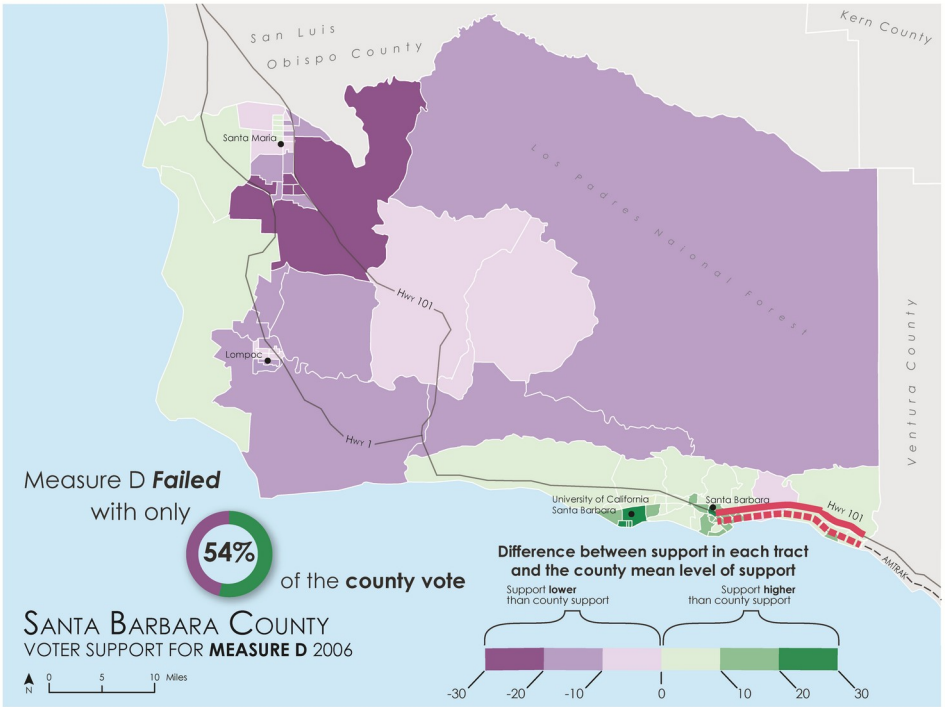

Alameda County
BART
EXTENSION
Palo Alto
Hwy 101
San Jose Airport
Santa Clara
San Jose
Stanislaus County
San Mateo County
Hwy 101
CALTRAIN
Morgan Hill
Gilroy
Hwy 101
Measure B Passed with
67%
of the county vote
Difference between support in each tract and the county mean level of support
Support lower than county support
Support higher than county support
-20
-10
-5
0
5
10
20
SANTA CLARA COUNTY
Voter Support for Measure B 2008

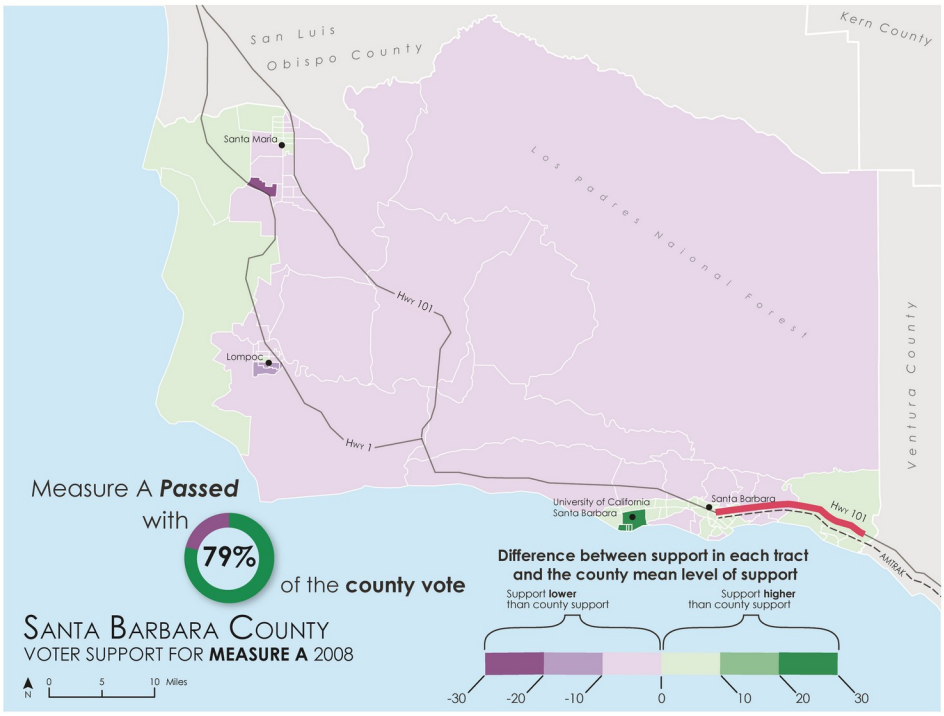
Note: Each census tract is colored according to its percentage deviation from the overall countywide passage rate. Census tracts contain roughly the same population; therefore, smaller census tracts represent the denser areas of the county while larger census tracts represent less dense locations.

