

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

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## Abstract

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. 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.

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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 vote are different from those who did not vote, then elected officials may not represent the full set of citizens (Bartels, 2008; 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. Merriam and Gosnell, 1924; Riker and Ordeshook, 1968). A large body of research has pointed to demographic and socio-economic differences in rates of voting participation, as well as the consequences of those participatory inequalities (Aldrich, 1993; Leighley and Nagler, 1992; Rosenstone and Hansen, 1993; Wolfinger and Rosenstone, 1980). One prominent explanation for differential rates of turnout has been that resources provided by socioeconomic status and education can be a primary driver of turnout (e.g. Verba, Scholzman 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 the ease with which they can do so: the mode of travel by which they get to the polls. Specifically, previous accounts of the barriers 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 lack both methods. Examining the way that access to reliable and fast transportation can be an obstacle to voters 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. These fine-grained individual-level data enable us to use modern causal inference strategies and 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 voters' home and polling place locations 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 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. 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 options or making alternative forms of voting, such as early or absentee voting, widely accessible to their citizens.

## **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 the state's

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 and personally owned automobiles or lived in the same household as a car owner.<sup>1</sup> These data give us a unique opportunity to learn about the effects of driving and car ownership on voter turnout.<sup>2</sup>

## 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 the 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 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 demo-

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<sup>1</sup>We obtained the drivers license and auto registration databases as the result of a data production request for voting rights litigation.

<sup>2</sup>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.

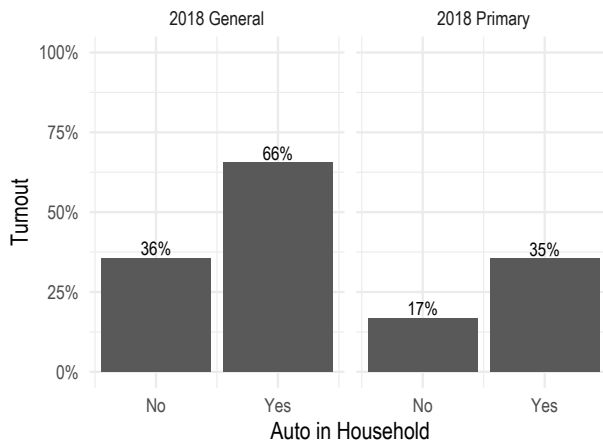


Figure 1: Participation rates by car ownership.

graphic 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 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 fixed effects analyses, shown 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 (columns 2 and 6) and precinct-level (columns 3 and 7) 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.

Table 1: Effect of Automobile Access on 2018 Voter Turnout

	<i>Dependent variable:</i>							
	2018 General Turnout				2018 Primary Turnout			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Auto in HH	0.272*** (0.001)	0.267*** (0.001)	0.236*** (0.001)	0.130*** (0.002)	0.173*** (0.001)	0.171*** (0.001)	0.157*** (0.001)	0.080*** (0.002)
Male	-0.021*** (0.0004)	-0.021*** (0.0004)	-0.020*** (0.0004)	-0.045*** (0.002)	-0.013*** (0.0004)	-0.012*** (0.0004)	-0.012*** (0.0004)	-0.020*** (0.001)
White	0.105*** (0.001)	0.109*** (0.001)	0.046*** (0.001)	0.034*** (0.003)	0.054*** (0.0005)	0.069*** (0.001)	0.045*** (0.001)	0.030*** (0.002)
Age	0.005*** (0.00001)	0.005*** (0.00001)	0.005*** (0.00001)	0.003*** (0.0001)	0.008*** (0.00001)	0.008*** (0.00001)	0.008*** (0.00001)	0.004*** (0.00005)
Constant	0.035*** (0.001)				-0.264*** (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 <sup>2</sup>	0.081	0.092	0.118	0.220	0.102	0.110	0.128	0.249
Adjusted R <sup>2</sup>	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

Our models using county and precinct fixed effects enable 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. 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. 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 addresses where both car owners and non-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 other observable or unobservable characteristics of those individuals that could result in participatory differences. Even with such a conservative estimand, 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.

Additionally, in Tables A4-A7 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.<sup>3</sup>

### **Effect of Travel Time**

One natural implication of the substantively large effects we observe across a variety of modeling choices—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.<sup>4</sup> As we show in Appendix Figure A2, 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 via public transit or on foot. However, the difference between these times—the time burden of not having access to a car—varies across our sample of voters. To examine the moderating role of the travel time burden imposed on voters 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 with versus without a car, and separately examine the effect of car access among these groups.

These results are displayed in Figure 2, which shows that the effect of access to a car on voting is moderated by the burden of travel time. 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 9.4 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),

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<sup>3</sup>We also replicate the above models in Table A1 for the 2016 elections and in Tables A2 and A3 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. 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 A8 and A9, indicate that having access to a car has a large effect on participation whether or not a person has a license.

<sup>4</sup>Specifically, we take a 1% random sample of 67,168 registered voters in our data and 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, we identify 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). See Figure A1.

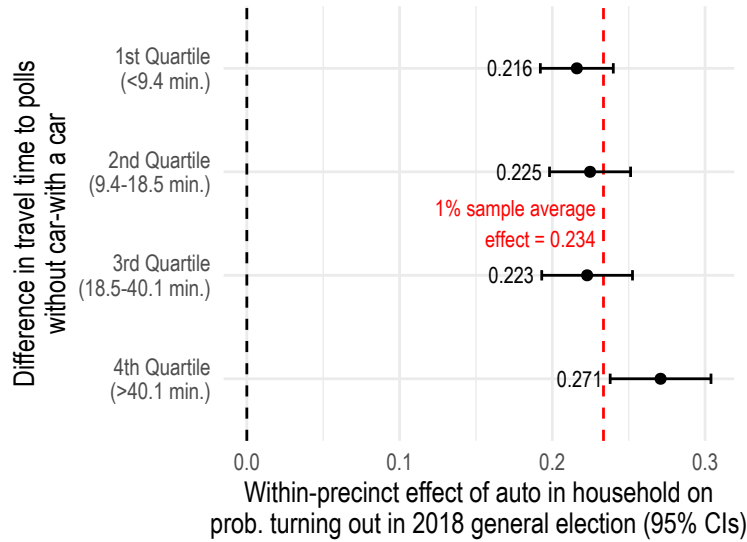


Figure 2: Within-precinct effects of car access on participation rates, by travel time to polls.

