

RESEARCH NOTE

# Driving turnout: the effect of car ownership on electoral participation

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(Received 8 March 2021; revised 11 August 2021; accepted 24 August 2021)

## 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 contributes to the theoretic understanding of political participation as well as the impact of potential policy reforms to solve participatory gaps.

**Keywords:** Political participation; turnout

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 voted 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 toward 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 (Wolfinger and Rosenstone, 1980; Leighley and Nagler, 1992; Aldrich, 1993; Rosenstone and Hansen, 1993). 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 et al., 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 et al., 2006; Haspel and Knotts, 2005). Those registrants 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 people’s 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 people have access to a car, and some have access to reliable and fast public transportation. Other people lack both methods—and the people who lack reliable transportation are more often people of color and less affluent (Schmitt, 2020). Yet existing large-scale surveys of political behavior neglect to ask about car ownership or transportation access and thus ignore its potential impact as it intersects with race- and class-based barriers to participation. 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. Moreover, 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.

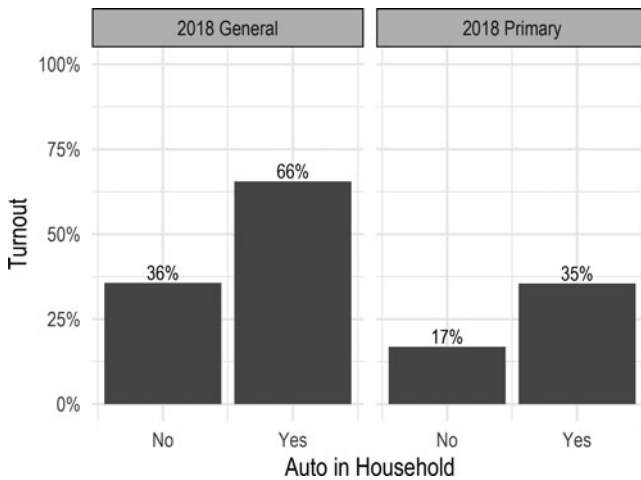
In this paper, we use administrative data on electoral participation and data on car ownership alongside modern causal inference analytic techniques to show that existing explanations of voter turnout miss a critical portion of the voting calculus. Specifically, these fine-grained individual-level data enable us to use powerful causal analytic strategies to compare nearly identical potential voters with access to a car and those 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 registrants' 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 percent of US residents have no access to a car, and while this rate varies across states from 3.8 percent in Wyoming to 29.1 percent in New York, Michigan is typical in that 7.8 percent of the state's residents have no access to a car (U.S. Census Bureau, 2018). We merged the Michigan voter file ( $n = 6,716,936$  registrants), provided by the private data vendor L2, to the complete Michigan auto registration ( $n = 15,983,061$  unique cars) and drivers license ( $n = 6,496,514$  licensed individuals) databases, both provided by the state of Michigan, to identify which people registered to vote had a drivers license and personally owned automobiles or lived in the same household as a car owner.<sup>1</sup> These data

<sup>1</sup>We obtained the drivers license and auto registration databases as the result of a data production request for voting rights litigation. The voter file from the state of Michigan contained an implausibly large number of registrants (over 95 percent of the state's adult population), so we chose to use L2's voter file, which is cleaned and maintained such that "deadwood," or people who have moved and/or are no longer eligible to vote, have been removed. For a review of similar commercial data



**Figure 1.** Participation rates by car ownership.

give us a unique opportunity to learn about the effects of driving and car ownership on voter turnout.<sup>2,3</sup>

## Results

In this section, we present the evidence showing inequalities in participation between registrants 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 percent of those without a car voted in the 2018 general election, 66 percent 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.<sup>4</sup> To account for these individual characteristics, we next analyze turnout in both general and primary elections while controlling for these demographic characteristics using OLS regression. 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 substantively large 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

files, see the Pew Research Center's report: <https://www.pewresearch.org/methods/2018/02/15/commercial-voter-files-and-the-study-of-u-s-politics/>

<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.

<sup>3</sup>We rely on the L2 voter file for data on voters' addresses, voting precincts, age, and sex. We estimate voters' race using the Bayesian Improved Surname Geocoding method from Imai and Khanna (2016).

<sup>4</sup>For instance, as we show in Appendix I, rates of car access are substantially higher among white registrants relative to non-white registrants.

**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)	0.156* (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	6,407,557	409,192	6,140,366	6,140,366	6,140,366	372,898
R <sup>2</sup>	0.081	0.092	0.119	0.220	0.102	0.110	0.128	0.249
Adjusted R <sup>2</sup>	0.081	0.092	0.118	0.137	0.102	0.110	0.128	0.161

Note: \*p < 0.01.

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 and 27 percentage points in the general election and 16 and 17 percentage points in the primary. Given the baseline average turnout levels in the general and primary elections (63 and 34 percent, 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 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 the same building).

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 A5–A8 we replicate our analyses with additional covariates for household income, education, and homeownership, using commercial data available for a subset of registrants. The inclusion of these variables does not alter the magnitude of our results; even controlling for household income and background characteristics, automobile access remains a substantial driver of turnout.<sup>5</sup>

### *The moderating role 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 registrants who live farther from the polls and who therefore would have a

<sup>5</sup>We also replicate the above models in Table A1 for the 2016 elections and in Tables A3 and A4 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 effect of automobile access on turnout that we observe. Interacting automobile access and drivers licenses, shown in Tables A9 and A10, indicate that having access to a car has a large effect on participation whether or not a person has a license.

