# Driving Turnout: The Effect of Car Ownership on Electoral Participation

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**Inequalities in voter participation between groups of the population pose a problem for democratic representation. We use administrative data on 6.7 million registered voters to show that a previously-ignored characteristic of voters – access to a personal automobile – creates large disparities in in-person voting rates. Lack of access to a car depresses election day voter turnout by substantively large amounts across a variety of fixed-effects models that account for other environmental and voter characteristics. Car access creates the largest hindrance to voting for those people who live farther from the polls, for young voters, and for non-white voters. These effects do not appear for absentee voting, suggesting a simple policy solution to solve large disparities in political participation. This study contribute to the theoretic understanding of political participation as well as the impact of potential policy reforms to solve participatory gaps.**

Regular electoral participation is a fundamental component of vibrant democracies. When citizens take part in elections, it suggests a democratic mandate for the government to enact policy. Yet low rates of voter turnout in settings like the United States create the potential for inequalities in representation. If the preferences of those who are vote are different from those who did not vote, then elected officials may not represent the full set of citizens (Bartels, 2008; Dahl, 1971; Gilens, 2012). Participatory inequalities can thus be reflected in policies that are biased towards those who turn out to vote.

Assessing the quality of representation and examining the question of "who votes?" is, of course, not new (e.g. Campbell et al., 1960; Downs, 1957; Merriam and Gosnell, 1924; Riker and Ordeshook, 1968). The last half century of research has pointed to patterns in voting participation that align with demographic and socio-economic divisions in the population and the consequences of those participatory inequalities (Aldrich, 1993; Leighley and Nagler, 1992, 2013; Rosenstone and Hansen, 1993; Wolfinger and Rosenstone, 1980). Among the explanations for differential rates of turnout has been the theory of resources: that socioeconomic status and education levels are primary drivers of turnout (e.g. Verba, Schlozman, and Brady, 1995). Subsequent research has suggested that the logistical cost of getting to the polls can result in differential turnout as well (Brady and McNulty, 2011; Dyck and Gimpel, 2005; Gimpel, Dyck, and Shaw, 2006; Haspel and Knotts, 2005). Those voters who live farther from their polling place have a harder time getting to the polls, thereby lowering their turnout rates.

Existing explanations of voter turnout, however, miss a critical feature of voters' lives that structures their ability to vote and ease with which they can do so: the mode of travel by which they get to the polls. Specifically, previous accounts of the barrier to voting posed by logistical costs largely ignore the fact that voters have a choice of how to get to the polls – on foot, by car, by public transportation, or any number of other ways. The degree to which these choices are available, however, differs across the population. Some voters have access to a car, and some have access to reliable and fast public transportation. Other voters, on the other hand, do not. Thus far, however, previous research has largely ignored these features of the voting process. Examining the way that access to reliable and fast transportation can be an obstacle preventing voters from participating on election day is critical for a theoretic understanding of political participation. Yet it is also relevant to contemporary policy debates about polling place administration, transportation planning, and alternatives to in-person voting, such as voting by mail.

In this paper, we use administrative data on electoral participation combined with data on car ownership to show that existing explanations of voter turnout miss a critical portion of the voting calculus. Using these fine-grained individual-level data and modern causal inference strategies, we compare those voters with access to a car to counterfactual voters without access to a car. We find that household access to a car has substantively large effects on voter turnout. This is true across a variety of fixed-effects regressions that leverage variation in car access within counties, within precincts, and even within the same buildings. The consistency of these results across a variety of identification strategies bolsters the causal interpretation of these effects, as do several theoretically-motivated moderating analyses. Using geographic data on voter home locations and polling place combined with travel time calculations from the Google Maps API, we show that the time it would take to travel to the polls moderates this relationship. Access to a car has an even larger effect on turnout among people for whom traveling to the polls would take a longer amount of time without a car. Furthermore, we show that the size of the effects of car access are larger among younger voters and non-white voters, indicating that demographic patterns of car access further exacerbate voting inequalities between racial and age groups. Finally, we find that car ownership has no effect on absentee voting – suggesting that mail voting

has the power to reduce participatory inequalities that result from transportation access. Overall, these results highlight an oft-ignored factor that causes differential electoral participation rates.

This paper contributes to the rich scholarly literature on political participation, and extends previous theories that focus on the role of material and temporal resources in driving voting. Our results provide new evidence that in-person voting rates depend partially on access to reliable transportation. In an advance over previous work on participation, we rely on a strong causal inference strategy that makes use of fine-grained administrative data on car access and participation. Our results show that the sector of the population without access to cars or reliable alternative modes of transportation participates in politics at lower rates, which has the potential to erode democratic representation. This has important implications for policymakers instituting electoral reform: they can reduce these inequalities by either providing more reliable alternative transportation or make alternative forms of voting, such as early voting or vote-by-mail, accessible to their citizens. Future work could extend our analyses by examining the over-time effects of car access when electoral reforms are instituted. Integrating these potential examinations with the current cross-sectional assessments of participation will help in developing a more holistic picture of the causal effects of car access in participation more broadly.

## Data and Research Design

To examine the effect of automobile access on electoral turnout, we used administrative data on voter registration and automobile ownership from Michigan. Michigan is a representative location to assess these patterns: 8.7% of US residents have no access to a car, and while this rate varies across states from 3.8% in Wyoming to 29.1% in New York, Michigan is typical in that 7.8% of Michigan residents have no access to a car (U.S. Census Bureau, 2018). We merged the Michigan voter file ($n = 6,716,936$ registered individuals) to the complete Michigan auto registration ($n = 15,983,061$ unique cars) and drivers license ($n = 6,496,514$ licensed individuals) databases to identify which voters had a drivers license, personally owned automobiles or lived in the same household as a car owner.[1] These data give us unique access into learning about the effects of driving and car ownership on voter turnout. While commercial data on car ownership are available from a variety of firms, and can be included on commercial voter file purchases, these data are generally limited to automobiles purchased from car dealerships, and exclude person-to-person sales, transfers between individuals, and other transactions. The state automobile registration database, however, includes every currently registered car, along with the names and address of the car owners.

Matching voters to the drivers license file is relatively simple, as both files include names, addresses, and birth years. Overall, 96.7% of registered voters match to a drivers license. Most voters (84.7%) match exactly on name, address, and birth year. The remainder match on variations of these variables or fuzzy matches that allow for small differences in full names or typos in birth years.

Matching voters to the automobile registration data is somewhat more challenging, as this data includes only names and addresses. Our ultimate goal is to identify the people who have access to a car through someone in their household owning a car, rather than only those who personally own an automobile.[2] First, we matched 54.0% of voters to at least one automobile using their exact name and address. An additional 24.1% of voters live in the same household (based on the same full address) as a car owner. An additional 10.8% match on variations of name and address, and 0.90% matched on fuzzy matches or variations of of name and address. Overall, we matched 89.7% of voters to an automobile, and the average voter matched to 2.4 unique cars.

## Results

In this section, we present the evidence showing inequalities in participation between voters who do and do not have access to a car, both with descriptive models showing cross-sectional differences and with more methodologically sophisticated models allowing us to rule out the vast majority of alternative explanations for such differences.

As a first cut at the differences in participation between those with access to a car and those without, Figure 1 shows the turnout rates in 2018 general (left panel) and primary (right panel) elections among those people with access to a car in the household and those without. While only 36% of those without a car voted in the 2018 general election, 66% with a car voted – a difference of 30 percentage points. A similar difference in turnout of 19 percentage points between those with and without access to a car occurred during the primary.

Of course, those individuals with and without access to cars are likely to differ in a variety of other ways that might also affect their participation rates. Gender, race, and age all may lead to differences in car access and in voting. To account for these individual characteristics, we next analyze turnout in both general and primary elections while controlling for these demographic characteristics. These results are shown in Models 1 and 5 of Table 1, and suggest that these demographic characteristics are not what account for the broad differences in turnout between

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[1] We obtained the drivers license and auto registration databases as the result of a data production request for voting rights litigation.

[2] Household ownership is a better measure of car access than personal ownership. For example, one person could own a car, but their spouse, family members, or others in the household may also have access to that vehicle.
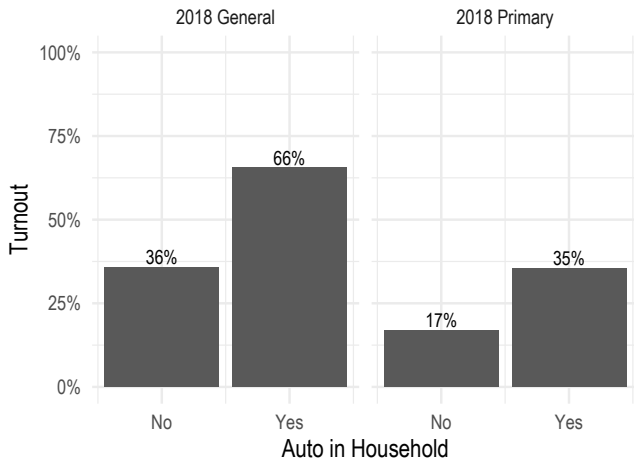
**Fig. 1.** Participation rates by car ownership.

people with and without access to a car. Car access has a large and statistically significant impact on voter turnout.

These models may still miss other potential confounding factors. While controlling for demographic characteristics of individuals allows us to rule out any variation in turnout induced by these *observable* characteristics, there are a host of *unobservable* characteristics that might lead some people to participate more than others. To better interrogate the the true effect of having access to a car on political participation, we next include geographic area fixed-effects. The models using county and precinct fixed effects allow us to account for geographical variation in turnout that comes from, say, neighborhood-level income or different offices on the ballot in different counties. Such variation, if it were correlated with car ownership patterns, might confound estimates of car access on participation. These fixed-effects also help to rule out alternative explanations that are not observable or measurable and which might explain the differences in participation between those with and without access to a car.

