The Impact of Voter ID Laws on Voter Turnout.

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1 Introduction

The fundament of democratic governance are regular, free, and fair elections in which citizens cast consequential votes between two or more distinguishable choices. The degree to which a state is considered democratic is measured, in part, through these basic electoral requirements.[1] The sanctity of these elections is a central tenant of any democratic system, upheld by both the mainstream political factions and the citizenry more broadly.

In the American context, two competing desires condition the conduct of American elections; both sincerely held and normatively legitimate positions. The first of these, generally made by the right-wing, is that American elections are susceptible to voter fraud and that this fraud occurs with enough frequency to warrant legitimate concern. Deliberate and politically motivated attempts to undermine democratic outcomes through duplicate voting, vote buying, absentee ballot abuse, and other forms of fraud undermine the sanctity of American elections and result in undemocratic outcomes. The most recent incarnation of this claim is that the expansion of mail-in voting, in response to COVID-19, is a partisan attempt to manipulate the outcome of the 2020 Election[2]. To prevent these abuses, advocates argue that citizens wishing to cast a vote should present some form of identification to ensure the legitimacy of all votes cast. Proponents of this position point to research conducted by the right-wing Heritage Foundation which alleges 1,088 "proven" cases of voter fraud at time of writing.[3]

The countervailing claim, generally made by the left-wing, is that universal suffrage is the superordinate concern in elections. Promoting conditions that will aid, not hinder, every eligible citizen having the same opportunity to cast their vote outweighs, what they view, as largely overstated concerns of voter fraud. They argue that voter ID laws disproportionately affect minority communities, and some argue these laws are a thinly veiled attempt to reverse the gains of the Voting Rights Act of 1965. Critics of voter ID laws note that minority voters are less likely to possess the requisite forms of photo ID than their White counterparts.[4]

The aim of this research is not to adjudicate the normative legitimacy of either position, although it does appear that roughly 1,000 cases of voter fraud are not consequential when compared to the frequency of American elections at all levels and a total population in excess of 300 million citizens. Nonetheless, if a segment of the population perceives the electoral process as suspect, this may have deleterious effects on turnout, feelings of political efficacy, and support for democracy. Both sides appear to have legitimate and sincerely held convictions. It is easy to dismiss either perspective as base partisan maneuvering, but without

[1] https://www.v-dem.net/en/; https://www.systemicpeace.org/polity/polity4.htm; https://freedomhouse.org/report/methodology-freedom-world-2019

[2] https://www.nytimes.com/2020/08/19/nyregion/nj-election-mail-voting-fraud.html

[3] https://www.heritage.org/sites/default/files/voterfraud_download/VoterFraudCases_5.pdf

[4] http://www.projectvote.org/wp-content/uploads/2015/06/AMERICANS-WITH-PHOTO-ID-Research-Memo-February-2015.pdf

explicit evidence it is inappropriate to do so. The balancing of these two imperatives, universal suffrage and electoral sanctity, requires careful consideration with significant consequences for American democracy if the wrong balance is struck.

The 2005 Commission on Federal Election Reform was tasked with finding this appropriate balance. Co-chaired by former President Jimmy Carter and former Reagan White House Chief-of-Staff James Baker, the bipartisan 'Carter-Baker Commission' offered a number of specific recommendations that could strengthen the Federal Election process. First among these was a proposal for a universal voter registration system. The second was a proposal for "a uniform system of voter identification based on the "REAL ID card" or an equivalent for people without a drivers license. To prevent the ID from being a barrier to voting, we recommend that states use the registration and ID process to enfranchise more voters than ever ... We also propose that voters who do not have a photo ID during a transitional period receive a provisional ballot that would be counted if their signature is verified" (E.A.C. 2005, iv).

This call for voter identification was isolated from the surrounding context and, along with the 2002 'Help American Vote Act', was used by Georgia and Indiana as justification to enact 'strict' photo ID laws.[5] These laws require voters to present government issued photo identification to cast a ballot. The constitutionality of these laws faced legal challenge, culminating in the 2008 case of Crawford v. Marion County Election Board in which the Supreme Court upheld the constitutionality of Indiana's photo ID requirement. This case cleared the path for the proliferation of voter ID laws in the following decade, including the strict photo ID requirement. As of the 2018 midterm election, 34 states have some form of voter identification requirement in place, with 7 states strictly requiring photo ID.[6]

Due to the gradual and intermittent adoption of these laws, research exploring the impact of photo ID laws on aggregate and minority turnout remains preliminary. This research aims to contribute to our understanding of this topic by analyzing the aggregate and racial effects of strict, photo ID laws. The rest of this article proceeds as follows; I first discuss the theoretical rationale for the expectation of decreased turnout. Next, I discuss previous research and findings on this topic. I then discuss the identification strategy and the data for this analysis. I detail the findings of this research, before closing with a discussion thereof.

2 Theory

The intuition underlying the expectations of this research - that voter ID laws will reduce aggregate turnout, and disproportionate reduce minority turnout - is relatively straightforward. Downs' (1957) economic theory

[5]Strict here refers to the difference between election officials requesting and requiring identification when voters go to cast their ballots, where strict requirements result in the potential voter not being able to cast their vote if the requirement is not met.

[6]http://www.ncsl.org/research/elections-and-campaigns/voter-id-history.aspx

of political participation suggests this outcome. Downs' argued that the individual choice to vote can largely be attributed to a rational cost-benefit calculation.

$$V = P(B) - C$$

Where V is the probability that one will cast a vote, P is the probability that this vote will be instrumental in deciding the outcome of the election, B is the expected benefit the individual will receive from their preferred candidate winning election, and C are the costs of casting a vote (Downs 1957). The costs of casting a vote can be material, wages forfeited from taking off work and transportation costs for example, as well as informational, the cost of gathering information to cast a reasonably informed ballot. However, the probability that an individual's vote will be instrumental or the deciding vote is functionally zero in most cases. Thus, no matter how great the relative benefits of one's preferred candidate being elected, the costs of voting will outweigh the individuated gains from this act. The conclusion must therefore be that voting is an irrational act.