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.<sup>5</sup>

### 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 (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 3 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.

The effect of car access on absentee voting is quite small. Meanwhile, the substantial difference

<sup>5</sup>Table A10 presents the full regression results. Table A11 and Figure A3 replicates these results using our within-address sample and address fixed effects, which similarly shows a strong moderating effect of travel time.

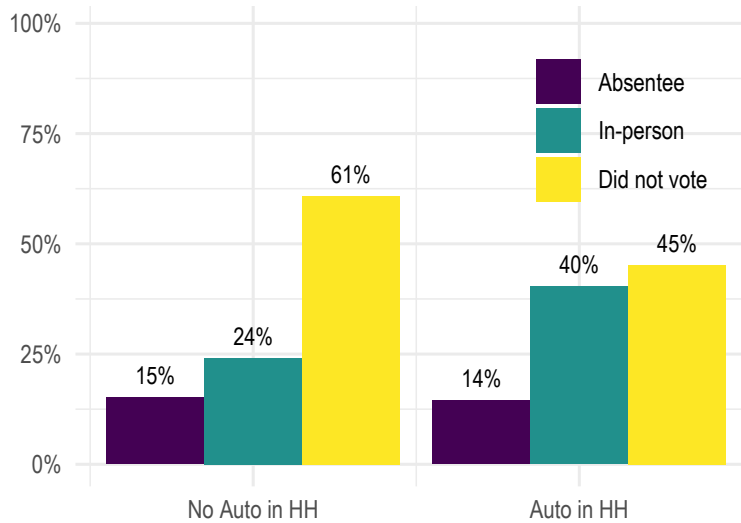


Figure 3: Within-address differences in participation rates by voting method, 2018 General Election.

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 difference 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 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 A14, reiterate the basic differences shown visually in Figure 3. In both the 2018 general and primary elections, car access had a large effect on in-person turnout, while its effect on absentee voting is much smaller.

## 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 voter turnout rates signal potential flaws in this mechanism of democratic representation. Examining such worrisome inequalities has been a central question in political 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 compare 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 also exacerbated by the burden of longer travel time between voters' homes and polling locations. Importantly, these participatory differences only exist for in-person election day voting, and not for absentee voting. 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 provides 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. Future work could extend our analyses by examining the over-time effects of car access or its interaction with institutional changes. Such work will help in developing a more holistic picture of the causal effects of car access in participation more broadly.

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.

## References

- Aldrich, John H. 1993. "Rational Choice and Turnout." *American Journal of Political Science* 37(1):246–278.
- Bartels, Larry M. 2008. *Unequal Democracy: The Political Economy of the New Gilded Age*. New York: Russell Sage Foundation.
- Brady, Henry E and John E McNulty. 2011. "Turning Out to Vote: The Costs of Finding and Getting to the Polling Place." *American Political Science Review* 105(1):115–134.
- Burden, Barry C and Jacob R Neiheisel. 2013. "Election Administration and the Pure Effect of Voter Registration on Turnout." *Political Research Quarterly* 66(1):77–90.
- Dyck, Joshua J and James G Gimpel. 2005. "Distance, Turnout, and the Convenience of Voting." *Social Science Quarterly* 86(3):531–548.
- Gilens, Martin. 2012. *Affluence and Influence: Economic Inequality and Political Power in America*. Princeton, NJ: Princeton University Press.
- Gimpel, James G, Joshua J Dyck and Daron R Shaw. 2006. "Location, Knowledge and Time Pressures in the Spatial Structure of Convenience Voting." *Electoral Studies* 25(1):35–58.
- Haspel, Moshe and H Gibbs Knotts. 2005. "Location, Location, Location: Precinct Placement and the Costs of Voting." *The Journal of Politics* 67(2):560–573.
- Highton, Benjamin. 2017. "Voter Identification Laws and Turnout in the United States." *Annual Review of Political Science* 20:149–167.
- Leighley, Jan E and Jonathan Nagler. 1992. "Individual and Systemic Influences on Turnout: Who Votes? 1984." *The Journal of Politics* 54(3):718–740.
- Merriam, Charles Edward and Harold Foote Gosnell. 1924. *Non-Voting: Causes and Methods of Control*. Chicago: University of Chicago Press.
- Riker, William H and Peter C Ordeshook. 1968. "A Theory of the Calculus of Voting." *American Political Science Review* 62(1):25–42.

Rosenstone, Steven and John Mark Hansen. 1993. *Mobilization, Participation and Democracy in America*. New York: Macmillan Publishing.

U.S. Census Bureau. 2018. "2013-2018 American Community Survey."

Verba, Sidney, Kay Lehman Schlozman and Henry E. Brady. 1995. *Voice and Equality: Civic Voluntarism in American Politics*. Cambridge, MA: Harvard University Press.

Wolfinger, Raymond E and Steven J Rosenstone. 1980. *Who Votes?* Yale University Press.

## Supplementary Appendix

### A Matching Process

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. 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. 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.