Santa Barbara

Santa Barbara County, located on the Southern California coast northwest of Los Angeles, placed two measures before voters: Measure D in 2006, and Measure A in 2008. Figure 2 shows the spatial distribution of projects and voter support for Measure D, which failed with 54 percent of the vote (13 percentage points short of the two-thirds super-majority requirement in California), and Measure A, which passed with 79 percent of the vote, well above the 67 percent approval threshold. As in Santa Clara County, spatial analyses of both measures show that proximity to largest LOST expenditures in the measure appear to be associated with voter support.

Figure 2 Spatial Distribution of Voter Support, Santa Barbara County for Measure D (2006) and Measure A (2008)





Measure D (2006). Measure D would have allocated $140 million (17.7% of measure revenues) to widen U.S. Highway 101—the major highway bisecting this relatively affluent county of small cities and rural areas—from four to six lanes between the City of Santa Barbara and the county's eastern border (Santa Barbara County Association of Governments 2006). The second largest proposed expenditure was $126 million (8%) dedicated to improving commuter rail between Goleta (near the University of California, Santa Barbara) and the eastern border, an expenditure that drew the ire of measure opponents (Meagher 2008, Welsh 2008). Overall, the measure expenditure plan dedicated 43 percent of measure revenue to "alternatives to the automobile." Voters supported this proposed plan in the relatively dense and transit rich urban area of Santa Barbara and its coastal suburbs, adjacent to primary projects and the plurality of measure spending, but voters were far less supportive in the more rural northern and western portions of the county, where no large-scale expenditures were promised.

Measure A (2008). Measure A contained two significant differences from the proposed Measure D expenditure plan. First, Measure A reduced the proposed funding increase for the south-county commuter rail by 80 percent (to $25.35 million), and total transit expenditures to about 11 percent of total expenditure (a 32% decrease from Measure D).[4] Second, Measure D

[4]This is the minimum that would be spent on alternative transport; cities can fund additional transit and active transportation programs with local return

divided expenditures into “local” and “regional” categories, but included “regional” investments that benefitted only part of the county, such as Amtrak commuter rail. Measure A, by contrast, explicitly planned for more spatially balanced expenditures. The measure divided expenditures equally between the rural northern and urban southern portions of the county, and highlighted the $42 million in north county highway improvements. An emphasis on the geographic balance in the measure expenditure plan helped to increase overall support across the county for Measure A—and to reduce spatial variation—relative to Measure D.

DISCUSSION

The analyses presented here offer three different perspectives on the factors associated with voter support of local option sales tax measures for transportation. Across counties, which are the larger, more heterogeneous geographies at which LOSTs in our sample pass or fail, voters are more likely to support extending an expiring LOST than a tax increase. Support also increases when more of the revenues are expended on public transit or returns to local governments, relative to other expenditures. At the census tract level, which are smaller and typically more homogenous geographies than counties, neighborhoods with more Democrats and other non-Republican voters are more likely to support LOSTs than those with more Republicans, as expected. Beyond partisanship, urban neighborhoods, such as those with higher population densities and a larger share of public transit commuters, are more likely to support LOSTs. Finally, our case studies suggest that support for LOSTs is correlated with proximity to proposed high-profile projects from which nearby voters would ostensibly be more likely to benefit.

Our finding that neighborhood-level party affiliation is strongly associated with LOST voter support, even when controlling for an array of socioeconomic factors, is consistent with voting on tax measures more broadly (Franko, Tolbert, and Witko 2013). Variables that correlate with the share of Democratic voters—such as presidential election year and share of young adults in a neighborhood—reinforce the strength of the Democratic (or, more accurately, non-Republican) vote in passing LOST measures. Stronger LOST support among more Democratic- and non-Republican tracts is consistent with previous survey research on support for transportation taxes (Nixon and Agrawal 2018, Manville 2019). Greater support among Democrats and other non-Republican voters reflects generally higher levels of support for government services among these groups relative to Republican voters (Franko, Tolbert, and Witko 2013). Partisan support for LOSTs could also reflect the spatial geography of partisanship, where

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funds at their discretion.

Democratic voters are more concentrated in urban areas, often proximate to large LOST capital expenditures.