This irrationality is belied by the fact that millions of citizens vote in elections, casting votes in a wide array of elections. Riker and Ordeshook (1968) proposed a revision of Downs' seminal theory with the addition of a single term.

$$V = P(B) - C + D$$

This revision holds Downs' original theory constant, but adds the D term which the authors term "positive satisfactions" (Riker & Ordeshook 1968, 28). This term captures the more ephemeral or intrinsic benefits of voting - affirming one's belief in the democratic system, letting one's voice be heard, and the socialized satisfaction of being a member of a democratic society, among others (Riker & Ordeshook 1968, 28). The author's term this "citizen duty." (Riker & Ordeshook 1968, 36)

This revision addresses the seeming irrationality of voting under Downs' (1957) original model. Although strictly irrational from an economic perspective, the addition of the psychological and sociological benefits of voting can outweigh the economic costs of the C term. Given the unlikelihood of one's vote being decisive, the remainder of the model can be distilled into a calculation of the C and D terms: where $C > D$, an individual will not cast a vote, and where $C < D$, the citizen will cast their vote. This calculation assumes a reasonable voter, correctly calculating the probability of their vote being decisive. These models are heuristics, and cannot account for the innumerable factors that contribute to an individual's choice to cast a vote.

Individual resources and levels of political efficacy are not uniformly distributed. Individuals of a higher socioeconomic strata are better equipped, all else equal, than those who do not possess the same material

resources. Time, another potential cost to voting, is also unequally distributed and valued. Those employed in high intensity and highly paid professions incur more of a cost for taking the time to vote than others; the lost wages of a CEO taking an hour to go vote are many times greater than those of a minimum wage worker. These highly paid citizens may be better able to incur this cost, but the point is that these costs are relative and subject to individual factors. This calculation also extends to age, where retired individuals may have more time to devote to casting a ballot than those of working age and are more likely to be habitual voters (Gerber, Green, and Shachar 2003).

In the same way that the costs of voting vary by individual, the 'citizen duty' element of this theory is also not uniformly distributed. Brady, Verba, and Schlozman (1995) discuss the importance of civic skills on this model. They define civic skills in a related but dissimilar manner as Riker & Ordeshook (1968) when they state, "the communications and organizational skills that facilitate effective participation" (Brady, Verba, and Schlozman 1995, 271). They argue that these skills are fomented throughout one's life. From parental socialization to religious and community organizations political participation is, partly, the result of belonging to a community that contains a political consciousness. (Brady, Verba, and Schlozman 1995)

This organizational and associational view has distinct corollaries on each of the economic model's terms. First, the perceived benefit of electing a preferred candidate is expanded beyond the self to both material benefits for one's group as well as ideological benefits which transcend the material – gun control activists are less likely to consider the material costs of saving lives, for example. Second, the probability of an individual being the decisive vote is functionally zero, but the probability of a larger group being instrumental in a given vote is non-zero. This results in the 'D' term not being the only positive element in an individual's calculation. Third, the costs of voting may be marginally lower, as gathering the necessary information is less costly. Finally, and most significantly, these civic skills operate in tandem with the original "citizen duty" conceptualization to inflate the 'D' term. Individual's self-satisfaction with voting, affirming one's belief in the political system, will likely be higher but increased civic skills also promote group-based motivations. The psychological desire for in-group membership and status will increase the likelihood of one voting where the organization promotes voting as an aspirational act. Individuals will vote not only to promote the goals of their chosen organization but will also vote, and be seen to vote, to secure their membership and status within their chosen in-group (Brady, Verba, and Schlozman 1995). Partisanship as social identity amplifies these incentives by enmeshing an individual's sense of self-worth with their chosen political faction's electoral performance (Kelly 1988; Greene 1999; Huddy, Mason, and Aarøe 2015).

By adopting this model of rational voting behavior, although deviating from strict economic rationality, the implementation of voter ID laws leads to clear expectations regarding voting behavior. Voter ID laws, despite their stated motivation of decreasing electoral fraud, have two deleterious effects on this model. First,

they increase the costs of voting. For a citizen who does not possess photo identification but is otherwise eligible to vote, the additional cost of obtaining this document will entail material and informational costs that otherwise may have been allocated towards casting a vote. The second negative effect is to potentially reduce the intrinsic benefits of voting. If one perceives the system as biased or illegitimate, a perception exacerbated by the narrative of voter ID laws as a partisan and motivated attempt to affect electoral outcomes, they are less likely to gain any intrinsic satisfaction from participating in such a system. Furthermore, this perception may reduce voter efficacy, the 'P' term, in that they will perceive the outcome of any election as beyond their influence. This is less consequential given the functionally zero value of the 'P' term before voter ID implementation. The outcome of voter ID laws should thus be a reduction in aggregate turnout, and a disproportionate reduction in those communities most susceptible to the added requirements; impoverished, low-education, and low efficacy communities. An elementary formalization of the theoretical expectations of this model is presented below.

It is an unfortunate fact that in America minority communities are less well educated and affluent than their white counterparts. This fact is mirrored in the proportion of minorities that possess acceptable forms of identification under voter ID laws, illustrated in Appendix A Figure 5 and with descriptive graphs of Income and Age by Race in Appendix A Figure 6.[7] It is not clear that, due to a history of disenfranchisement, oppression, and voter suppression efforts, members of minority communities necessarily possess of lower 'civic ethic' than other groups. In fact, mobilization efforts and community organization in these communities may account for why disproportionately lower turnout is not observed in these communities in the absence of voter ID laws (Fraga 2016).