### B Effect of Car Access on 2016 Participation

In Table A1 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 A1: Effect of Automobile Access on 2016 Voter Turnout

	<i>Dependent variable:</i>							
	2016 General Turnout				2016 Primary Turnout			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Auto in HH	0.255*** (0.001)	0.248*** (0.001)	0.215*** (0.001)	0.119*** (0.002)	0.107*** (0.001)	0.106*** (0.001)	0.101*** (0.001)	0.049*** (0.002)
Male	-0.042*** (0.0004)	-0.042*** (0.0004)	-0.041*** (0.0003)	-0.071*** (0.002)	-0.010*** (0.0004)	-0.010*** (0.0004)	-0.010*** (0.0004)	-0.018*** (0.002)
White	0.105*** (0.0005)	0.106*** (0.001)	0.034*** (0.001)	0.028*** (0.003)	0.060*** (0.001)	0.049*** (0.001)	0.048*** (0.001)	0.022*** (0.003)
Age	0.003*** (0.00001)	0.003*** (0.00001)	0.003*** (0.00001)	0.001*** (0.0001)	0.008*** (0.00001)	0.008*** (0.00001)	0.008*** (0.00001)	0.004*** (0.0001)
Constant	0.270*** (0.001)				-0.327*** (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 <sup>2</sup>	0.062	0.070	0.099	0.243	0.104	0.111	0.132	0.310
Adjusted R <sup>2</sup>	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

## C Effect of Drivers License on Turnout

In Table A2 and Table A3, we demonstrate that access to a drivers license also has an effect on voter participation.

Table A2: Effect of Drivers Licenses on 2018 Voter Turnout

	<i>Dependent variable:</i>					
	2018 General Turnout			2018 Primary Turnout		
	(1)	(2)	(3)	(4)	(5)	(6)
Drivers License	0.456*** (0.001)	0.434*** (0.001)	0.293*** (0.004)	0.256*** (0.001)	0.245*** (0.001)	0.150*** (0.004)
Male	-0.026*** (0.0004)	-0.026*** (0.0004)	-0.047*** (0.002)	-0.015*** (0.0004)	-0.015*** (0.0004)	-0.022*** (0.001)
White	0.133*** (0.001)	0.049*** (0.001)	0.033*** (0.003)	0.086*** (0.001)	0.047*** (0.001)	0.030*** (0.002)
Age	0.005*** (0.00001)	0.005*** (0.00001)	0.003*** (0.0001)	0.008*** (0.00001)	0.008*** (0.00001)	0.004*** (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 <sup>2</sup>	0.093	0.123	0.220	0.108	0.127	0.247
Adjusted R <sup>2</sup>	0.093	0.122	0.137	0.108	0.127	0.159

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Table A3: Effect of Drivers Licenses on 2016 Voter Turnout

	<i>Dependent variable:</i>					
	2016 General Turnout			2016 Primary Turnout		
	(1)	(2)	(3)	(4)	(5)	(6)
Drivers License	0.527*** (0.001)	0.504*** (0.001)	0.358*** (0.004)	0.179*** (0.001)	0.174*** (0.001)	0.115*** (0.004)
Male	-0.048*** (0.0003)	-0.047*** (0.0003)	-0.075*** (0.002)	-0.013*** (0.0004)	-0.012*** (0.0004)	-0.019*** (0.002)
White	0.126*** (0.001)	0.037*** (0.001)	0.026*** (0.003)	0.059*** (0.001)	0.049*** (0.001)	0.022*** (0.003)
Age	0.003*** (0.00001)	0.003*** (0.00001)	0.001*** (0.0001)	0.008*** (0.00001)	0.008*** (0.00001)	0.004*** (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 <sup>2</sup>	0.089	0.120	0.250	0.112	0.133	0.310
Adjusted R <sup>2</sup>	0.089	0.119	0.156	0.112	0.132	0.194

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## **D 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 A4 and A5 present models with the effect of automobile access with these control variables on turnout in the 2018 and 2016 elections, and Tables A6 and A6 present results for the effect of drivers licenses.

Table A4: Effect of Car Access on 2018 Election Turnout, with Additional Controls

	<i>Dependent variable:</i>							
	2018 General Turnout				2018 Primary Turnout			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Auto in HH	0.180*** (0.001)	0.179*** (0.001)	0.177*** (0.001)	0.109*** (0.003)	0.131*** (0.001)	0.133*** (0.001)	0.136*** (0.001)	0.080*** (0.003)
Male	-0.017*** (0.0005)	-0.016*** (0.0005)	-0.015*** (0.0005)	-0.025*** (0.003)	-0.017*** (0.001)	-0.016*** (0.001)	-0.015*** (0.001)	-0.013*** (0.003)
White	0.025*** (0.001)	0.033*** (0.001)	0.031*** (0.001)	0.003 (0.005)	-0.001 (0.001)	0.020*** (0.001)	0.041*** (0.001)	0.021*** (0.005)
Age	0.005*** (0.00002)	0.005*** (0.00002)	0.005*** (0.00002)	0.003*** (0.0001)	0.009*** (0.00002)	0.009*** (0.00002)	0.009*** (0.00002)	0.005*** (0.0001)
Est. HH Income	0.0005*** (0.00000)	0.0004*** (0.00000)	0.0002*** (0.00000)	-0.0002*** (0.00003)	0.0002*** (0.00001)	0.0001*** (0.00001)	0.00001 (0.00001)	-0.0001*** (0.00003)
HS Diploma	0.022*** (0.001)	0.020*** (0.001)	0.014*** (0.001)	0.016*** (0.004)	0.005*** (0.001)	0.004*** (0.001)	0.002 (0.001)	0.017*** (0.004)
Vocational Degree	0.061*** (0.005)	0.061*** (0.005)	0.056*** (0.005)	0.082*** (0.030)	0.039*** (0.005)	0.040*** (0.005)	0.038*** (0.005)	0.080*** (0.029)
Some College	0.055*** (0.001)	0.050*** (0.001)	0.037*** (0.001)	0.030*** (0.005)	0.045*** (0.001)	0.040*** (0.001)	0.031*** (0.001)	0.023*** (0.005)
College Degree	0.095*** (0.001)	0.084*** (0.001)	0.067*** (0.001)	0.043*** (0.005)	0.065*** (0.001)	0.057*** (0.001)	0.044*** (0.001)	0.047*** (0.005)
Grad Degree	0.129*** (0.001)	0.112*** (0.001)	0.088*** (0.001)	0.059*** (0.006)	0.111*** (0.002)	0.095*** (0.002)	0.072*** (0.002)	0.066*** (0.006)
Renter	-0.101*** (0.001)	-0.105*** (0.001)	-0.105*** (0.001)	-0.035*** (0.009)	-0.077*** (0.001)	-0.081*** (0.001)	-0.088*** (0.001)	-0.064*** (0.008)
Constant	0.169*** (0.002)				-0.247*** (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 <sup>2</sup>	0.075	0.082	0.101	0.291	0.102	0.109	0.125	0.315
Adjusted R <sup>2</sup>	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 A5: Effect of Car Access on 2016 Election Turnout, with Additional Controls