The results from these analyses, shown in Models 2 and 6, for counties, and 3 and 7, for precincts in Table 1, indicate that access to a car has a consistently positive effect on participation. In both the general and primary elections in 2018, people with access to a car voted at higher rates than those without access to a car. This effect holds true when using both county-level and precinct-level fixed effects — in essence, when comparing individuals within the same county or precinct to other potential voters in the same location. The size of this effect is between 23–27 percentage points in the general election and 16–17 percentage points in the primary. Given the baseline average turnout levels in the general and primary elections (63% and 34%, respectively), these effects are substantively enormous. They suggest that gaining access to a car can effectively increase the probability of a voter participating by at least a third.

Our models using county and precinct fixed effects enabled us to account for confounding that could occur within these geographic areas. However, there are any number of potential confounders that could still occur within precincts. Even though precincts are quite small geographic areas, there still may be some sorting in individuals' residential patterns if, for instance, more politically interested individuals choose to live closer to a downtown area. This residential choice to live closer to a commercial center might also lead to individuals living closer to their polling place, and could easily correlate with turnout as a result. To avoid this possible confounding, we next move to comparing participation among a subgroup of comparable respondents who live at addresses with both car owners and non-car owners (i.e. multiple apartments or units). In Models 4 and 8 of Table 1, we use fixed effects at the address level, which enables us to compare turnout within individual addresses and allows us to get a more conservative estimate with less potential bias from unobserved confounders.

These models account for any observable or unobservable confounding that could occur at the address level. The effects identified by these models thus represent our most conservative estimates of car access on turnout, as they only compare turnout within the subset of locations where both car and car owners live. The effect of car access could, of course, be much larger when comparing participation rates among people who live in incomparable locations, but we would not be able to rule out any number of observable or unobservable characteristics of those individuals that could result in participatory differences. Our address-level fixed effects avoid this problem. Additionally, in Tables SI4-SI7 we replicate our analyses with additional covariates for household income, education, and homeownership, using commercial data available for a subset of voters. The inclusion of these variables does not alter the significance or magnitude of our results; even controlling for household income and background characteristics, automobile access remains a significant driver of turnout.

The results from these within-address comparisons corroborate the earlier analyses. Namely, access to a car still has a substantively large effect on turnout: 13 percentage points in the general election and eight in the primary.

We replicate the above models in Table SI1 for the 2016 elections and in Tables SI2 and SI3 using drivers licenses, rather than automobile access, as our primary independent variable. Having a drivers license also has a large and positive effect on electoral turnout. However, having a drivers license alone does not explain the the effect of automobile access on turnout that we observe. Interacting automobile access and drivers licenses, shown in Tables SI8 and SI9, indicate that having access to a car has a large effect on participation whether or not a person has a license.

**Table 1. Effect of Automobile Access on 2018 Voter Turnout**

| | 2018 General Turnout | | | | 2018 Primary Turnout | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Auto in HH | 0.272*** | 0.267*** | 0.236*** | 0.130*** | 0.173*** | 0.171*** | 0.157*** | 0.080*** |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) | (0.002) |
| Male | −0.021*** | −0.021*** | −0.020*** | −0.045*** | −0.013*** | −0.012*** | −0.012*** | −0.020*** |
| | (0.0004) | (0.0004) | (0.0004) | (0.002) | (0.0004) | (0.0004) | (0.0004) | (0.001) |
| White | 0.105*** | 0.109*** | 0.046*** | 0.034*** | 0.054*** | 0.069*** | 0.045*** | 0.030*** |
| | (0.001) | (0.001) | (0.001) | (0.003) | (0.0005) | (0.001) | (0.001) | (0.002) |
| Age | 0.005*** | 0.005*** | 0.005*** | 0.003*** | 0.008*** | 0.008*** | 0.008*** | 0.004*** |
| | (0.00001) | (0.00001) | (0.00001) | (0.0001) | (0.00001) | (0.00001) | (0.00001) | (0.00005) |
| Constant | 0.035*** | | | | −0.264*** | | | |
| | (0.001) | | | | (0.001) | | | |
| FE for County | | ✓ | | | | ✓ | | |
| FE for Precinct | | | ✓ | | | | ✓ | |
| FE for Address | | | | ✓ | | | | ✓ |
| Observations | 6,407,557 | 6,407,557 | 6,407,555 | 409,192 | 6,140,366 | 6,140,366 | 6,140,364 | 372,898 |
| $R^2$ | 0.081 | 0.092 | 0.118 | 0.220 | 0.102 | 0.110 | 0.128 | 0.249 |
| Adjusted $R^2$ | 0.081 | 0.092 | 0.117 | 0.137 | 0.102 | 0.110 | 0.127 | 0.161 |

*Note:* $^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

**Effect of Travel Time.** The effect of car access on turnout is large and persistent across modeling choices, as shown in the previous sections. The robustness of these effects suggests that we are indeed capturing a significant barrier to voter participation. One natural implication of these effects – and a logical corollary of their causal interpretation – is that car access should have a larger effect for voters who live farther from the polls and who therefore would have a more difficult time voting without access to a car.

To examine this, we bring in auxiliary data on travel times to the polls calculated using the Google Maps API. We take a 1% random sample of 67,168 registered voters in our data, and for each voter we calculate the time it would take to travel to their polling place by car, by car in traffic, by public transportation, and by walking. Then, for each voter we calculate the fastest travel time among the non-driving modes (i.e. public transportation and walking) and including the driving modes (i.e. all four potential travel times).[3] The time it takes to get to the polls with access to a car is far shorter on average than the time it takes to get to the polls without access to a car. However, the difference between these times for each voter varies across our sample of voters. For some voters there is a vast disparity in travel times to the polls with and without access to a car, while for others this difference is smaller. This highlights the heterogeneity in

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[3]Figure SI1 plots the density of these travel times and Figure SI2 plots the difference between these times for each voter.
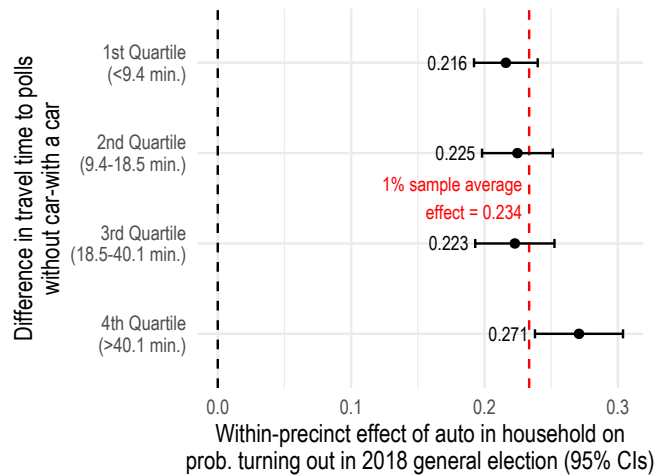


**Fig. 2.** Within-precinct effects of car access on participation rates, by travel time to polls.

the burden of time placed on voters without access to a car.

To examine the moderating role of the difference in travel time for each voter with and without access to a car, we break our sample into quartiles of the difference in the time it would take them to travel to the polls without a car versus with a car, and separately examine the effect of car access among these people. These results are displayed in Figure 2.

Figure 2 shows that the effect of access to a car in a

person's household on voting is smaller when the additional time burden posed by traveling to the polls without a car is greater. For those people in the lowest quartile of travel time burden to the polls (for whom the difference between traveling to the polls with a car and without a car is less than 9.43 minutes), people with access to a car are 21.6 percentage points more likely to vote than those people without access to a car. Meanwhile, among those people who live farther from the polls (for whom access to a car would reduce their travel time by more than 40 minutes), car access has an even larger effect on turnout of 27.1 percentage points. Not only does car access hinder some people from participating, but it has its largest effect on those people who live farther from the polls or do not have access to fast and reliable public transportation.[4]

**Disparate Effects of Car Access.** On whom do the effects of car access have the greatest impact on political participation? Underlying patterns of car ownership are not equal across certain demographic characteristics. Racial minorities in our full voter file are less likely to have access to cars, as are the youngest groups of potential voters. We might therefore expect car access to have differential effects on turnout.

To examine who bears the largest burden from a lack of access to a car (and whose participation is most boosted by car access) we next examine differences in turnout between those with a car and without a car by age and race. Figure 3 compares turnout rates in the 2018 general election by age and race. Across all subgroups, turnout is significantly higher among car owners compared to non-owners. The largest effects of car access on turnout are among white voters and older voters.[5] White voters without access to a car turn out at an average rate of 39.3%, while Black voters without a car turn out at a rate of 29.2% and Hispanic voters at a rate of 24.6%. Meanwhile, among those with access to a car, 67.5% of white voters turn out, while only 53.4% of Black voters and 49.7% of Hispanic voters turn out. The difference in turnout rates between White and Black voters without car access is 10.1 percentage points, while this gap in turnout widens to 14.1 percentage points for those with access to a car. Similarly, the difference in turnout between White and Hispanic voters is 14.7 percentage points among those without car access, but an even larger 17.8 percentage points for those with access to a car. In other words, car access has an effect that widens existing participatory gaps.
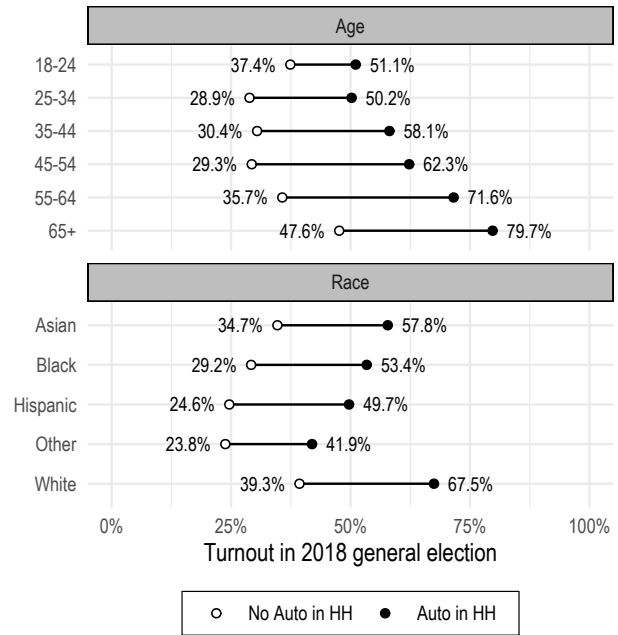
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[4]Table SI10 presents the full regression results. Table SI11 and Figure SI3 replicates these results using our within-address sample and address fixed effects, which similarly shows a strong moderating effect of travel time.