The effects of voter ID laws may be lessened by these same factors; registration and ID drives may offset the extent to which turnout will be suppressed when compared to communities without this existing infrastructure. This research argues that these efforts will not entirely offset the disproportionate effect of voter ID laws on minority communities, but African American community may be more resilient to these laws than, for example, Hispanic communities. The long fought, storied, and continued efforts of African Americans to gain a voice in the United States left a robust grassroots political infrastructure in their wake. Hispanic communities, on the other hand, possess a less robust network of political bodies to offset additional costs to voting. The fact that minority individuals are less likely to possess photo identification than their White counterparts should reduce their likelihood of voting, all else equal.

[7]Data taken from `projectvote.org` and the Census Bureau's ACS

2.1 Quasi-Formal Model

Starting with Riker & Ordeshook's (1968) formalization:

$$V = P(B) - C + D \tag{1}$$

Where in equation 1, V is the likelihood that one will vote, P is the probability that one's vote will be decisive, B is the perceived benefit of having a preferred candidate elected, C are the material, time, and informational costs of voting, and D is the citizen duty and civic skills term; the intrinsic benefits of voting. Assuming $P \equiv 0$, then $P(B) \equiv 0$. As such, the original equation is reducible to $V \equiv D - C$. However V, voting, is a discrete act (V=(0,1)). Thus the more accurate way to denote this relationship is:

$$\nu = D - C \tag{2}$$

where ν is the remainder of the cost-benefit calculation, the expected utility of voting, and $V = 1$ if $\nu > 0$ and $V = 0$ if $\nu \leq 0$, assuming inaction where indifferent.[8]. I then add two terms related to the increased costs voter ID laws place on the voter. X denotes the additional material and informational cost of obtaining an acceptable form of photo identification. As these costs are zero only for those who already possess an acceptable form of ID, $X \geq 0$. Y denotes the negative effect on feelings of efficacy and inclusion in the political system. Given likely feelings of alienation and loss in democratic sentiment, for most voters under consideration here, $Y \leq 0$. It is possible that some may feel that these laws are a legitimate and worthwhile attempt to curtail voter fraud; in this case, $Y > 0$. Thus, Y=$(-\infty, \infty)$ although the effect of this term are likely marginal and heavily negatively skewed. We can thus rewrite this as equation 3 where ν' is the expected utility of voting under a voter ID law. This is the "calculus of voting" under a voter ID regime.

$$\nu' = D + Y - C - X \tag{3}$$

Four resultant scenarios emerge from the implications of equation 3, corresponding to changes in political behavior. Listed in order of likelihood.

- ▷ $X > 0$, and $Y < 0$
  - This results in $\nu > \nu'$, and thus decreasing the likelihood of voting. Taken in aggregate, this would decrease overall election turnout, especially amongst low-income and low-educated citizens.
- ▷ $X > 0$, and $Y = 0$

[8] Riker & Ordeshook (1968) use b in lieu of ν I use ν for visual consistency with V.

- Again, this results in $\nu > \nu'$, and thus decreasing the likelihood of voting. Taken in aggregate, this would decrease overall election turnout especially amongst low-income citizens.

▷ $X = 0$, and $Y < 0$

- Again, this results in $\nu > \nu'$, and thus decreasing the likelihood of voting. Taken in aggregate, this would decrease overall election turnout especially amongst low-educated citizens.

▷ $X = 0$, and $Y > 0$

- This is the unique case, where the individual would be more likely to vote following the adoption of voter ID laws ($\nu < \nu'$). This person would already possess an acceptable form of ID and would not have to change their voting-day behavior in any way. They must also view electoral fraud as a legitimate threat to elections remedied by voter ID laws. In all likelihood this marginal case will be overshadowed by the larger number of voters who abstain from voting following implementation of the voter ID law. It is unlikely, although not impossible, that an individual will choose to vote in the election following ID adoption, where they those chose to abstain in the previous, solely on the basis of the newly implemented voter ID regime.

These consequent expectations are presented graphically below, in Figure 1.

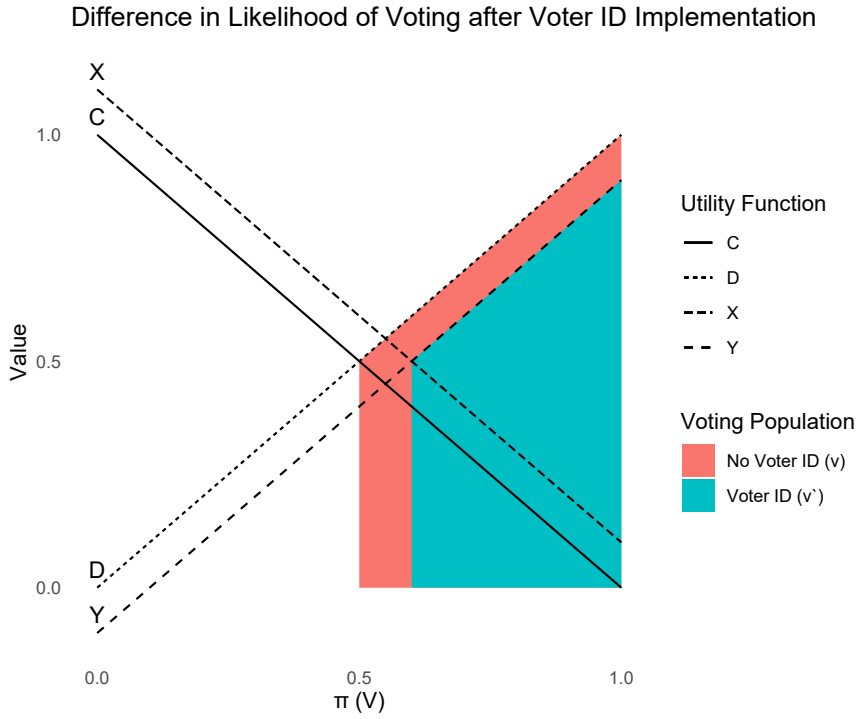


Figure 1: Implication of Formal Model

Where the lines C, D, X, and Y correspond to their previous definitions. The red shaded region illustrates the area relating to the proportion of expected voters under no voter ID law regime, whereas the blue shaded area illustrates the proportion of expected voters following the implementation of the voter ID legislation. Due to the added costs, denoted by X, and the decreased intrinsic satisfaction from voting, denoted by Y, the proportion of voters (turnout rate) should be less under a voter ID regime, all else equal.