	<i>Dependent variable:</i>							
	2016 General Turnout				2016 Primary Turnout			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Auto in HH	0.141*** (0.001)	0.140*** (0.001)	0.136*** (0.001)	0.085*** (0.003)	0.074*** (0.001)	0.073*** (0.001)	0.079*** (0.001)	0.044*** (0.003)
Male	-0.036*** (0.0004)	-0.035*** (0.0004)	-0.035*** (0.0004)	-0.050*** (0.003)	-0.014*** (0.0005)	-0.015*** (0.0005)	-0.014*** (0.0005)	-0.012*** (0.003)
White	0.030*** (0.001)	0.034*** (0.001)	0.021*** (0.001)	0.0004 (0.005)	0.029*** (0.001)	0.020*** (0.001)	0.052*** (0.001)	0.019*** (0.005)
Age	0.003*** (0.00001)	0.003*** (0.00001)	0.003*** (0.00001)	0.001*** (0.0001)	0.009*** (0.00002)	0.009*** (0.00002)	0.009*** (0.00002)	0.005*** (0.0001)
Est. HH Income	0.0004*** (0.00000)	0.0003*** (0.00000)	0.0002*** (0.00000)	-0.0001** (0.00003)	-0.0001*** (0.00000)	-0.0001*** (0.00001)	-0.0001*** (0.00001)	-0.0001*** (0.00003)
HS Diploma	0.0001 (0.001)	-0.001 (0.001)	-0.005*** (0.001)	-0.005 (0.004)	-0.013*** (0.001)	-0.013*** (0.001)	-0.015*** (0.001)	0.023*** (0.005)
Vocational Degree	0.023*** (0.004)	0.024*** (0.004)	0.020*** (0.004)	0.034 (0.028)	0.009* (0.005)	0.010** (0.005)	0.008 (0.005)	0.057** (0.029)
Some College	0.037*** (0.001)	0.035*** (0.001)	0.024*** (0.001)	0.020*** (0.005)	0.021*** (0.002)	0.022*** (0.002)	0.013*** (0.002)	0.023*** (0.006)
College Degree	0.060*** (0.001)	0.053*** (0.001)	0.039*** (0.001)	0.012*** (0.005)	0.027*** (0.001)	0.028*** (0.001)	0.020*** (0.001)	0.033*** (0.005)
Grad Degree	0.086*** (0.001)	0.075*** (0.001)	0.055*** (0.001)	0.026*** (0.006)	0.052*** (0.002)	0.053*** (0.002)	0.039*** (0.002)	0.056*** (0.006)
Renter	-0.074*** (0.001)	-0.076*** (0.001)	-0.076*** (0.001)	-0.018** (0.008)	-0.062*** (0.001)	-0.061*** (0.001)	-0.065*** (0.001)	-0.042*** (0.009)
Constant	0.416*** (0.002)				-0.317*** (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 <sup>2</sup>	0.052	0.056	0.078	0.300	0.104	0.111	0.134	0.356
Adjusted R <sup>2</sup>	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 A6: Effect of Drivers License on 2018 Election Turnout, with Additional Controls

	<i>Dependent variable:</i>							
	2018 General Turnout				2018 Primary Turnout			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Drivers License	0.337*** (0.002)	0.335*** (0.002)	0.332*** (0.002)	0.241*** (0.011)	0.186*** (0.002)	0.184*** (0.002)	0.184*** (0.002)	0.158*** (0.011)
Male	-0.017*** (0.0005)	-0.016*** (0.0005)	-0.016*** (0.0005)	-0.023*** (0.003)	-0.016*** (0.001)	-0.015*** (0.001)	-0.014*** (0.001)	-0.012*** (0.003)
White	0.036*** (0.001)	0.042*** (0.001)	0.030*** (0.001)	0.002 (0.005)	0.007*** (0.001)	0.026*** (0.001)	0.040*** (0.001)	0.020*** (0.005)
Age	0.005*** (0.00002)	0.005*** (0.00002)	0.005*** (0.00002)	0.003*** (0.0001)	0.009*** (0.00002)	0.009*** (0.00002)	0.009*** (0.00002)	0.005*** (0.0001)
Est. HH Income	0.001*** (0.00000)	0.0004*** (0.00000)	0.0003*** (0.00000)	-0.0001*** (0.00003)	0.0002*** (0.00001)	0.0001*** (0.00001)	0.00003*** (0.00001)	-0.0001*** (0.00003)
HS Diploma	0.030*** (0.001)	0.028*** (0.001)	0.021*** (0.001)	0.017*** (0.005)	0.010*** (0.001)	0.010*** (0.001)	0.007*** (0.001)	0.017*** (0.004)
Vocational Degree	0.071*** (0.005)	0.072*** (0.005)	0.065*** (0.005)	0.088*** (0.030)	0.047*** (0.005)	0.048*** (0.005)	0.045*** (0.005)	0.084*** (0.029)
Some College	0.061*** (0.001)	0.056*** (0.001)	0.042*** (0.001)	0.030*** (0.005)	0.049*** (0.001)	0.045*** (0.001)	0.035*** (0.001)	0.023*** (0.005)
College Degree	0.103*** (0.001)	0.092*** (0.001)	0.074*** (0.001)	0.043*** (0.005)	0.071*** (0.001)	0.063*** (0.001)	0.049*** (0.001)	0.048*** (0.005)
Grad Degree	0.138*** (0.001)	0.121*** (0.001)	0.096*** (0.001)	0.061*** (0.006)	0.118*** (0.002)	0.102*** (0.002)	0.078*** (0.002)	0.068*** (0.006)
Renter	-0.119*** (0.001)	-0.123*** (0.001)	-0.119*** (0.001)	-0.036*** (0.009)	-0.091*** (0.001)	-0.095*** (0.001)	-0.099*** (0.001)	-0.065*** (0.009)
Constant	0.0001 (0.003)				-0.311*** (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 <sup>2</sup>	0.073	0.080	0.099	0.286	0.100	0.106	0.123	0.311
Adjusted R <sup>2</sup>	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 A7: Effect of Drivers License on 2016 Election Turnout, with Additional Controls