[5]Figure SI4 and Tables SI12 and SI13 present regression results for each subgroup, using the full voter file and precinct fixed effects. The differences in turnout due to car ownership are statistically significant for all groups.



**Fig. 3.** Differences in Turnout by Car Ownership

**Vote Method.** Up to this point, we have analyzed the impact of car access on voting by any mode. However, if we expect that car access has an important mobilizing effect apart from the effect of other characteristics — observable or unobservable — that are potentially correlated with car access, then it should only have a true effect on voting *in person*, and very little effect on absentee voting, or vote by mail. To test this assertion and further support the causal interpretation of our results, we next move to separately examining the impact of car access on voting in person and absentee. Again, we use the subset of potential voters who lived in buildings that had car owning households and non-car owning households to identify the most conservative estimate of car access on voting. Figure 4 shows the percent of such individuals voting absentee (purple bar), voting in-person (turquoise bar), or not voting (yellow bar), broken down by car access along the horizontal axis, for the 2018 general election (left panel) and 2018 primary election (right panel).

The results in Figure 4 verify that the effect of car access on absentee voting is quite small – and, in fact, negative – for both the 2018 general and primary elections. Meanwhile, the substantial difference in rates of voting in-person between those with and without car access remains. In the 2018 general election, 40% of people with access to a car voted in-person, while only 24% of those without access to a car voted in-person. This effect of 16 percentage points represents a 68% increase over the baseline of in-person turnout among those without car access. This effect is comparatively even larger in the primary, and accounts for an in-person turnout rate among people with access to a car that is effectively double
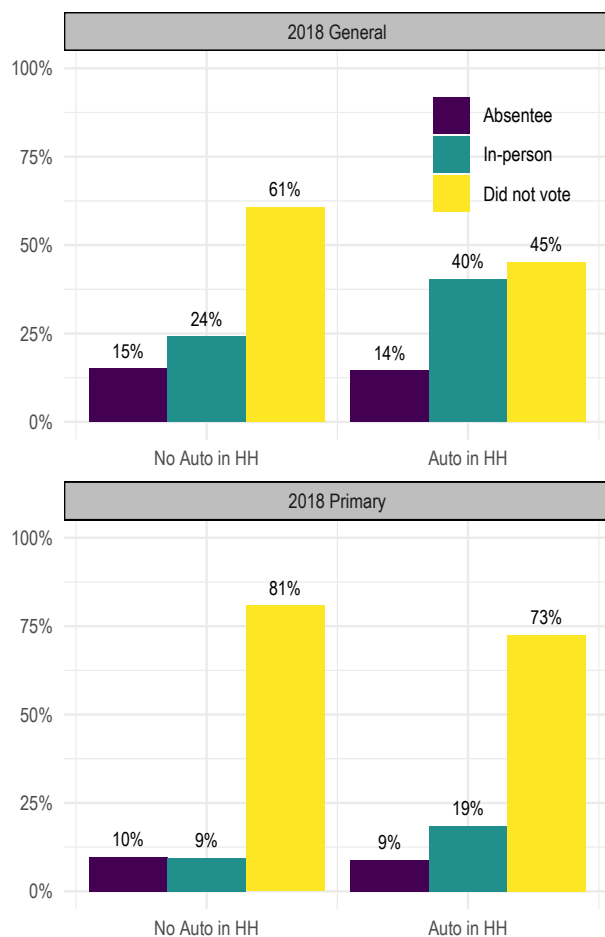
**2018 General**

**2018 Primary**

**Fig. 4.** Within-address differences in participation rates, by voting method

that of those without car access.

Though our use of the same-address sample helps alleviate concerns that these differences might be due to other confounding variables, we further verify that car access is driving these differences by again using address-level fixed effects to compare turnout among individuals with and without car access within the same residential building. These results, shown in Table SI14, reiterate the basic differences shown visually in Figure 4. In both the 2018 general and primary elections, car access had a large effect on in-person turnout, while the effect of car access on absentee voting is much smaller (1.1–1.4 percentage points).

## Discussion and Conclusion

Investigating inequalities in political participation is a crucial task for assessing the health of democracy. The legitimacy provided to a democratic government by broad voter turnout is a normatively attractive outcome. Differential rates of turnout signals potential flaws in this mechanism of democratic representation. Examining such worrisome inequalities has been a central question in po-

litical science, leading to the development of a host of theories about what drives people to participate in democracy (e.g. Verba, Schlozman, and Brady, 1995; Rosenstone and Hansen, 1993).

Building from previous research on political participation, we show that a frequently-ignored feature of citizens' environment — transportation to the polls — can lead to large inequalities in voter turnout. We use administrative data on 6.7 million registered voters and a research design with a strong causal inference strategy to address a topic where scholars must often utilize correlational research designs or survey measures instead. Our findings indicate that car access has a large causal effect on voting on election day. This effect goes beyond the effects of other demographic features and holds true using a variety of modeling strategies, including those that make use of comparisons between voters residing in the same building. The size of the barrier to participation that results from a lack of car access is larger than many other hindrances to turnout, such as registration deadlines (Burden and Neiheisel, 2013) or voter identification laws (Highton, 2017). The effects of car access are exacerbated by the burden of longer travel time between voters' homes and polling locations, and differ slightly by voters' race/ethnicity and age. Importantly, these participatory differences only exist for in-person election day voting, and not for absentee voting (vote-by-mail). Together, the variety of identification strategies and moderating analyses strongly support a causal interpretation of the effect of access to a car.

Our findings suggest that previous theories on the motivations and correlates of political participation ignore the critical role of transportation in voters' lives. Any explanation of voter participation that does not incorporate the political geography of citizens' transportation options between their home and polling locations provide an incomplete picture. We highlight how access to cars creates inequalities in access to voting. This paper therefore builds a more comprehensive theory of voter participation.

These results have nuanced implications for policymakers. Lack of access to a car is a substantial obstacle to voting. A naive interpretation of our results would suggest that, due to their mobilizing effects, cars should be made more widely available. However, we caution against such a conclusion. More tractable instead is to broaden access to reliable and fast public transportation that closes the travel time burden imposed on those voters without access to cars. Though infeasible in all locations, policymakers might also locate polling places in walkable locations that eliminate the need for car access to reach them quickly. A simple alternative to these potentially expensive policy reforms could involve broadening access to early or absentee voting, which we find exhibits no differences stemming from citizens' access to cars. Policymakers seeking to reduce voting inequalities and broaden the electoral franchise should pursue these reforms to electoral institutions.

Doing so has the power to decouple democratic participation from access to a personal automobile and improve representation.

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# Supplemental Information

**A. Effect of Car Access on 2016 Participation.** In Table SI1 we replicate the analyses presented in the main text of the paper but with 2016 general and primary election turnout as the dependent variable. These results largely corroborate the primary analyses in the paper, and show that across a variety of modeling strategies, access to a car has a substantively large effect on participation.

**Table SI1. Effect of Automobile Access on 2016 Voter Turnout**

| | *Dependent variable:* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2016 General Turnout | | | | 2016 Primary Turnout | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Auto in HH | 0.255*** | 0.248*** | 0.215*** | 0.119*** | 0.107*** | 0.106*** | 0.101*** | 0.049*** |
| | (0.001) | (0.001) | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) | (0.002) |
| | | | | | | | | |
| Male | −0.042*** | −0.042*** | −0.041*** | −0.071*** | −0.010*** | −0.010*** | −0.010*** | −0.018*** |
| | (0.0004) | (0.0004) | (0.0003) | (0.002) | (0.0004) | (0.0004) | (0.0004) | (0.002) |
| | | | | | | | | |
| White | 0.105*** | 0.106*** | 0.034*** | 0.028*** | 0.060*** | 0.049*** | 0.048*** | 0.022*** |
| | (0.0005) | (0.001) | (0.001) | (0.003) | (0.001) | (0.001) | (0.001) | (0.003) |
| | | | | | | | | |
| Age | 0.003*** | 0.003*** | 0.003*** | 0.001*** | 0.008*** | 0.008*** | 0.008*** | 0.004*** |
| | (0.00001) | (0.00001) | (0.00001) | (0.0001) | (0.00001) | (0.00001) | (0.00001) | (0.0001) |
| | | | | | | | | |
| Constant | 0.270*** | | | | −0.327*** | | | |
| | (0.001) | | | | (0.001) | | | |
| FE for County | | ✓ | | | | ✓ | | |
| FE for Precinct | | | ✓ | | | | ✓ | |
| FE for Address | | | | ✓ | | | | ✓ |
| Observations | 5,878,275 | 5,878,275 | 5,878,273 | 346,093 | 5,047,643 | 5,047,643 | 5,047,641 | 256,929 |
| $R^2$ | 0.062 | 0.070 | 0.099 | 0.243 | 0.104 | 0.111 | 0.132 | 0.310 |
| Adjusted $R^2$ | 0.062 | 0.070 | 0.098 | 0.147 | 0.104 | 0.111 | 0.131 | 0.194 |

Note: $^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

**B. Effect of Drivers License on Turnout.** In Table SI2 and Table SI3, we demonstrate that access to a drivers license also has an effect on voter participation.