2.2 Hypotheses

These theoretical premises yield two testable hypotheses:

- ▷ H_1: Voter ID laws will reduce overall turnout, compared to areas without these laws.
- ▷ H_2: Voter ID laws will reduce minority turnout to a greater extent than White turnout, compared to areas without these laws.

3 Previous Research

The relatively recent and gradual adoption of Voter ID laws has limited the amount of research conducted on this topic, despite the salience of this issue. Nonetheless, several studies have attempted to examine the impact of these laws. This research can be grouped into three categories on the basis of their findings: no impact, no racial impact, and a racial impact.

Early attempts to isolate the effect of voter ID laws contended with data scarcity, as the number of states having adopted these laws were limited. Possibly due to this factor, early attempts to study the impact of these laws concluded no effect on either aggregate or minority turnout (Alvarez et al. 2008; Ansolabehere 2009; Mycoff et al. 2009; Hood & Bullock 2012). These studies also rely heavily on self-reporting to measure turnout, which may bias turnout levels upwards due to respondent's social desirability bias (Karp and Brockington 2005). The following decade saw the proliferation of strict photo ID laws with a larger pool of sample cases to examine. A more recent study, not subject to the previously limited data, also concluded that voter ID laws have no effect on turnout, aggregate or minority (Heller et al. 2019). However, this study relies on the Census Bureau's self-reported turnout measure. Moreover, it does not appear that this analysis used panel corrected standard errors and thus their lack of results could be result of a failure to account for non-spherical disturbances. The authors did use both state and year fixed-effects, but this is a suboptimal, inefficient approach when analyzing time-series, cross-sectional data (Gelman & Hill 2007). More robust approaches explicitly account for the sources of the non-spherical disturbances caused by variance across groups and over time.

Shifting from null findings, to no racial findings, several studies have concluded that voter ID laws decrease the turnout of less affluent and less educated voters. Alvarez and his colleagues, while finding no disparate effect on minority turnout, find that voter ID laws decrease turnout on these bases (Alvarez et al. 2008). An unpublished manuscript found similar findings and found mixed results regarding a racial effect, although these findings are questionable due to the lack of peer-review (Vercellotti & Anderson 2006). Finally, Barreto and his colleagues illustrate the disparity in ID possession rates by income, education and age (Barreto et al. 2009). These results support the theory underlying the first hypothesis presented here.

Finally, a somewhat controversial study concluded that voter ID laws have a disproportionate, negative effect on minority turnout (Hajnel et al. 2017). This study used the validated vote measure from the CCES (Cooperative Congressional Election Study) over 51 elections between 2006 and 2014, and found minority turnout, specifically Hispanic turnout, was decreased by stricter voter ID laws - even where including measures of education, age, and income. However, the methodology and findings of this research were criticized in a direct rebuttal of this article (Grimmer et al. 2018). Grimmer and his colleagues argue that Hajnal and his colleague's model was misspecified, the data were suboptimal, and ultimately the findings could thus not be relied upon. Hajnal and his fellow authors responded with their own rebuttal (Hajnal et al. 2018), but the findings of their original research remain questionable. Pryor et al. (2019) attempted to replicate the findings of Hajnal et. al. (2017), but their analysis contends with the same issues of Hajnal et. al.'s (2017) work (Pryor et. al. 2019). This research incorporates the lessons of previous research by leveraging an expanded scope and more appropriate identification strategy to study the effect of voter ID laws on turnout.

4 Identification Strategy

The ideal approach to study the effect of voter ID laws is a field experiment, randomly assigning voting precincts to either the control condition, no voter ID restrictions, or the treatment condition, the voter ID laws that are the focus of this research. Notwithstanding the practical and ethical considerations of such a design, data collection on factors of interest at this level are either sporadic or non-existent. Given these limitations, the next-best approach is to identify a natural experiment and examine the difference between the treated and control groups.

This approach relies on the assumption that ID Law adoption is exogenous to political outcomes. Between 2008 and 2018, 10 states adopted strict, photo identification voting requirements: Arkansas, Georgia, Indiana, Kansas, Mississippi, North Dakota, Tennessee, Texas, Virginia, and Wisconsin. These varied in their duration, with laws subject to judicial review or legislative repeal. Less strict Voter ID laws also

proliferated with only 24 states having no such legislation by 2018.

This approach relies on the assumption that ID Law adoption is exogenous to political outcomes. The clearest barrier to terming the adoption of these laws as a natural experiment is that the motivations for adopting such laws may be correlated with the outcome of interest - turnout. Specifically, given the claims of minority suppression and partisan motivations, the adoption of these laws may have been in response to increased minority turnout or partisan trends towards the Democratic party. As illustrated in Appendix B, Figure 7, the demographic composition of these states during this period is relatively static. Turnout rates by ethnicity, illustrated in Figure 5, are also static during this period. It is impossible to determine if the adoption of these laws was driven by an explicit desire to suppress minority votes, but clear evidence that the adoption of these laws was driven by increased minority vote share is absent.