	<i>Dependent variable:</i>							
	2016 General Turnout				2016 Primary Turnout			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Drivers License	0.365*** (0.002)	0.363*** (0.002)	0.360*** (0.002)	0.335*** (0.011)	0.117*** (0.002)	0.117*** (0.002)	0.117*** (0.002)	0.133*** (0.012)
Male	-0.037*** (0.0004)	-0.036*** (0.0004)	-0.035*** (0.0004)	-0.049*** (0.003)	-0.014*** (0.0005)	-0.014*** (0.0005)	-0.014*** (0.0005)	-0.011*** (0.003)
White	0.038*** (0.001)	0.040*** (0.001)	0.020*** (0.001)	-0.001 (0.005)	0.033*** (0.001)	0.024*** (0.001)	0.052*** (0.001)	0.018*** (0.005)
Age	0.003*** (0.00001)	0.003*** (0.00001)	0.003*** (0.00001)	0.001*** (0.0001)	0.009*** (0.00002)	0.009*** (0.00002)	0.009*** (0.00002)	0.005*** (0.0001)
Est. HH Income	0.0005*** (0.00000)	0.0004*** (0.00000)	0.0002*** (0.00000)	-0.00004 (0.00003)	-0.0001*** (0.00000)	-0.00003*** (0.00001)	-0.0001*** (0.00001)	-0.0001** (0.00003)
HS Diploma	0.006*** (0.001)	0.005*** (0.001)	0.0002 (0.001)	-0.005 (0.004)	-0.009*** (0.001)	-0.009*** (0.001)	-0.012*** (0.001)	0.023*** (0.005)
Vocational Degree	0.031*** (0.004)	0.032*** (0.004)	0.027*** (0.004)	0.040 (0.028)	0.013** (0.005)	0.014*** (0.005)	0.012** (0.005)	0.059** (0.029)
Some College	0.042*** (0.001)	0.039*** (0.001)	0.028*** (0.001)	0.019*** (0.005)	0.023*** (0.002)	0.024*** (0.002)	0.016*** (0.002)	0.022*** (0.006)
College Degree	0.066*** (0.001)	0.059*** (0.001)	0.045*** (0.001)	0.013*** (0.005)	0.030*** (0.001)	0.031*** (0.001)	0.023*** (0.001)	0.033*** (0.005)
Grad Degree	0.092*** (0.001)	0.082*** (0.001)	0.061*** (0.001)	0.028*** (0.006)	0.056*** (0.002)	0.057*** (0.002)	0.043*** (0.002)	0.057*** (0.006)
Renter	-0.087*** (0.001)	-0.089*** (0.001)	-0.085*** (0.001)	-0.019** (0.008)	-0.070*** (0.001)	-0.068*** (0.001)	-0.072*** (0.001)	-0.043*** (0.009)
Constant	0.187*** (0.002)				-0.365*** (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 <sup>2</sup>	0.055	0.059	0.081	0.300	0.103	0.111	0.134	0.355
Adjusted R <sup>2</sup>	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

## E Interaction Between Automobile Access and Drivers Licenses

In Table A8 and Table A9 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 A8: Effects of Car Ownership and Drivers Licenses on 2018 Election Turnout

	<i>Dependent variable:</i>							
	2018 General Turnout				2018 Primary Turnout			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Auto in HH	0.055*** (0.002)	0.060*** (0.002)	0.048*** (0.002)	0.020*** (0.008)	0.028*** (0.002)	0.033*** (0.002)	0.028*** (0.002)	0.006 (0.007)
Drivers License	0.203*** (0.002)	0.193*** (0.002)	0.179*** (0.002)	0.104*** (0.008)	0.140*** (0.002)	0.132*** (0.002)	0.125*** (0.002)	0.072*** (0.007)
Auto in HH x Drivers License	0.264*** (0.002)	0.273*** (0.002)	0.273*** (0.002)	0.231*** (0.005)	0.124*** (0.002)	0.132*** (0.002)	0.133*** (0.002)	0.108*** (0.004)
Male	-0.028*** (0.0004)	-0.028*** (0.0004)	-0.027*** (0.0004)	-0.049*** (0.002)	-0.017*** (0.0004)	-0.016*** (0.0004)	-0.016*** (0.0004)	-0.023*** (0.001)
White	0.099*** (0.0005)	0.104*** (0.001)	0.046*** (0.001)	0.032*** (0.003)	0.051*** (0.0005)	0.066*** (0.001)	0.045*** (0.001)	0.029*** (0.002)
Age	0.005*** (0.00001)	0.005*** (0.00001)	0.005*** (0.00001)	0.003*** (0.0001)	0.008*** (0.00001)	0.008*** (0.00001)	0.008*** (0.00001)	0.004*** (0.00005)
Constant	-0.189*** (0.002)				-0.368*** (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 <sup>2</sup>	0.104	0.115	0.139	0.231	0.109	0.117	0.135	0.252
Adjusted R <sup>2</sup>	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 A9: Effects of Car Ownership and Drivers Licenses on 2016 Election Turnout