While partisan affiliation was strongly associated with LOST support at the neighborhood level, it was not statistically significant in our county level model. Counties in California average better than 675,000 residents, and the average population of LOST counties is about double that (1.3 million residents on average). So it is easy to speak of areas in counties that lean more Democratic or Republican, or more urban or rural. But census tracts, on the other hand, average about 4,000 residents each, and so tend to be more homogeneous in character and politics, and more so over time (Bishop 2009). One measure of this is that the partisan variance among neighborhoods in our sample is greater than among counties. Sixty-three percent of the registered voters in the most Democratic California county (Alameda in 1986) were Democrats, while just 29 percent of residents were so registered in the least Democratic county (Placer in 2016) – a 34 percentage point spread. By contrast, the partisan variance across the census tracts in our local model was much greater, ranging from 12 to 81 percent registered Democrat – a 69 percentage point spread.

A second reason that partisan leaning was not significant in our county model may be that the *appearance* of LOST measures on a county ballot is endogenous to partisanship. That is, officials may put more measures on the ballots in Democratic-leaning counties where measures, *ceteris paribus*, are more likely to pass, while officials are more risk-averse in putting them on ballots in more Republican-leaning counties where such measures are less likely to pass, all else equal. The result may be similar pass rates across counties irrespective of partisan leaning. Indeed, only eight percentage points separate the share of Democratic voters in counties whose first LOST measure passed (50%) compared with counties whose first LOST measure failed (42%). Further, while Democratic-leaning counties put more LOST measures on the ballot, these measures fail with some regularity. For example, California's most Democratic county, Alameda in the San Francisco Bay Area, put five measures on the ballot between 1986 and 2014; three of these measures passed (in 1986, 2000, and 2014) and two failed (in 1998 and 2012).

With respect to public transit funding, it may seem surprising that voters tend to be especially supportive of transit expenditures given that 80 percent of trips in California are by private vehicle, and only one-quarter of Californians take transit once a week or more (California Department of Transportation 2012); however, our finding of strong voter support for transit expenditures is consistent with the literature. Manville and Cummins (2015) suggest that voters support transit expenditures because they tend to vote for collective interests (such as the belief that funding transit will reduce

congestion); such collective interests do not necessarily reflect their personal intention to use transit.

Finally, our case studies suggest that proposed project proximity is associated with measure support, and that measure expenditure plans are crafted with this in mind, which is also consistent with the findings of previous research. To garner supermajority support for a LOST, we found that officials constructing the measure tended to plan large capital investments in one of two ways: 1) they distributed projects evenly across the county, as Santa Barbara County did in its successful 2008 bid to address north county voter antipathy toward the failed 2006 measure; or 2) they concentrate capital projects in populous areas and rely on concentrated support to carry a measure, as Santa Clara County did in both 2000 and 2008.

CONCLUSION

Traditional sources of transportation funding in the U.S., particularly motor fuels taxes, have been waning in inflation-adjusted terms for decades, and in many places voter-approved sales tax measures linked to transportation expenditure plans are increasingly filling the gap. Because these measures must attract the support of a cross-section of voters, the crafting of them – which typically occurs outside of, and can supersede, traditional transportation programming processes – is an increasingly important element of transportation policy and planning. To better understand these LOST measures, and what explains voter support of them, we present three analyses drawing on data of 76 LOST measures from California, the most populous and LOST-intensive U.S. state.

In spite of occasional failures, LOST ballot measures are increasingly common, and are passing with a two-thirds supermajority of voter support in California across counties that vary geographically, economically, culturally, and politically. Our analyses of these measures and their pass rates suggests that public officials are crafting these measures to align with the factors this research finds are associated with voter support.

LOSTs have been put before California voters with increasing frequency; in the 40 years examined in this research (1976 to 2016), California residents voted on more than three times as many (59) LOST measures between 1996 and 2016, when a 2/3 super-majority was required for passage, than between 1976 and 1995 (16), when only a simple majority was required for passage. One reason for increasing LOST frequency over time includes counties asking voters to extend or renew previously-enacted and soon-expiring LOSTs. Of the 76 measures included in this study, 33 (43%) renewed and/or extended a previously-passed LOST. Yet our findings reveal that counties may face little penalty for putting long-term or even permanent LOSTs before voters: contrary to conventional wisdom, we find

that a measure's duration is not associated with its voter support at the county level.

In sum, we find that voter support is associated with 1) measure characteristics (transit and local return funding, extensions of expiring LOSTs, and, suggested by our case studies, voter proximity to projects to be funded by LOSTs) and 2) jurisdiction characteristics (urban, transit-oriented, long commute-time, and Democratic-leaning neighborhoods are more supportive of LOSTs). LOSTs' widespread adoption into the late 2010s, even in the face of a supermajority requirement in California, suggests that electoral politics is shaping transportation projects and programming more than ever.

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