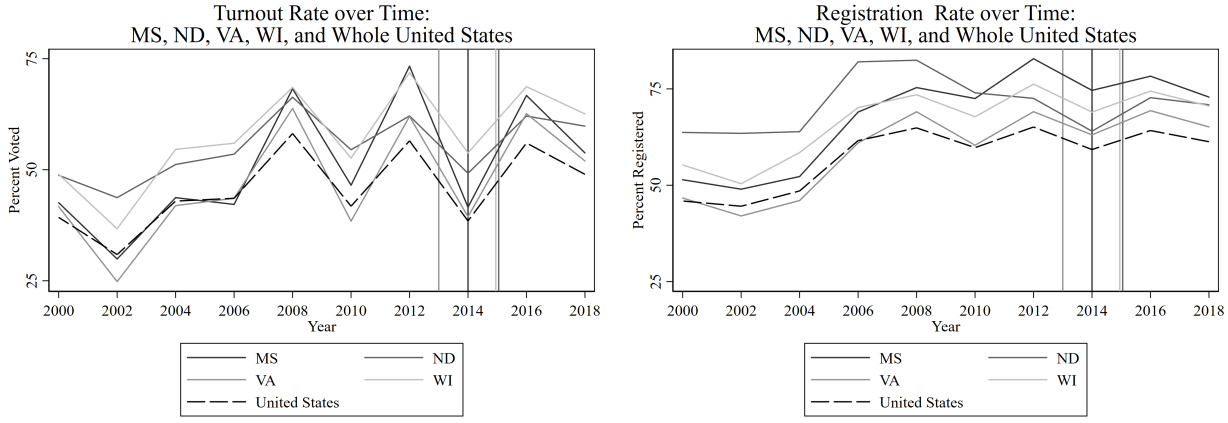
The other explanation which would result in endogenous adoption is partisan motivation. This is a more difficult explanation to refute as all of the states adopting strict ID measures have skewed Republican in recent elections, especially at the state level where such legislation is implemented [9]. Despite this suggestive evidence, I argue that the source of Voter ID laws is not partisan outcomes *per se*, rather that Voter ID laws have become an effective rhetorical tool of the Republican Party.

I argue the source of voter ID laws is the delayed effect of Crawford v. Marion County, high-profile instances of voter fraud, and a social learning effect. The recommendations of the Carter-Baker commission (2005), and the holding of the Supreme court in Crawford (553 U.S. 181), created the incentive for states to enact legislation strengthening their election process. Alone this would be insufficient to explain the proliferation of voter ID laws, given the relative independence of state legislatures. However, this incentive combined with reporting on confirmed instances of voter fraud provide lawmakers with a politically salient message upon which to campaign. [10] Local and state politicians seize upon the, perhaps inflated, concern of election fraud, and campaign with claims of protecting the sanctity of elections; Governor Scott Walker of Wisconsin, for example, claimed that Voter ID was "the most pressing issue" of the 2014 election (Spicuzza & DeFour 2014). Other politicians observe this success, and seek to replicate it to their own electoral benefit. The result is an exogenous shock on the basis of wedge issue politics and the drive to be elected, not explicit attempts to suppress voters. Donald Trump has no authority to impose restrictions on voting-by-mail in the 2020 election – a decision wholly the purview of the individual States. Rather, he is using the issue as a means by which to motivate his voters to get out to the polls and preemptively undermine a potential

[9] Arkansas, Georgia, Indiana, Kansas, Mississippi, North Dakota, Tennessee, Texas, Virginia, and Wisconsin

[10] http://archive.jsonline.com/news/milwaukee/prosecutors-charge-10-with-voter-fraud-4t98ni8-199446341.html/; https://www.hattiesburgamerican.com/story/news/local/hattiesburg/2015/04/01/man-pleads-guilty-voter-fraud/70787186/; https://www.usatoday.com/story/sports/ncaaf/mvc/2012/10/02/north-dakota-state-players-plead-guilty-to-petition-fraud/1608409/; https://www.roanoke.com/archive/ex-mayor-to-plead-guilty-in-vote-fraud-case/article_a5bb2cd8-a966-559a-ac3c-ffd955dc520b.html

election loss. [11]. We cannot be certain of as-if random assignment nor the exogeneity of the treatment but for purposes here I can be reasonably confident in this approach.



(a) Turnout Rates over Time

(b) Registration Rates over Time

Figure 2: Income and Age Distributions, by Race

The most appropriate method is therefore a difference-in-difference approach, analyzing different levels of turnout between the control and treatment groups; no voter-ID laws, and strict photo ID laws respectively.[12] Due to the unavailability of data at the precinct level, this analysis instead uses county-level data for Presidential elections, Congressional District-level data for House races, and State-level data for Senate races. A prerequisite of using this approach is that the treated and control groups both have corresponding trends in the outcome variable of interest, here turnout rates, before the treatment was assigned; parallel trends. Illustrated above in Figure 2, with state-by-state illustrations in Appendix D, we observe the existence of parallel trends prior to the adoption of voter ID laws, by state.[13] The level of analysis is the area-year.

5 Data & Methods

The data for this analysis come from the Census Bureau's American Community Survey (ACS)[14] for the demographic characteristics, the National Conference of State Legislatures (NCSL) for the voter ID law measures[15], and from MIT's Election Data and Science Lab for the election data.[16] The outcome variable of interest, turnout, is measured as a proportion of the population who cast a vote in the examined election.

[11] https://www.politico.com/news/2020/08/08/trump-wants-to-cut-mail-in-voting-the-republican-machine-is-helping-him-392428

[12] Strict means, per the NCSL definition, that one is not allowed to vote to given a provisionally ballot if they do not meet the appropriate requirements – in this case a government issued photo ID.

[13] Also included is an illustration of registration rates over time, similarly displaying the characteristic of parallel trends, which will be discussed as a factor that could affect the results.

[14] https://www.census.gov/programs-surveys/acs/data.html

[15] http://www.ncsl.org/research/elections-and-campaigns/voter-id-history.aspx

[16] https://electionlab.mit.edu/

This is necessarily suboptimal, as registration rates vary across geographic areas. However, it is less likely that registration rates vary greatly across election cycles within the same area. Any increased trend in registration rates are unlikely to be localized in a single state or county. Moreover, registration data at the country and district state level are not readily available. The benefits of robustly examining the relationship of voter ID laws on turnout at different levels and during different elections outweighs the costs of not using an outcome measure including registration rates.