**Table SI2. Effect of Drivers Licenses on 2018 Voter Turnout**

| | *Dependent variable:* | | | | | |
|---|---|---|---|---|---|---|
| | 2018 General Turnout | | | 2018 Primary Turnout | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Drivers License | 0.456*** | 0.434*** | 0.293*** | 0.256*** | 0.245*** | 0.150*** |
| | (0.001) | (0.001) | (0.004) | (0.001) | (0.001) | (0.004) |
| | | | | | | |
| Male | −0.026*** | −0.026*** | −0.047*** | −0.015*** | −0.015*** | −0.022*** |
| | (0.0004) | (0.0004) | (0.002) | (0.0004) | (0.0004) | (0.001) |
| | | | | | | |
| White | 0.133*** | 0.049*** | 0.033*** | 0.086*** | 0.047*** | 0.030*** |
| | (0.001) | (0.001) | (0.003) | (0.001) | (0.001) | (0.002) |
| | | | | | | |
| Age | 0.005*** | 0.005*** | 0.003*** | 0.008*** | 0.008*** | 0.004*** |
| | (0.00001) | (0.00001) | (0.0001) | (0.00001) | (0.00001) | (0.00005) |
| | | | | | | |
| FE for County | ✓ | | | ✓ | | |
| FE for Precinct | | ✓ | | | ✓ | |
| FE for Address | | | ✓ | | | ✓ |
| Observations | 6,407,557 | 6,407,555 | 409,192 | 6,140,366 | 6,140,364 | 372,898 |
| $R^2$ | 0.093 | 0.123 | 0.220 | 0.108 | 0.127 | 0.247 |
| Adjusted $R^2$ | 0.093 | 0.122 | 0.137 | 0.108 | 0.127 | 0.159 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

**Table SI3. Effect of Drivers Licenses on 2016 Voter Turnout**

| | *Dependent variable:* | | | | | |
|---|---|---|---|---|---|---|
| | 2016 General Turnout | | | 2016 Primary Turnout | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Drivers License | 0.527*** | 0.504*** | 0.358*** | 0.179*** | 0.174*** | 0.115*** |
| | (0.001) | (0.001) | (0.004) | (0.001) | (0.001) | (0.004) |
| | | | | | | |
| Male | −0.048*** | −0.047*** | −0.075*** | −0.013*** | −0.012*** | −0.019*** |
| | (0.0003) | (0.0003) | (0.002) | (0.0004) | (0.0004) | (0.002) |
| | | | | | | |
| White | 0.126*** | 0.037*** | 0.026*** | 0.059*** | 0.049*** | 0.022*** |
| | (0.001) | (0.001) | (0.003) | (0.001) | (0.001) | (0.003) |
| | | | | | | |
| Age | 0.003*** | 0.003*** | 0.001*** | 0.008*** | 0.008*** | 0.004*** |
| | (0.00001) | (0.00001) | (0.0001) | (0.00001) | (0.00001) | (0.0001) |
| | | | | | | |
| FE for County | ✓ | | | ✓ | | |
| FE for Precinct | | ✓ | | | ✓ | |
| FE for Address | | | ✓ | | | ✓ |
| Observations | 5,878,275 | 5,878,273 | 346,093 | 5,047,643 | 5,047,641 | 256,929 |
| $R^2$ | 0.089 | 0.120 | 0.250 | 0.112 | 0.133 | 0.310 |
| Adjusted $R^2$ | 0.089 | 0.119 | 0.156 | 0.112 | 0.132 | 0.194 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

**C. Effects of Automobile Access and Drivers Licenses with Additional Controls.** Here we supplement our previous analyses with additional data on voters' household income, education, and homeowner status using commercial data provided on the voter file from L2. The use of these data comes with several tradeoffs. Income and homeownership status are estimated by L2 using proprietary data and models that have been validated by L2, but these data are not available for all voters. Nevertheless, we include them here as an additional robustness check to ensure that car access is not simply a proxy for income or education levels. These models confirm our primary results presented in the main paper. However, the coefficients on income, education, and renting should be interpreted with caution, and missing data and modeled covariates may bias the results.

Tables SI4 and SI5 present models with the effect of automobile access with these control variables on turnout in the 2018 and 2016 elections, and Tables SI6 and SI6 present results for the effect of drivers licenses.

**Table SI4. Effect of Car Access on 2018 Election Turnout, with Additional Controls**

| | *Dependent variable:* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2018 General Turnout | | | | 2018 Primary Turnout | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Auto in HH | 0.180*** | 0.179*** | 0.177*** | 0.109*** | 0.131*** | 0.133*** | 0.136*** | 0.080*** |
| | (0.001) | (0.001) | (0.001) | (0.003) | (0.001) | (0.001) | (0.001) | (0.003) |
| Male | −0.017*** | −0.016*** | −0.015*** | −0.025*** | −0.017*** | −0.016*** | −0.015*** | −0.013*** |
| | (0.0005) | (0.0005) | (0.0005) | (0.003) | (0.001) | (0.001) | (0.001) | (0.003) |
| White | 0.025*** | 0.033*** | 0.031*** | 0.003 | −0.001 | 0.020*** | 0.041*** | 0.021*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.005) |
| Age | 0.005*** | 0.005*** | 0.005*** | 0.003*** | 0.009*** | 0.009*** | 0.009*** | 0.005*** |
| | (0.00002) | (0.00002) | (0.00002) | (0.0001) | (0.00002) | (0.00002) | (0.00002) | (0.0001) |
| Est. HH Income | 0.0005*** | 0.0004*** | 0.0002*** | −0.0002*** | 0.0002*** | 0.0001*** | 0.00001 | −0.0001*** |
| | (0.00000) | (0.00000) | (0.00000) | (0.00003) | (0.00001) | (0.00001) | (0.00001) | (0.00003) |
| HS Diploma | 0.022*** | 0.020*** | 0.014*** | 0.016*** | 0.005*** | 0.004*** | 0.002 | 0.017*** |
| | (0.001) | (0.001) | (0.001) | (0.004) | (0.001) | (0.001) | (0.001) | (0.004) |
| Vocational Degree | 0.061*** | 0.061*** | 0.056*** | 0.082*** | 0.039*** | 0.040*** | 0.038*** | 0.080*** |
| | (0.005) | (0.005) | (0.005) | (0.030) | (0.005) | (0.005) | (0.005) | (0.029) |
| Some College | 0.055*** | 0.050*** | 0.037*** | 0.030*** | 0.045*** | 0.040*** | 0.031*** | 0.023*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.005) |
| College Degree | 0.095*** | 0.084*** | 0.067*** | 0.043*** | 0.065*** | 0.057*** | 0.044*** | 0.047*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.005) |
| Grad Degree | 0.129*** | 0.112*** | 0.088*** | 0.059*** | 0.111*** | 0.095*** | 0.072*** | 0.066*** |
| | (0.001) | (0.001) | (0.001) | (0.006) | (0.002) | (0.002) | (0.002) | (0.006) |
| Renter | −0.101*** | −0.105*** | −0.105*** | −0.035*** | −0.077*** | −0.081*** | −0.088*** | −0.064*** |
| | (0.001) | (0.001) | (0.001) | (0.009) | (0.001) | (0.001) | (0.001) | (0.008) |
| Constant | 0.169*** | | | | −0.247*** | | | |
| | (0.002) | | | | (0.002) | | | |
| FE for County | | ✓ | | | | ✓ | | |
| FE for Precinct | | | ✓ | | | | ✓ | |
| FE for Address | | | | ✓ | | | | ✓ |
| Observations | 3,434,399 | 3,434,399 | 3,434,398 | 173,024 | 3,363,529 | 3,363,529 | 3,363,528 | 161,238 |
| $R^2$ | 0.075 | 0.082 | 0.101 | 0.291 | 0.102 | 0.109 | 0.125 | 0.315 |
| Adjusted $R^2$ | 0.075 | 0.082 | 0.100 | 0.119 | 0.102 | 0.109 | 0.124 | 0.139 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