	<i>Dependent variable:</i>							
	2016 General Turnout				2016 Primary Turnout			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Auto in HH	0.061*** (0.002)	0.060*** (0.002)	0.045*** (0.002)	-0.020** (0.008)	0.015*** (0.002)	0.018*** (0.002)	0.021*** (0.002)	0.010 (0.008)
Drivers License	0.170*** (0.002)	0.165*** (0.002)	0.153*** (0.002)	0.132*** (0.008)	0.088*** (0.002)	0.084*** (0.002)	0.076*** (0.002)	0.037*** (0.008)
Auto in HH x Drivers License	0.365*** (0.002)	0.368*** (0.002)	0.365*** (0.002)	0.285*** (0.005)	0.097*** (0.002)	0.101*** (0.002)	0.104*** (0.002)	0.092*** (0.005)
Male	-0.050*** (0.0003)	-0.050*** (0.0003)	-0.049*** (0.0003)	-0.076*** (0.002)	-0.013*** (0.0004)	-0.013*** (0.0004)	-0.013*** (0.0004)	-0.020*** (0.002)
White	0.098*** (0.0005)	0.099*** (0.001)	0.034*** (0.001)	0.025*** (0.003)	0.057*** (0.001)	0.046*** (0.001)	0.047*** (0.001)	0.022*** (0.003)
Age	0.003*** (0.00001)	0.003*** (0.00001)	0.003*** (0.00001)	0.001*** (0.0001)	0.008*** (0.00001)	0.008*** (0.00001)	0.008*** (0.00001)	0.004*** (0.0001)
Constant	-0.039*** (0.002)				-0.407*** (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 <sup>2</sup>	0.100	0.108	0.134	0.259	0.109	0.116	0.136	0.312
Adjusted R <sup>2</sup>	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

## F Descriptive Information on Travel Time to Polls and the Effect of Travel Time on Participation

In Figure A1 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 A2 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.

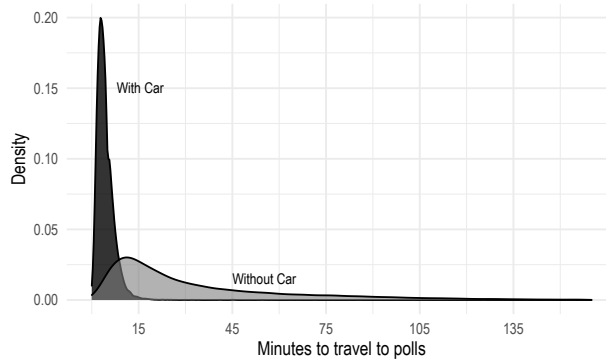


Figure A1: Minutes to travel to polls.

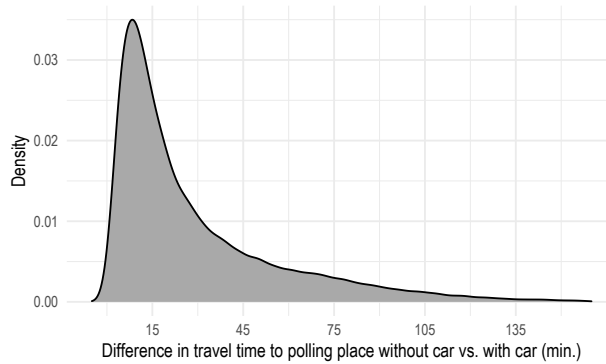


Figure A2: Minutes to travel to polls.

In Table A10 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 A3 and Table A11.

Table A10: Within-Precinct Effect of Travel Time on Turnout, by Quartile

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

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

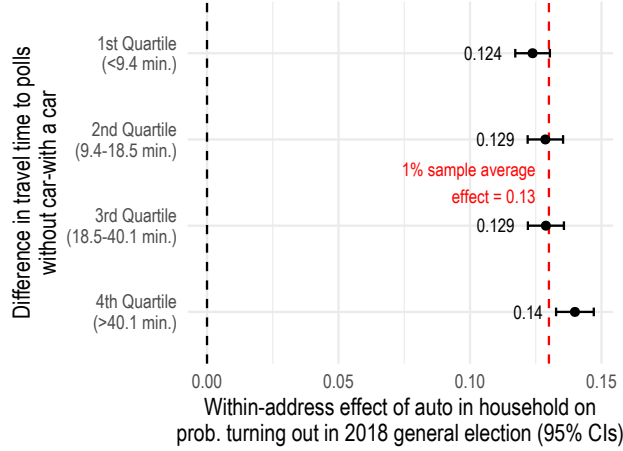


Figure A3: Within-address differences in participation rates, by travel time to polls.

Table A11: Within-Address Effect of Travel Time on Turnout, by Quartile

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

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## G 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 A4 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.<sup>6</sup> 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.

In Figure A5 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 A4 of the main paper. In Table A12 and Table A13 we present the tabular results for these models in each subgroup as well.

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<sup>6</sup>Figure A5 and Tables A12 and A13 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.