The difference-in-difference estimator, the primary explanatory variable, is a binary measure denoting treatment. Treatment here denotes the implementation of a strict phot ID requirement. The measure of voter ID laws come from the NCSL website, where voter ID laws are categorized by their severity [17].

The second hypothesis of this study posits a racial effect of voter ID laws. To examine this effect, I use the proportion of the state, district, or county comprised of the four major racial groups in the United States: Asian, Black, Hispanic, and White. To isolate this racial effect and avoid issues of multicollinearity, these are specified in four separate models. Previous research has shown that voter ID affects turnout through income and education (Alvarez et al. 2008). Another repeatedly robust finding is that turnout is also affected by age (Bhatti et al. 2012). I include these measures, in what I term the 'full' models, to account for the most significant findings of previous research on this topic. From a theoretical perspective, education, income, and age affect the voter's calculation of casting a vote and thus their exclusion from analysis would be inappropriate. Income is measured as the area's median income, in thousands. Education is measured as the percentage of the county population having a bachelor's degree or higher. Age is measured as the area's median age.[18]

I use a series of linear regression models, with the Huber-White variant of standard errors clustered at the geographic area level, to study the hypothesized effect of voter ID laws on turnout via a difference-in-difference estimator, by both overall and by racial composition. To account for the influence of serial correlation on the model estimates, I include a lagged measure of turnout; turnout in the previous election. The inclusion of this term mitigates the effects of serial correlation by explictly modeling the source of this disturbance; the most influential factor on this year's turnout rate is last election's turnout rate. The clustered standard errors for each area accounts for group-specific heteroscedastic residuals on the coefficient estimates. I use this approach in lieu of a fixed effects model as this specification is both simpler and more efficient. Moreover, a fixed-effects approach would result in each 'group' containing less than 10 observations, rendering estimation of the area-specific disturbances unreliable. Similarly, the data used unfortunately do not allow for the use of a more sophisticated model such as a 'random effects' or multi-level approach to explicitly model any

[17] `http://www.ncsl.org/research/elections-and-campaigns/voter-id-history.aspx`

[18] Each of these measures are taken from the ACS. Descriptive statistics for each of these variables can be found in Appendix E, Table 3, with illustrations of the distribution of the variables in Figure 17.

macro effect - the number of observations per group/cluster does not approach sufficiency.

I estimate the effect of voter ID laws on turnout both with and without the county characteristics of age, income, and education. I term the models without the factors of age, income, and education the 'focused' models, and with the factors as the 'full' models. The 'full' models are a better analysis of the effect under study, while the 'focused' models isolate the effect of voter ID laws but are susceptible to omitted variable bias. Model specifications are presented below.

5.1 Model Specification

5.1.1 'Focused' Models

$$Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 T + \epsilon_{it} \tag{4}$$

$$Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 T + \beta_3 R_r + \beta_4 T R_r + \epsilon_{it} \tag{5}$$

5.1.2 'Full' Models

$$Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 T + \beta_5 \chi_1 + \beta_6 \chi_2 + \beta_7 \chi_3 + \epsilon_{it} \tag{6}$$

$$Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 T + \beta_3 R_r + \beta_4 T R_r + \beta_5 \chi_1 + \beta_6 \chi_2 + \beta_7 \chi_3 + \epsilon_{it} \tag{7}$$

Where Y_{it} is turnout in the election under study, Y_{it-1} is turnout in the previous election (the lagged term), and T is the treatment or implementation of strict photo ID law. T is defined as:

$$T = E(Y_{it}|T = 1) - E(Y_{it}|T = 0) \tag{8}$$

R_r is the racial composition of county of asian, black, hispanic, and white residents. As I model each racial proportion separately, to avoid issues of multicollinearity and isolate the effect of each race, the subscript r denotes each of these models: asian, black, hispanic, and white residents. χ_1 is the median age of the analysis area, χ_2 is the median income, in thousands, of the analysis area, χ_3 is the percent of a the analysis area with a bachelor's degree, β_k are the estimated effect of these covariates, and ϵ_{it} is the error term. The clustered Huber-White standard error calculation decompose ϵ_{it} into:

$$\epsilon_{it} = \upsilon_i + \nu_{it} \tag{9}$$

Where υ_i is the county specific heteroscedastic variance, and ν_{it} is the remaining residual term, where

$\nu_{it} \sim N(0, \sigma^2)$.

6 Findings

The results of these models are presented below in Tables 1 and 2, where Table 1 presents the 'Focused' models and Table 2 presents the 'Full' models. In both sets of models, the results of Senate elections show neither an aggregate nor racial effect of strict photo ID laws on turnout. This is likely due to the lower number of elections during the examined period, and the low resolution level of analysis – the state level. The analyses of House and Presidential elections offer a better examination of any possible effect, as the District and county level contain more variation in the factors of interest and offer greater statistical leverage due to the greater number of cases.

In both the full and focused models (Tables 1 and 2 respectively) strict photo ID laws decrease aggregate turnout, though this relationship is not evident on House elections in the full model. The only observed racial effect, the proportion of Asian residents in Presidential elections, is eliminated once the other demographic factors are included in the model. This analysis thus offers no support for the second hypothesis, that strict voter ID laws disproportionately affect minority communities. These analyses do provide suggestive evidence in support of the first hypothesis, that voter ID laws decrease aggregate turnout.