**Table SI5. Effect of Car Access on 2016 Election Turnout, with Additional Controls**

| | *Dependent variable:* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2016 General Turnout | | | | 2016 Primary Turnout | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Auto in HH | 0.141*** | 0.140*** | 0.136*** | 0.085*** | 0.074*** | 0.073*** | 0.079*** | 0.044*** |
| | (0.001) | (0.001) | (0.001) | (0.003) | (0.001) | (0.001) | (0.001) | (0.003) |
| Male | −0.036*** | −0.035*** | −0.035*** | −0.050*** | −0.014*** | −0.015*** | −0.014*** | −0.012*** |
| | (0.0004) | (0.0004) | (0.0004) | (0.003) | (0.0005) | (0.0005) | (0.0005) | (0.003) |
| White | 0.030*** | 0.034*** | 0.021*** | 0.0004 | 0.029*** | 0.020*** | 0.052*** | 0.019*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.005) |
| Age | 0.003*** | 0.003*** | 0.003*** | 0.001*** | 0.009*** | 0.009*** | 0.009*** | 0.005*** |
| | (0.00001) | (0.00001) | (0.00001) | (0.0001) | (0.00002) | (0.00002) | (0.00002) | (0.0001) |
| Est. HH Income | 0.0004*** | 0.0003*** | 0.0002*** | −0.0001** | −0.0001*** | −0.0001*** | −0.0001*** | −0.0001*** |
| | (0.00000) | (0.00000) | (0.00000) | (0.00003) | (0.00000) | (0.00001) | (0.00001) | (0.00003) |
| HS Diploma | 0.0001 | −0.001 | −0.005*** | −0.005 | −0.013*** | −0.013*** | −0.015*** | 0.023*** |
| | (0.001) | (0.001) | (0.001) | (0.004) | (0.001) | (0.001) | (0.001) | (0.005) |
| Vocational Degree | 0.023*** | 0.024*** | 0.020*** | 0.034 | 0.009* | 0.010** | 0.008 | 0.057** |
| | (0.004) | (0.004) | (0.004) | (0.028) | (0.005) | (0.005) | (0.005) | (0.029) |
| Some College | 0.037*** | 0.035*** | 0.024*** | 0.020*** | 0.021*** | 0.022*** | 0.013*** | 0.023*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.002) | (0.002) | (0.002) | (0.006) |
| College Degree | 0.060*** | 0.053*** | 0.039*** | 0.012*** | 0.027*** | 0.028*** | 0.020*** | 0.033*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.005) |
| Grad Degree | 0.086*** | 0.075*** | 0.055*** | 0.026*** | 0.052*** | 0.053*** | 0.039*** | 0.056*** |
| | (0.001) | (0.001) | (0.001) | (0.006) | (0.002) | (0.002) | (0.002) | (0.006) |
| Renter | −0.074*** | −0.076*** | −0.076*** | −0.018** | −0.062*** | −0.061*** | −0.065*** | −0.042*** |
| | (0.001) | (0.001) | (0.001) | (0.008) | (0.001) | (0.001) | (0.001) | (0.009) |
| Constant | 0.416*** | | | | −0.317*** | | | |
| | (0.002) | | | | (0.002) | | | |
| FE for County | | ✓ | | | | ✓ | | |
| FE for Precinct | | | ✓ | | | | ✓ | |
| FE for Address | | | | ✓ | | | | ✓ |
| Observations | 3,307,509 | 3,307,509 | 3,307,508 | 155,254 | 3,025,023 | 3,025,023 | 3,025,022 | 121,289 |
| $R^2$ | 0.052 | 0.056 | 0.078 | 0.300 | 0.104 | 0.111 | 0.134 | 0.356 |
| Adjusted $R^2$ | 0.052 | 0.056 | 0.077 | 0.115 | 0.104 | 0.111 | 0.133 | 0.157 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

**Table SI6. Effect of Drivers License on 2018 Election Turnout, with Additional Controls**

| | *Dependent variable:* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2018 General Turnout | | | | 2018 Primary Turnout | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Drivers License | 0.337*** | 0.335*** | 0.332*** | 0.241*** | 0.186*** | 0.184*** | 0.184*** | 0.158*** |
| | (0.002) | (0.002) | (0.002) | (0.011) | (0.002) | (0.002) | (0.002) | (0.011) |
| | | | | | | | | |
| Male | −0.017*** | −0.016*** | −0.016*** | −0.023*** | −0.016*** | −0.015*** | −0.014*** | −0.012*** |
| | (0.0005) | (0.0005) | (0.0005) | (0.003) | (0.001) | (0.001) | (0.001) | (0.003) |
| | | | | | | | | |
| White | 0.036*** | 0.042*** | 0.030*** | 0.002 | 0.007*** | 0.026*** | 0.040*** | 0.020*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.005) |
| | | | | | | | | |
| Age | 0.005*** | 0.005*** | 0.005*** | 0.003*** | 0.009*** | 0.009*** | 0.009*** | 0.005*** |
| | (0.00002) | (0.00002) | (0.00002) | (0.0001) | (0.00002) | (0.00002) | (0.00002) | (0.0001) |
| | | | | | | | | |
| Est. HH Income | 0.001*** | 0.0004*** | 0.0003*** | −0.0001*** | 0.0002*** | 0.0001*** | 0.00003*** | −0.0001*** |
| | (0.00000) | (0.00000) | (0.00000) | (0.00003) | (0.00001) | (0.00001) | (0.00001) | (0.00003) |
| | | | | | | | | |
| HS Diploma | 0.030*** | 0.028*** | 0.021*** | 0.017*** | 0.010*** | 0.010*** | 0.007*** | 0.017*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.004) |
| | | | | | | | | |
| Vocational Degree | 0.071*** | 0.072*** | 0.065*** | 0.088*** | 0.047*** | 0.048*** | 0.045*** | 0.084*** |
| | (0.005) | (0.005) | (0.005) | (0.030) | (0.005) | (0.005) | (0.005) | (0.029) |
| | | | | | | | | |
| Some College | 0.061*** | 0.056*** | 0.042*** | 0.030*** | 0.049*** | 0.045*** | 0.035*** | 0.023*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.005) |
| | | | | | | | | |
| College Degree | 0.103*** | 0.092*** | 0.074*** | 0.043*** | 0.071*** | 0.063*** | 0.049*** | 0.048*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.005) |
| | | | | | | | | |
| Grad Degree | 0.138*** | 0.121*** | 0.096*** | 0.061*** | 0.118*** | 0.102*** | 0.078*** | 0.068*** |
| | (0.001) | (0.001) | (0.001) | (0.006) | (0.002) | (0.002) | (0.002) | (0.006) |
| | | | | | | | | |
| Renter | −0.119*** | −0.123*** | −0.119*** | −0.036*** | −0.091*** | −0.095*** | −0.099*** | −0.065*** |
| | (0.001) | (0.001) | (0.001) | (0.009) | (0.001) | (0.001) | (0.001) | (0.009) |
| | | | | | | | | |
| Constant | 0.0001 | | | | −0.311*** | | | |
| | (0.003) | | | | (0.003) | | | |
| | | | | | | | | |
| FE for County | | ✓ | | | | ✓ | | |
| FE for Precinct | | | ✓ | | | | ✓ | |
| FE for Address | | | | ✓ | | | | ✓ |
| Observations | 3,434,399 | 3,434,399 | 3,434,398 | 173,024 | 3,363,529 | 3,363,529 | 3,363,528 | 161,238 |
| $R^2$ | 0.073 | 0.080 | 0.099 | 0.286 | 0.100 | 0.106 | 0.123 | 0.311 |
| Adjusted $R^2$ | 0.073 | 0.080 | 0.098 | 0.113 | 0.100 | 0.106 | 0.122 | 0.135 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

**Table SI7. Effect of Drivers License on 2016 Election Turnout, with Additional Controls**

| | | | | *Dependent variable:* | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2016 General Turnout | | | | 2016 Primary Turnout | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Drivers License | 0.365*** | 0.363*** | 0.360*** | 0.335*** | 0.117*** | 0.117*** | 0.117*** | 0.133*** |
| | (0.002) | (0.002) | (0.002) | (0.011) | (0.002) | (0.002) | (0.002) | (0.012) |
| | | | | | | | | |
| Male | −0.037*** | −0.036*** | −0.035*** | −0.049*** | −0.014*** | −0.014*** | −0.014*** | −0.011*** |
| | (0.0004) | (0.0004) | (0.0004) | (0.003) | (0.0005) | (0.0005) | (0.0005) | (0.003) |
| | | | | | | | | |
| White | 0.038*** | 0.040*** | 0.020*** | −0.001 | 0.033*** | 0.024*** | 0.052*** | 0.018*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.005) |
| | | | | | | | | |
| Age | 0.003*** | 0.003*** | 0.003*** | 0.001*** | 0.009*** | 0.009*** | 0.009*** | 0.005*** |
| | (0.00001) | (0.00001) | (0.00001) | (0.0001) | (0.00002) | (0.00002) | (0.00002) | (0.0001) |
| | | | | | | | | |
| Est. HH Income | 0.0005*** | 0.0004*** | 0.0002*** | −0.00004 | −0.0001*** | −0.00003*** | −0.0001*** | −0.0001** |
| | (0.00000) | (0.00000) | (0.00000) | (0.00003) | (0.00000) | (0.00001) | (0.00001) | (0.00003) |
| | | | | | | | | |
| HS Diploma | 0.006*** | 0.005*** | 0.0002 | −0.005 | −0.009*** | −0.009*** | −0.012*** | 0.023*** |
| | (0.001) | (0.001) | (0.001) | (0.004) | (0.001) | (0.001) | (0.001) | (0.005) |
| | | | | | | | | |
| Vocational Degree | 0.031*** | 0.032*** | 0.027*** | 0.040 | 0.013** | 0.014*** | 0.012** | 0.059** |
| | (0.004) | (0.004) | (0.004) | (0.028) | (0.005) | (0.005) | (0.005) | (0.029) |
| | | | | | | | | |
| Some College | 0.042*** | 0.039*** | 0.028*** | 0.019*** | 0.023*** | 0.024*** | 0.016*** | 0.022*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.002) | (0.002) | (0.002) | (0.006) |
| | | | | | | | | |
| College Degree | 0.066*** | 0.059*** | 0.045*** | 0.013*** | 0.030*** | 0.031*** | 0.023*** | 0.033*** |
| | (0.001) | (0.001) | (0.001) | (0.005) | (0.001) | (0.001) | (0.001) | (0.005) |
| | | | | | | | | |
| Grad Degree | 0.092*** | 0.082*** | 0.061*** | 0.028*** | 0.056*** | 0.057*** | 0.043*** | 0.057*** |
| | (0.001) | (0.001) | (0.001) | (0.006) | (0.002) | (0.002) | (0.002) | (0.006) |
| | | | | | | | | |
| Renter | −0.087*** | −0.089*** | −0.085*** | −0.019** | −0.070*** | −0.068*** | −0.072*** | −0.043*** |
| | (0.001) | (0.001) | (0.001) | (0.008) | (0.001) | (0.001) | (0.001) | (0.009) |
| | | | | | | | | |
| Constant | 0.187*** | | | | −0.365*** | | | |
| | (0.002) | | | | (0.003) | | | |
| FE for County | | ✓ | | | | ✓ | | |
| FE for Precinct | | | ✓ | | | | ✓ | |
| FE for Address | | | | ✓ | | | | ✓ |
| Observations | 3,307,509 | 3,307,509 | 3,307,508 | 155,254 | 3,025,023 | 3,025,023 | 3,025,022 | 121,289 |
| $R^2$ | 0.055 | 0.059 | 0.081 | 0.300 | 0.103 | 0.111 | 0.134 | 0.355 |
| Adjusted $R^2$ | 0.055 | 0.059 | 0.080 | 0.116 | 0.103 | 0.111 | 0.132 | 0.156 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

**D. Interaction Between Automobile Access and Drivers Licenses.** In Table SI8 and Table SI9 we present the regression results for election turnout where we include indicators for automobile access, drivers licenses, and the interaction of both variables. These results show that the effect of access to a car on participation remains large and statistically significant for individuals both with and without a drivers license, but is even larger for those with a license.