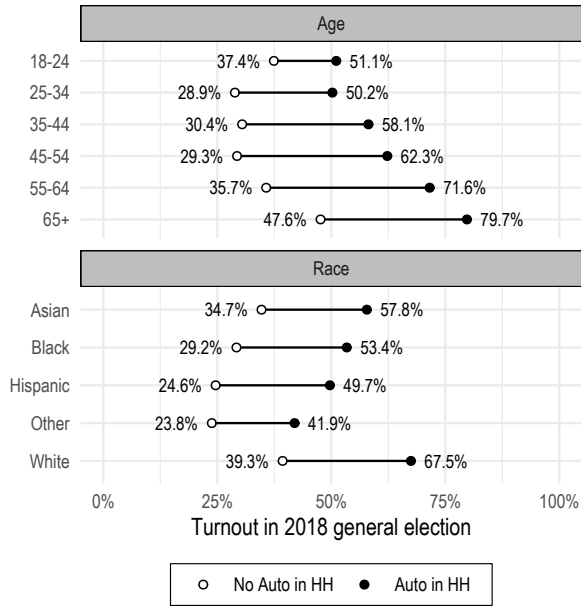


Figure A4: Differences in Turnout by Car Ownership

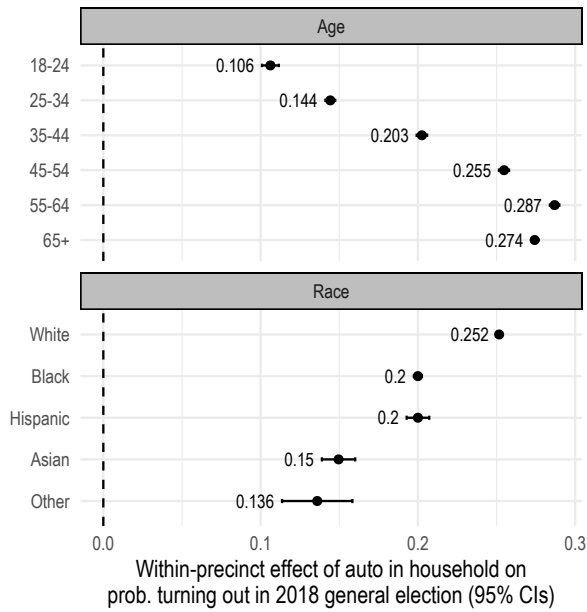


Figure A5: Differential effects of car access by race and age

Table A12: Effect of Car Ownership on 2018 General Election Turnout by Age

	<i>Dependent variable:</i>					
	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*** (0.003)	0.144*** (0.002)	0.203*** (0.002)	0.255*** (0.002)	0.287*** (0.002)	0.274*** (0.001)
Male	-0.045*** (0.002)	-0.055*** (0.001)	-0.045*** (0.001)	-0.018*** (0.001)	-0.014*** (0.001)	0.012*** (0.001)
White	0.042*** (0.003)	0.060*** (0.002)	0.051*** (0.002)	0.039*** (0.002)	0.050*** (0.002)	0.057*** (0.002)
FE for Precinct	✓	✓	✓	✓	✓	✓
Observations	397,722	958,711	988,011	1,137,468	1,275,008	1,650,635
R <sup>2</sup>	0.063	0.081	0.087	0.094	0.096	0.100
Adjusted R <sup>2</sup>	0.051	0.076	0.083	0.091	0.093	0.098

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Table A13: Effect of Car Ownership on 2018 General Election Turnout by Race

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

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## H Effect on Vote Mode: Tabular Results

In Table A14 we present the tabular results that correspond to the average turnout rates presented in Figure 3 of the main paper.

Table A14: Effect of Car Ownership on 2018 General Election Voting Method

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

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

# I Subgroup Effects within Individual Counties

In Figure A6 and Figure A7 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 A8 and A9 we do the same but for the 2016 general and primary elections.