These analyses also serve to provide further support for well-established findings regarding turnout – increased median age, income, and education are all positively associated with higher levels of turnout throughout the 'full' models. General election years also see approximately an 18 to 20 percent increase in House election turnout compared to midterm elections, while the effect is approximately halved in Senate elections. Most significant of these findings is the effect magnitude of median age, as each year increase in median age roughly corresponds to a 0.5 percent in turnout.[19]

These results raise another question: what is driving the negative aggregate effect of these laws on turnout if not a disparate racial impact? In addition to the previously established demographic factors, the impact of general elections on increasing turnout is remarkably high.[20] To explore this relationship, I performed an additional series of analyses examining if strict photo ID laws exerted a disparate impact on aggregate turnout in Midterm elections. These results are presented below in Table 3. Presidential elections are clearly not within the purview of Midterm elections, so these models only examine the impact on Senate and House races. I analyze this relationship both in isolation, and including the previously discussed demographic factors for a more holistic accounting of the relationship under study.

[19] See Appendix D for descriptive statistics.

[20] I also examined a disparate impact on the three demographic factors, and the only meaningful result found was that photo ID laws interacted with median age were significant in House elections. These results are presented in Appendix E.

Table 1: Focused Models: Effect of Strict Voter ID Laws on Turnout Rates, by Type of Election and Area Racial Composition: 2010-2018.

	Senate Elections					**House Elections**					**Presidential Elections**				
	Full Population	Racial Effect: Asian	Racial Effect: Black	Racial Effect: Hispanic	Racial Effect: White	Full Population	Racial Effect: Asian	Racial Effect: Black	Racial Effect: Hispanic	Racial Effect: White	Full Population	Racial Effect: Asian	Racial Effect: Black	Racial Effect: Hispanic	Racial Effect: White
Treatment	-1.499					-0.676**					-1.540***				
	(1.386)					(0.279)					(0.152)				
	[0.285]					[0.016]					[0.000]				
Interaction: Treatment and Proportion Asian		42.748					4.997					7.420**			
		(65.924)					(10.240)					(3.601)			
		[0.520]					[0.626]					[0.040]			
Interaction: Treatment and Proportion Black			-12.933					0.809					1.340*		
			(12.482)					(1.883)					(0.764)		
			[0.305]					[0.668]					[0.080]		
Interaction: Treatment and Proportion Hispanic				-9.109					-2.567					0.855	
				(38.904)					(1.763)					(3.206)	
				[0.816]					[0.146]					[0.790]	
Interaction: Treatment and Proportion White					-0.645					-1.232					0.041
					(9.852)					(1.698)					(0.706)
					[0.948]					[0.469]					[0.954]
Lagged Turnout	0.145***	0.148***	0.142***	0.145***	0.142***	0.809***	0.795***	0.808***	0.664***	0.684***	0.928***	0.924***	0.922***	0.916***	0.879***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.020)	(0.017)	(0.019)	(0.017)	(0.030)	(0.025)	(0.010)	(0.010)	(0.010)	(0.013)	(0.013)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
General Election Indicator	8.840***	9.179***	8.777***	9.127***	9.462***	20.451***	20.263***	20.445***	18.395***	18.777***	–	–	–	–	–
	(0.732)	(0.698)	(0.757)	(0.679)	(0.624)	(0.330)	(0.346)	(0.329)	(0.482)	(0.434)	–	–	–	–	–
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	–	–	–	–	–
Constant	31.913***	33.054***	32.113***	34.276***	19.918***	-1.838***	-0.922	-1.753**	5.784***	-0.909	4.451***	4.723***	5.246***	5.08***2	3.785***
	(0.818)	(0.872)	(1.364)	(1.148)	(2.766)	(0.705)	(0.813)	(0.714)	(1.397)	(0.684)	(0.417)	(0.440)	(0.450)	(0.650)	(0.422)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.009]	[0.258]	[0.014]	[0.000]	[0.185]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
N	112	112	112	112	112	1,321	1,321	1,321	1,321	1,321	810	766	766	810	766
R^2	0.500	0.562	0.508	0.573	0.626	0.677	0.679	0.677	0.695	0.692	0.939	0.941	0.948	0.940	0.948
Number of Clusters	49	49	49	49	49	410	410	410	410	410	810	766	766	810	766

Note: Outcome variable is voter turnout in analysis year election as a percentage, calculated as number of total votes cast over total population in a geographic area. Treatment is a binary variable indicating the implementation of strict photo identification requirements for voting. Lagged Turnout refers to the previous election for House and Presidential elections. Lagged Turnout for Senate elections refers to the previous election wherein the incumbent ran. Robust standard errors in parentheses, *p*-values in brackets. Robust standard errors clustered at the State level for Senate elections, District level for House elections, and County level for Presidential elections. *** p<0.01, ** p<0.05, * p<0.1.

Table 2: Full Models: Effect of Strict Voter ID Laws on Turnout Rates, by Type of Election, Racial Composition, and Pertinent Demographic Factors: 2010-2018.