**Table SI8. Effects of Car Ownership and Drivers Licenses on 2018 Election Turnout**

| | *Dependent variable:* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2018 General Turnout | | | | 2018 Primary Turnout | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Auto in HH | 0.055*** | 0.060*** | 0.048*** | 0.020*** | 0.028*** | 0.033*** | 0.028*** | 0.006 |
| | (0.002) | (0.002) | (0.002) | (0.008) | (0.002) | (0.002) | (0.002) | (0.007) |
| Drivers License | 0.203*** | 0.193*** | 0.179*** | 0.104*** | 0.140*** | 0.132*** | 0.125*** | 0.072*** |
| | (0.002) | (0.002) | (0.002) | (0.008) | (0.002) | (0.002) | (0.002) | (0.007) |
| Auto in HH x Drivers License | 0.264*** | 0.273*** | 0.273*** | 0.231*** | 0.124*** | 0.132*** | 0.133*** | 0.108*** |
| | (0.002) | (0.002) | (0.002) | (0.005) | (0.002) | (0.002) | (0.002) | (0.004) |
| Male | −0.028*** | −0.028*** | −0.027*** | −0.049*** | −0.017*** | −0.016*** | −0.016*** | −0.023*** |
| | (0.0004) | (0.0004) | (0.0004) | (0.002) | (0.0004) | (0.0004) | (0.0004) | (0.001) |
| White | 0.099*** | 0.104*** | 0.046*** | 0.032*** | 0.051*** | 0.066*** | 0.045*** | 0.029*** |
| | (0.0005) | (0.001) | (0.001) | (0.003) | (0.0005) | (0.001) | (0.001) | (0.002) |
| Age | 0.005*** | 0.005*** | 0.005*** | 0.003*** | 0.008*** | 0.008*** | 0.008*** | 0.004*** |
| | (0.00001) | (0.00001) | (0.00001) | (0.0001) | (0.00001) | (0.00001) | (0.00001) | (0.00005) |
| Constant | −0.189*** | | | | −0.368*** | | | |
| | (0.002) | | | | (0.002) | | | |
| FE for County | | ✓ | | | | ✓ | | |
| FE for Precinct | | | ✓ | | | | ✓ | |
| FE for Address | | | | ✓ | | | | ✓ |
| Observations | 6,407,557 | 6,407,557 | 6,407,555 | 409,192 | 6,140,366 | 6,140,366 | 6,140,364 | 372,898 |
| $R^2$ | 0.104 | 0.115 | 0.139 | 0.231 | 0.109 | 0.117 | 0.135 | 0.252 |
| Adjusted $R^2$ | 0.104 | 0.115 | 0.139 | 0.149 | 0.109 | 0.117 | 0.134 | 0.165 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

**Table SI9. Effects of Car Ownership and Drivers Licenses on 2016 Election Turnout**

| | *Dependent variable:* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2016 General Turnout | | | | 2016 Primary Turnout | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Auto in HH | 0.061*** | 0.060*** | 0.045*** | −0.020** | 0.015*** | 0.018*** | 0.021*** | 0.010 |
| | (0.002) | (0.002) | (0.002) | (0.008) | (0.002) | (0.002) | (0.002) | (0.008) |
| Drivers License | 0.170*** | 0.165*** | 0.153*** | 0.132*** | 0.088*** | 0.084*** | 0.076*** | 0.037*** |
| | (0.002) | (0.002) | (0.002) | (0.008) | (0.002) | (0.002) | (0.002) | (0.008) |
| Auto in HH x Drivers License | 0.365*** | 0.368*** | 0.365*** | 0.285*** | 0.097*** | 0.101*** | 0.104*** | 0.092*** |
| | (0.002) | (0.002) | (0.002) | (0.005) | (0.002) | (0.002) | (0.002) | (0.005) |
| Male | −0.050*** | −0.050*** | −0.049*** | −0.076*** | −0.013*** | −0.013*** | −0.013*** | −0.020*** |
| | (0.0003) | (0.0003) | (0.0003) | (0.002) | (0.0004) | (0.0004) | (0.0004) | (0.002) |
| White | 0.098*** | 0.099*** | 0.034*** | 0.025*** | 0.057*** | 0.046*** | 0.047*** | 0.022*** |
| | (0.0005) | (0.001) | (0.001) | (0.003) | (0.001) | (0.001) | (0.001) | (0.003) |
| Age | 0.003*** | 0.003*** | 0.003*** | 0.001*** | 0.008*** | 0.008*** | 0.008*** | 0.004*** |
| | (0.00001) | (0.00001) | (0.00001) | (0.0001) | (0.00001) | (0.00001) | (0.00001) | (0.0001) |
| Constant | −0.039*** | | | | −0.407*** | | | |
| | (0.002) | | | | (0.002) | | | |
| FE for County | | ✓ | | | | ✓ | | |
| FE for Precinct | | | ✓ | | | | ✓ | |
| FE for Address | | | | ✓ | | | | ✓ |
| Observations | 5,878,275 | 5,878,275 | 5,878,273 | 346,093 | 5,047,643 | 5,047,643 | 5,047,641 | 256,929 |
| $R^2$ | 0.100 | 0.108 | 0.134 | 0.259 | 0.109 | 0.116 | 0.136 | 0.312 |
| Adjusted $R^2$ | 0.100 | 0.108 | 0.134 | 0.166 | 0.109 | 0.116 | 0.136 | 0.197 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

**E. Descriptive Information on Travel Time to Polls and the Effect of Travel Time on Participation.** In Figure SI1 below we present the density of travel time to get to the polls both with and without access to a car for all registered voter in the 1% random sample of the voter file.

In Figure SI2 we present the density of the difference between these two quantities for each potential voter in the 1% sample (i.e. the travel time with car access subtracted from the travel time without access to a car). As described in the main text of the paper, this additional time burden on voters without access to a car ranges from a median of approximately 18.5 minutes to time burdens of over an hour.
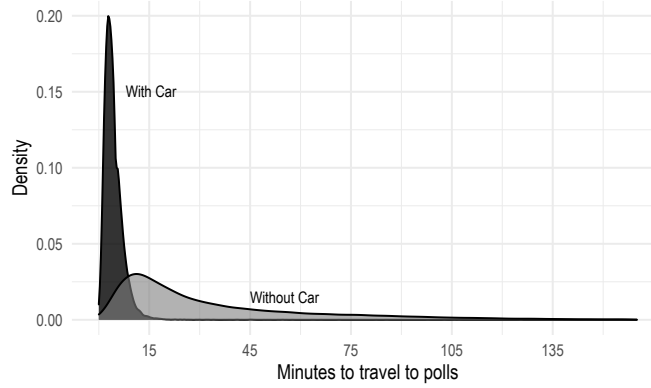


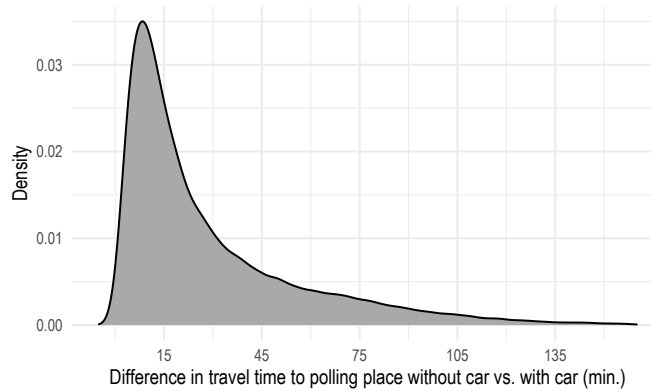**Fig. SI1.** Minutes to travel to polls.



**Fig. SI2.** Minutes to travel to polls.

In Table SI10 we show the results from the models presented in the main text of the paper in Figure 2, showing moderation of the effect of car access by travel time burden. In addition, we replicate this examination of the moderating effect of travel time using our within-address comparison (i.e. columns 4 and 8 of Table 1 in the main text) in Figure SI3 and Table SI11.