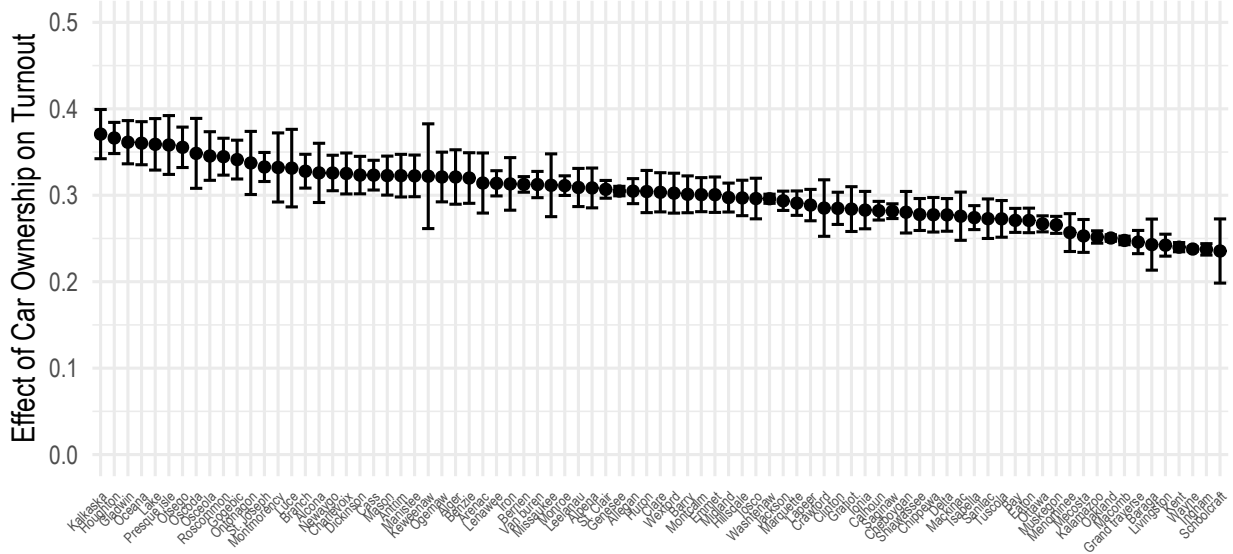


Figure A6: Effect of Car Ownership by County, 2018 General Election

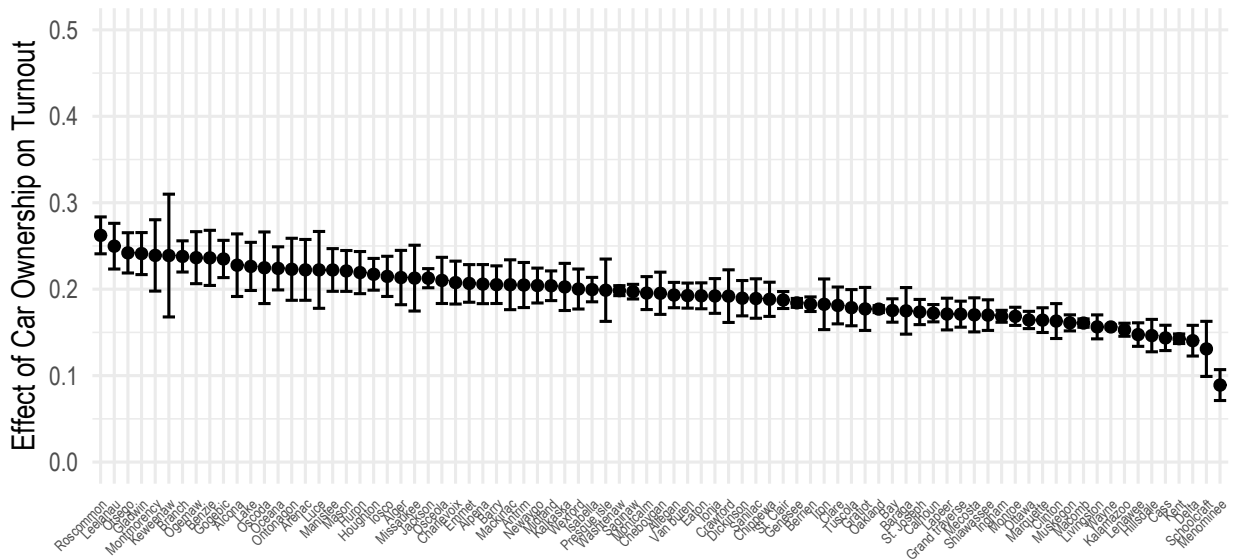


Figure A7: Effect of Car Ownership by County, 2018 Primary Election

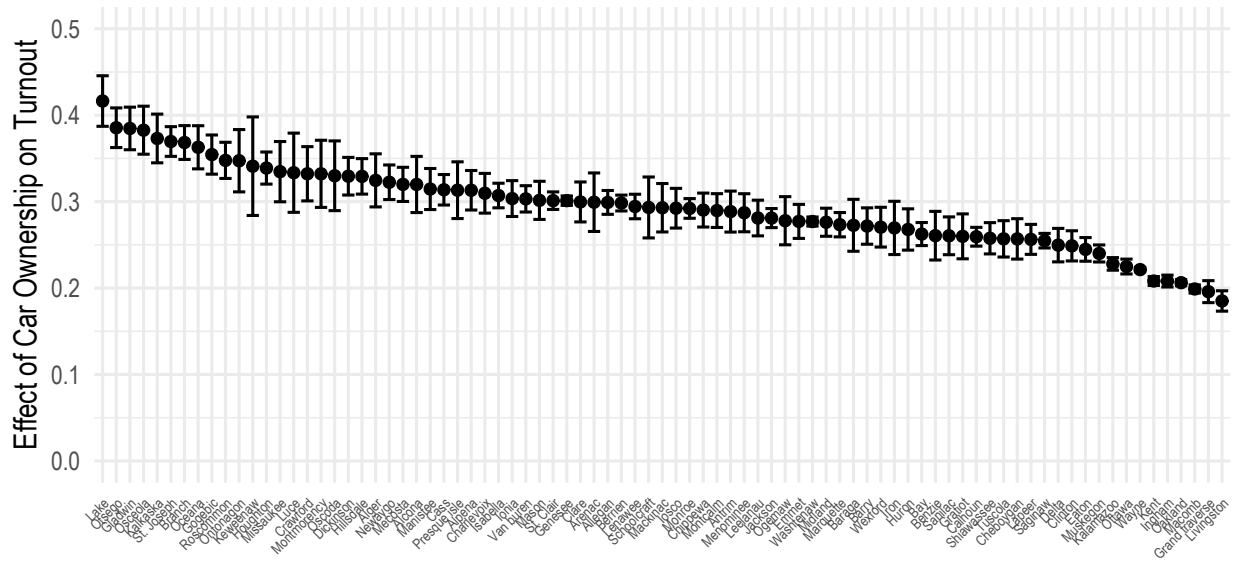


Figure A8: Effect of Car Ownership by County, 2016 General Election

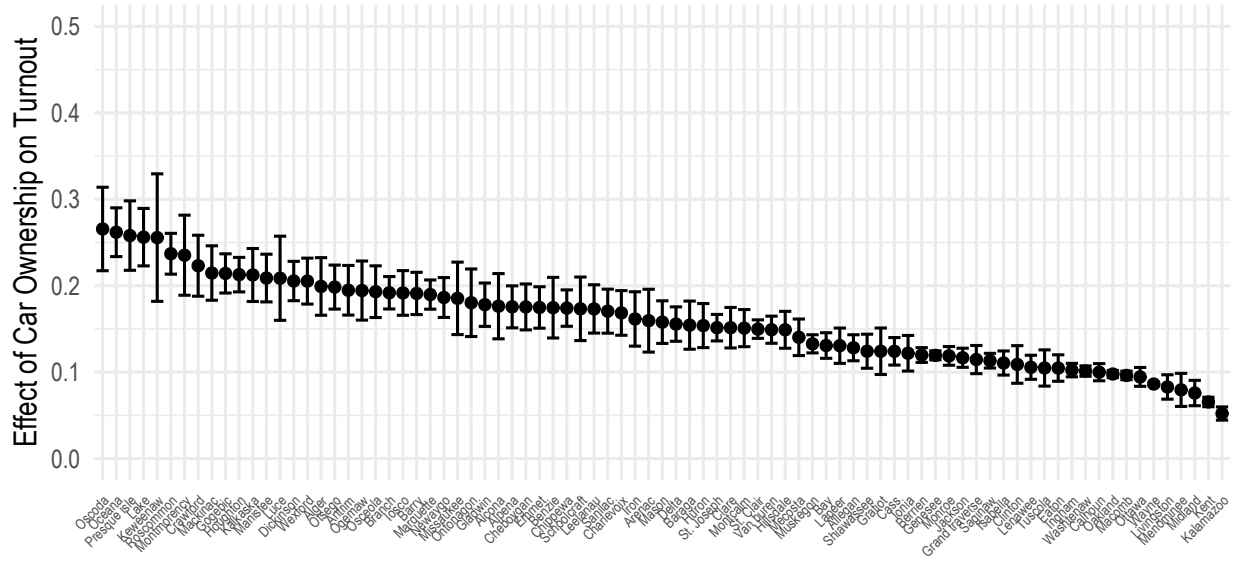


Figure A9: Effect of Car Ownership by County, 2016 Primary Election