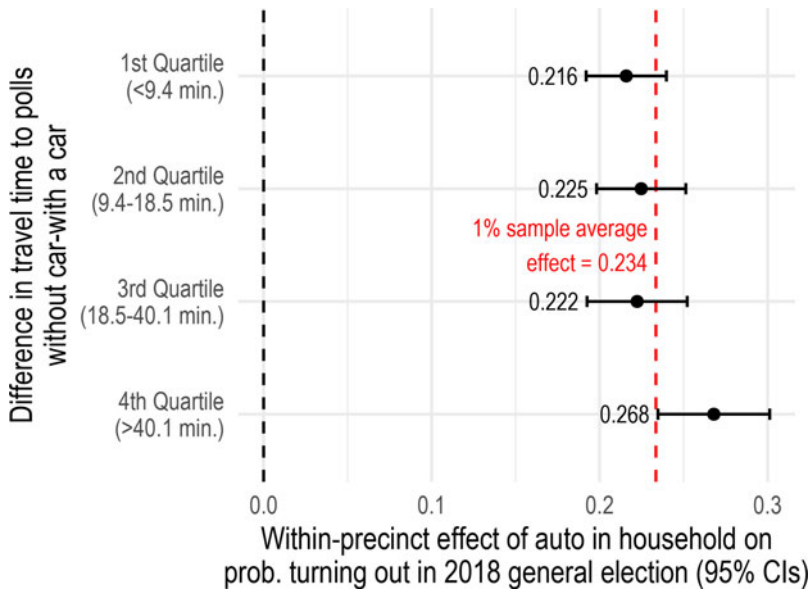


Figure 2. Within-precinct effects of car access on participation rates, by travel time to polls.

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>6</sup> As we show in Appendix Figure A3, 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 registrants. 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), car access has an even larger effect on turnout of 26.8 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>7</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

<sup>6</sup>Specifically, we take a 1 percent random sample of 67,168 registrants 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 A2.

<sup>7</sup>Table A13 presents the full regression results. Table A14 and Figure A4 replicate these results using our within-address sample and address fixed effects, which similarly shows a strong moderating effect of travel time burden.

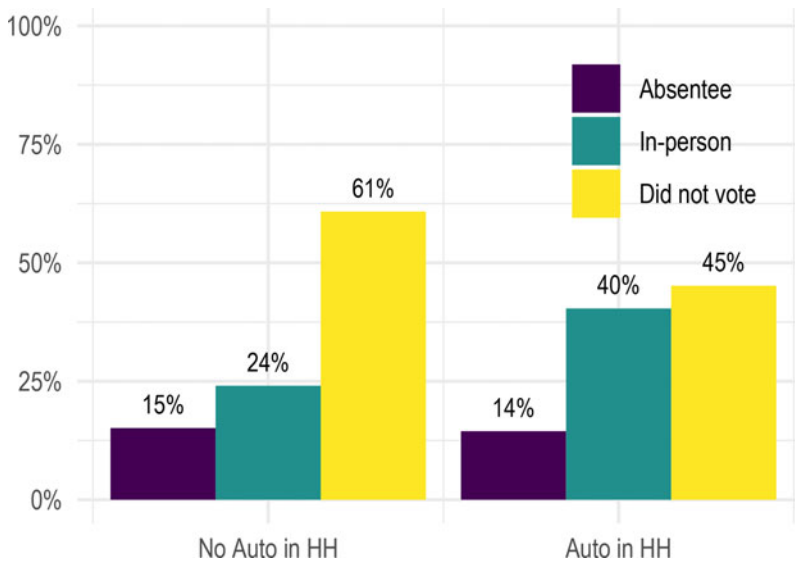


Figure 3. Within-address differences in participation rates by voting method, 2018 General Election.

should have its largest effect on voting *in person*, and much smaller or no 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 in rates of voting in-person between those with and without car access remains. In the 2018 general election, 40 percent of people in this subset of registrants with access to a car voted in-person, while only 24 percent of those without access to a car voted in-person. This difference of 16 percentage points represents a 68 percent 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 A17, reiterate the basic differences shown visually in Figure 3.<sup>8</sup> 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

<sup>8</sup>We also present analyses of the full choice set using multinomial logit regression in Table A18.



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., Rosenstone and Hansen, 1993; Verba et al., 1995).

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 potential voters residing in the same building.<sup>9</sup> 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 potential 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. Disparate access to cars across race and age groups can explain a large portion of race- and age-based disparities in participation. 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 people 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.

**Supplementary material.** The supplementary material for this article can be found at <https://doi.org/10.1017/psrm.2021.67>. To obtain replication material for this article, please visit <https://doi.org/10.7910/DVN/WMDSUU>.

**Acknowledgments.** We appreciate feedback on earlier drafts from Marc Meredith, Spencer Piston, and Sarah Wald.

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<sup>9</sup>We also verify that these differences are not confounded by other demographics using one of the only public survey datasets that tracks car access in Appendix I.



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