**Table SI10. Within-Precinct Effect of Travel Time on Turnout, by Quartile**

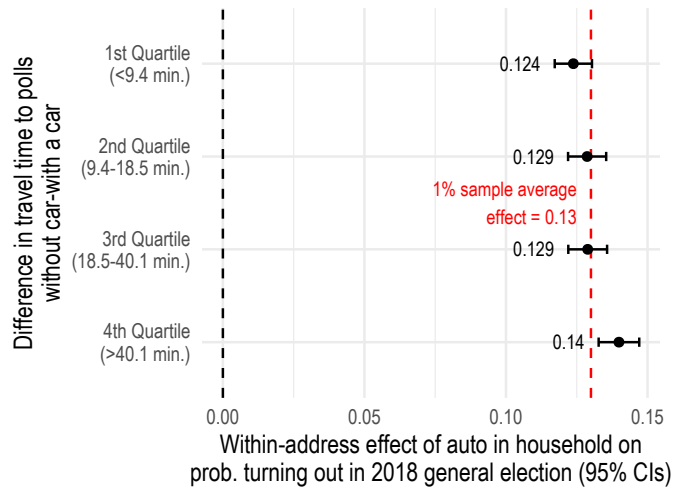| | *Dependent variable:* | | | |
|---|---|---|---|---|
| | 2018 Turnout | | | |
| | 1st Quartile | 2nd Quartile | 3rd Quartile | 4th Quartile |
| | (1) | (2) | (3) | (4) |
| Auto in HH | 0.216*** | 0.225*** | 0.223*** | 0.271*** |
| | (0.012) | (0.014) | (0.015) | (0.017) |
| | | | | |
| Male | −0.036*** | −0.043*** | −0.016** | 0.001 |
| | (0.008) | (0.008) | (0.008) | (0.008) |
| | | | | |
| White | 0.030** | 0.033** | 0.038** | 0.037 |
| | (0.015) | (0.015) | (0.016) | (0.023) |
| | | | | |
| Age | 0.004*** | 0.005*** | 0.005*** | 0.006*** |
| | (0.0002) | (0.0002) | (0.0002) | (0.0002) |
| FE for Precinct | ✓ | ✓ | ✓ | ✓ |
| Observations | 15,976 | 15,995 | 15,999 | 16,084 |
| $R^2$ | 0.287 | 0.299 | 0.278 | 0.212 |
| Adjusted $R^2$ | 0.128 | 0.123 | 0.116 | 0.099 |

*Note:* $^{*}$p<0.1; $^{**}$p<0.05; $^{***}$p<0.01



**Fig. SI3.** Within-address differences in participation rates, by travel time to polls.

**Table SI11. Within-Address Effect of Travel Time on Turnout, by Quartile**

| | *Dependent variable:* | | | |
|---|---|---|---|---|
| | 2018 Turnout | | | |
| | 1st Quartile | 2nd Quartile | 3rd Quartile | 4th Quartile |
| | (1) | (2) | (3) | (4) |
| Auto in HH | 0.124*** | 0.129*** | 0.129*** | 0.140*** |
| | (0.003) | (0.003) | (0.003) | (0.004) |
| Male | −0.048*** | −0.042*** | −0.053*** | −0.034*** |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| White | 0.046*** | 0.043*** | 0.021*** | 0.023*** |
| | (0.005) | (0.005) | (0.005) | (0.005) |
| Age | 0.002*** | 0.003*** | 0.003*** | 0.003*** |
| | (0.0001) | (0.0001) | (0.0001) | (0.0001) |
| FE for Address | ✓ | ✓ | ✓ | ✓ |
| Observations | 104,034 | 102,433 | 102,112 | 100,495 |
| $R^2$ | 0.220 | 0.226 | 0.220 | 0.215 |
| Adjusted $R^2$ | 0.142 | 0.136 | 0.135 | 0.136 |

*Note:* $^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

**F. Moderation by Demographics.** In Figure SI4 we present the coefficients for the effect of car access within age and race/ethnicity subgroups, which represent the differences between the subgroup mean turnout rates presented in Figure 3 of the main paper. In Table SI12 and Table SI13 we present the tabular results for these models in each subgroup as well.
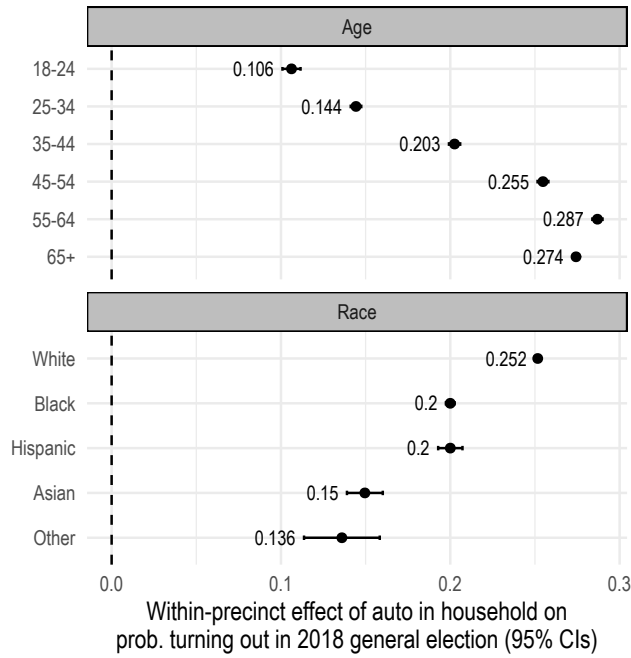


**Fig. SI4.** Differential effects of car access by race and age

**Table SI12. Effect of Car Ownership on 2018 General Election Turnout by Age**

| | | | *Dependent variable:* | | | |
|---|---|---|---|---|---|---|
| | | | 2018 General Turnout | | | |
| | 18-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Auto in HH | 0.106*** | 0.144*** | 0.203*** | 0.255*** | 0.287*** | 0.274*** |
| | (0.003) | (0.002) | (0.002) | (0.002) | (0.002) | (0.001) |
| Male | −0.045*** | −0.055*** | −0.045*** | −0.018*** | −0.014*** | 0.012*** |
| | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| White | 0.042*** | 0.060*** | 0.051*** | 0.039*** | 0.050*** | 0.057*** |
| | (0.003) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| FE for Precinct | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 397,722 | 958,711 | 988,011 | 1,137,468 | 1,275,008 | 1,650,635 |
| $R^2$ | 0.063 | 0.081 | 0.087 | 0.094 | 0.096 | 0.100 |
| Adjusted $R^2$ | 0.051 | 0.076 | 0.083 | 0.091 | 0.093 | 0.098 |

*Note:* *p<0.1; **p<0.05; ***p<0.01

**Table SI13. Effect of Car Ownership on 2018 General Election Turnout by Race**

|  | Dependent variable: | | | | |
|---|---|---|---|---|---|
|  | 2018 General Turnout | | | | |
|  | White | Black | Hispanic | Asian | Other |
|  | (1) | (2) | (3) | (4) | (5) |
| Auto in HH | 0.252*** | 0.200*** | 0.200*** | 0.150*** | 0.136*** |
|  | (0.001) | (0.001) | (0.004) | (0.005) | (0.011) |
| Male | −0.007*** | −0.114*** | −0.051*** | −0.005* | −0.064*** |
|  | (0.0004) | (0.001) | (0.002) | (0.003) | (0.009) |
| Age | 0.005*** | 0.005*** | 0.003*** | 0.003*** | 0.003*** |
|  | (0.00001) | (0.00003) | (0.0001) | (0.0001) | (0.0003) |
| FE for Precinct | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 5,403,838 | 719,191 | 160,820 | 112,350 | 11,356 |
| $R^2$ | 0.102 | 0.136 | 0.129 | 0.106 | 0.240 |
| Adjusted $R^2$ | 0.102 | 0.132 | 0.104 | 0.080 | 0.105 |

*Note:* $^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

**G. Effect on Vote Mode: Tabular Results.** In Table SI14 we present the tabular results that correspond to the average turnout rates presented in Figure 4 of the main paper.

**Table SI14. Effect of Car Ownership on 2018 General Election Voting Method**

| | Dependent variable: | | | |
|---|---|---|---|---|
| | 2018 General Absentee | 2018 General In-Person | 2018 Primary Absentee | 2018 Primary In-Person |
| | (1) | (2) | (3) | (4) |
| Auto in HH | 0.014*** | 0.117*** | 0.011*** | 0.069*** |
| | (0.001) | (0.002) | (0.001) | (0.001) |
| Male | −0.029*** | −0.015*** | −0.020*** | −0.0003 |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| White | 0.010*** | 0.025*** | 0.010*** | 0.020*** |
| | (0.002) | (0.002) | (0.002) | (0.002) |
| Age | 0.006*** | −0.003*** | 0.004*** | 0.0004*** |
| | (0.00003) | (0.0001) | (0.00003) | (0.00004) |
| FE for Address | ✓ | ✓ | ✓ | ✓ |
| Observations | 408,839 | 408,839 | 372,684 | 372,684 |
| $R^2$ | 0.334 | 0.212 | 0.284 | 0.186 |
| Adjusted $R^2$ | 0.264 | 0.128 | 0.200 | 0.091 |

*Note:* $^*p<0.1; ^{**}p<0.05; ^{***}p<0.01$

**H. Subgroup Effects within Individual Counties.** In Figure SI5 and Figure SI6 we replicate the same models presented in the main text of the paper, but within county subgroups of registered voters for both 2018 general and primary election participation. In Figures SI7 and SI8 we do the same but for the 2016 general and primary elections.
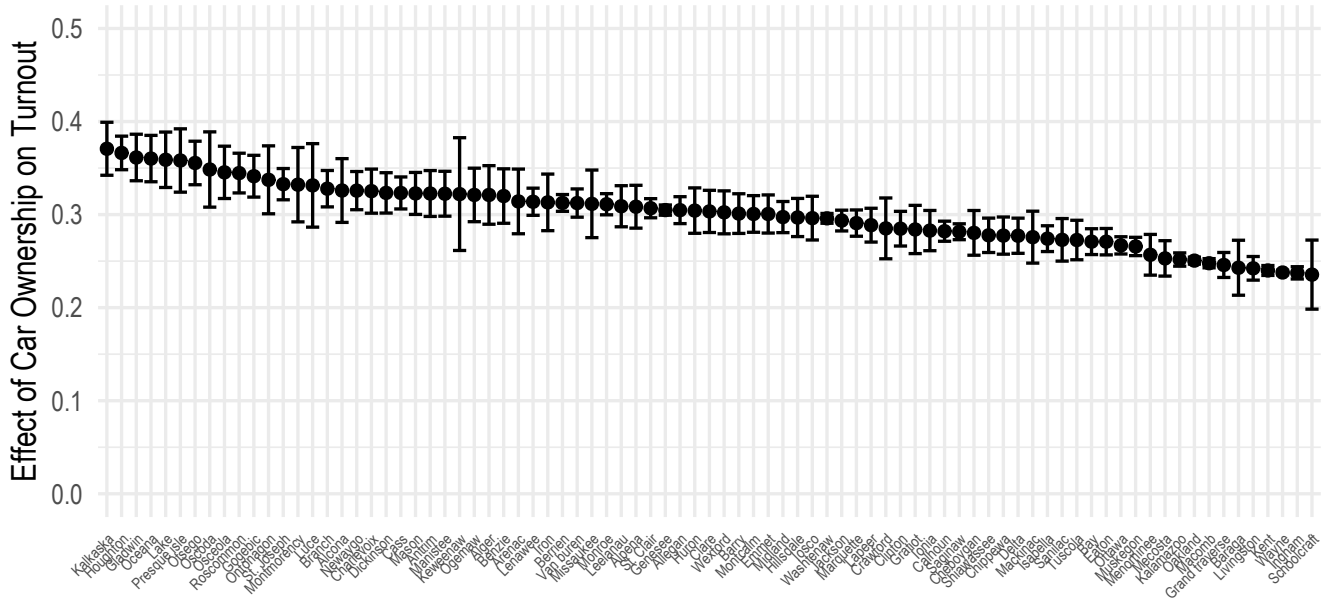


**Fig. SI5.** Effect of Car Ownership by County, 2018 General Election
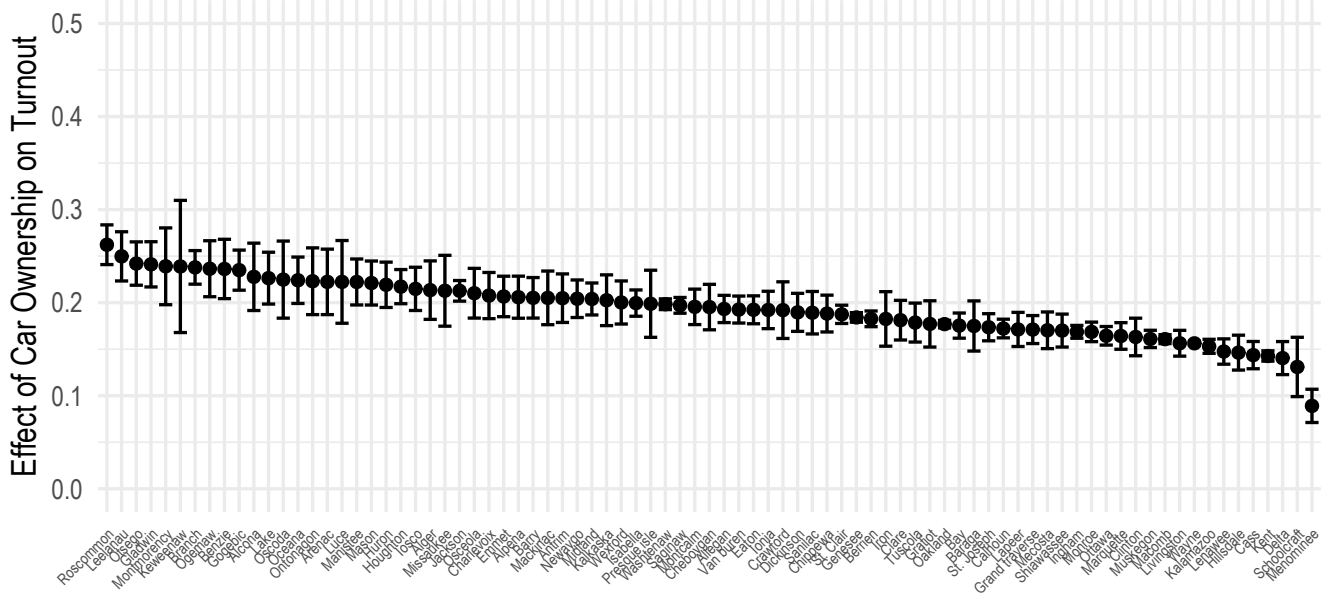


**Fig. SI6.** Effect of Car Ownership by County, 2018 Primary Election
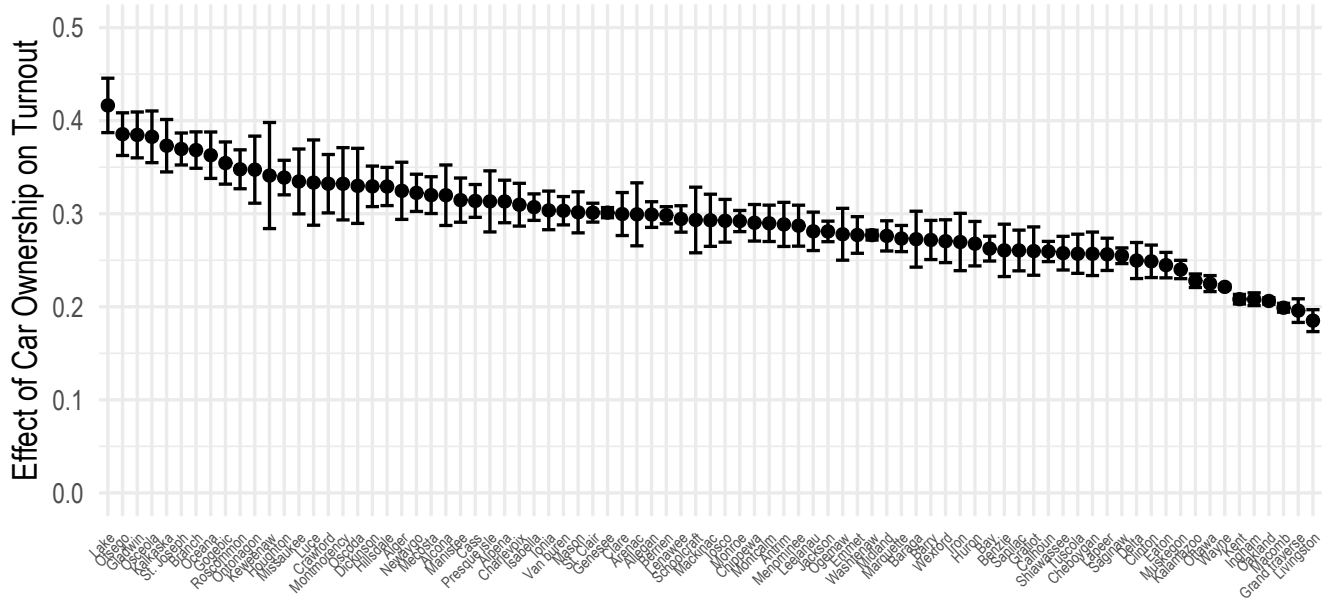
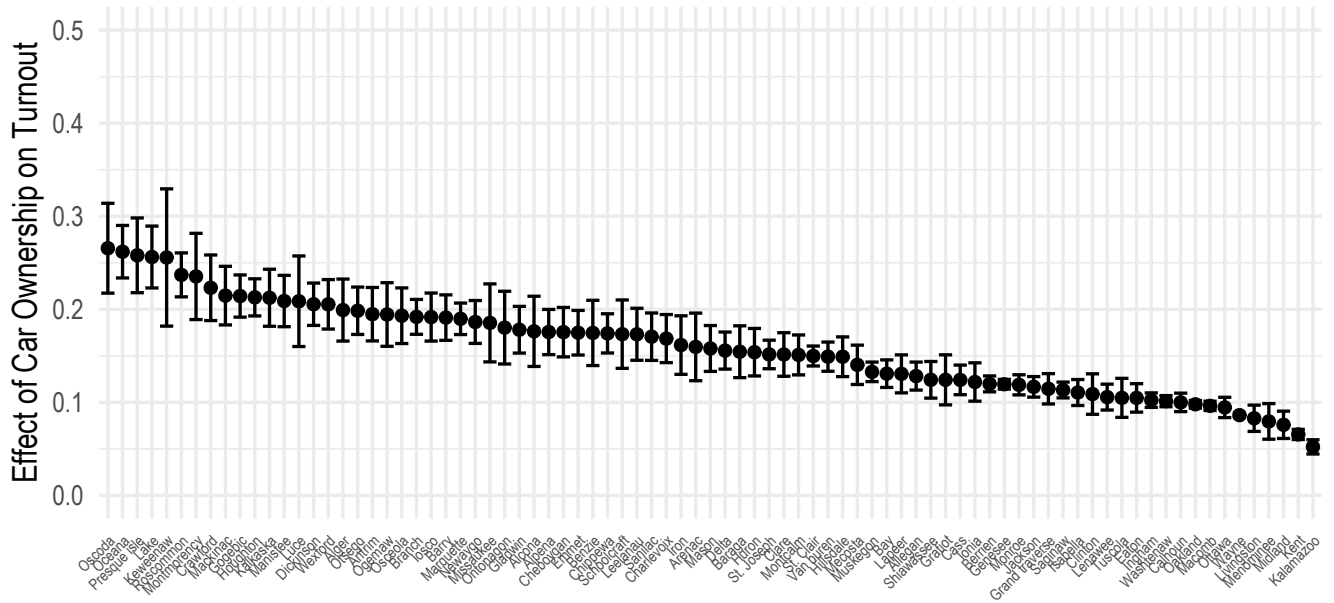**Fig. SI7.** Effect of Car Ownership by County, 2016 General Election



**Fig. SI8.** Effect of Car Ownership by County, 2016 Primary Election