	Senate Elections					**House Elections**					**Presidential Elections**				
	Full Population	Racial Effect: Asian	Racial Effect: Black	Racial Effect: Hispanic	Racial Effect: White	Full Population	Racial Effect: Asian	Racial Effect: Black	Racial Effect: Hispanic	Racial Effect: White	Full Population	Racial Effect: Asian	Racial Effect: Black	Racial Effect: Hispanic	Racial Effect: White
Treatment	0.144					-0.203					-1.162***				
	(1.203)					(0.284)					(0.136)				
	[0.906]					[0.474]					[0.000]				
Interaction: Treatment and Proportion Asian		-37.832					-18.178*					4.175			
		(60.181)					(10.229)					(3.475)			
		[0.533]					[0.076]					[0.230]			
Interaction: Treatment and Proportion Black			-4.564					0.789					1.150		
			(13.181)					(1.938)					(0.730)		
			[0.731]					[0.684]					[0.115]		
Interaction: Treatment and Proportion Hispanic				-55.857					-3.650*					-0.314	
				(34.956)					(1.989)					(2.919)	
				[0.117]					[0.067]					[0.914]	
Interaction: Treatment and Proportion White					-3.138					-1.391					-0.538
					(9.691)					(1.708)					(0.671)
					[0.748]					[0.416]					[0.422]
Median Age	0.954***	0.955***	0.980***	0.785***	0.792***	0.469***	0.460***	0.502***	0.404***	0.373***	0.214***	0.215***	0.181***	0.213***	0.184***
	(0.254)	(0.229)	(0.251)	(0.206)	(0.191)	(0.042)	(0.039)	(0.046)	(0.037)	(0.038)	(0.017)	(0.017)	(0.017)	(0.017)	(0.015)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Percent Bachelor's Degree, or higher	0.314*	0.335**	0.289	0.434***	0.290	0.084***	0.150***	0.083***	0.104***	0.105***	0.030***	0.051***	0.032***	0.033***	0.048***
	(0.167)	(0.160)	(0.175)	(0.159)	(0.179)	(0.027)	(0.027)	(0.027)	(0.027)	(0.026)	(0.009)	(0.011)	(0.009)	(0.010)	(0.010)
	[0.067]	[0.041]	[0.105]	[0.009]	[0.111]	[0.002]	[0.000]	[0.002]	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]	[0.001]	[0.000]
Median Income, in thousands	-0.162	-0.018	-0.127	-0.216	0.019	0.073**	0.130***	0.081**	0.047	0.059*	0.036**	0.045***	0.022	0.035**	0.025*
	(0.186)	(0.171)	(0.197)	(0.161)	(0.184)	(0.030)	(0.032)	(0.031)	(0.030)	(0.030)	(0.015)	(0.016)	(0.015)	(0.015)	(0.014)
	[0.389]	[0.919]	[0.520]	[0.185]	[0.916]	[0.017]	[0.000]	[0.010]	[0.120]	[0.052]	[0.016]	[0.006]	[0.128]	[0.017]	[0.072]
Lagged Turnout	0.122***	0.115***	0.117***	0.121***	0.108***	0.649***	0.561***	0.646***	0.555***	0.573***	0.839***	0.817***	0.847***	0.825***	0.795***
	(0.022)	(0.020)	(0.023)	(0.019)	(0.019)	(0.024)	(0.025)	(0.025)	(0.032)	(0.028)	(0.017)	(0.020)	(0.017)	(0.023)	(0.022)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
General Election Indicator	9.177***	9.673***	9.200***	9.346***	9.939***	18.679***	17.571***	18.622***	17.275***	17.605***	–	–	–	–	–
	(0.742)	(0.689)	(0.800)	(0.701)	(0.630)	(0.394)	(0.396)	(0.403)	(0.483)	(0.467)	–	–	–	–	–
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	–	–	–	–	–
Constant	-7.776	-12.214	-8.607	-0.684	-20.147**	-18.883***	-17.635***	-20.665***	-10.876***	-15.417***	-2.259***	-1.998***	-0.473	-1.580**	-1.966***
	(9.030)	(8.315)	(9.295)	(7.612)	(8.473)	(1.319)	(1.288)	(1.483)	(1.482)	(1.240)	(0.550)	(0.558)	(0.551)	(0.625)	(0.528)
	[0.393]	[0.148]	[0.359]	[0.929]	[0.021]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.391]	[0.012]	[0.000]
N	112	112	112	112	112	1,321	1,321	1,321	1,321	1,321	810	766	766	810	766
R^2	0.620	0.710	0.629	0.677	0.746	0.725	0.748	0.727	0.734	0.732	0.952	0.955	0.957	0.953	0.959
Number of Clusters	49	49	49	49	49	410	410	410	410	410	810	766	766	810	766

Note: Outcome variable is voter turnout in analysis year election as a percentage, calculated as number of total votes cast over total population in a geographic area. Treatment is a binary variable indicating the implementation of strict photo identification requirements for voting. Lagged Turnout refers to the previous election for House and Presidential elections. Lagged Turnout for Senate elections refers to the previous election wherein the incumbent ran. Robust standard errors in parentheses, *p*-values in brackets. Robust standard errors clustered at the State level for Senate elections, District level for House elections, and County level for Presidential elections. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Effect of Strict Voter ID Laws on Turnout Rates in Midterm Elections, with Demographic Factors: 2010-2018.

	Senate Elections							**House Elections**						
	Isolated Effect	Interaction Effect	Demographic Effect	Racial Effects				Isolated Effect	Interaction Effect	Demographic Effect	Racial Effects			
Treatment	-1.499	-1.004	0.943	0.106	1.428	-0.217	0.006	-0.676**	0.443	0.897**	0.299	0.666	0.002	0.440
	(1.386)	(1.504)	(1.521)	(1.399)	(1.491)	(1.460)	(1.456)	(0.279)	(0.498)	(0.436)	(0.406)	(0.422)	(0.431)	(0.447)
	[0.285]	[0.508]	[0.538]	[0.940]	[0.343]	[0.883]	[0.997]	[0.016]	[0.374]	[0.040]	[0.462]	[0.115]	[0.997]	[0.326]
Midterm	-8.840***	-8.715***	-8.978***	-9.593***	-9.092***	-9.214***	-9.916***	-20.451***	-20.198***	-18.436***	-17.340***	-18.391***	-17.133***	-17.389***
	(0.732)	(0.823)	(0.838)	(0.769)	(0.882)	(0.787)	(0.716)	(0.330)	(0.351)	(0.415)	(0.412)	(0.422)	(0.494)	(0.483)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Interaction: Treatment and Midterm Election		-0.985	-1.580	-0.895	-1.164	-1.202	0.066		-1.942**	-1.912**	-1.858***	-1.819**	-1.558**	-1.795**
		(1.837)	(1.745)	(1.664)	(1.891)	(1.636)	(1.719)		(0.808)	(0.750)	(0.710)	(0.743)	(0.700)	(0.718)
		[0.594]	[0.370]	[0.593]	[0.541]	[0.466]	[0.969]		[0.017]	[0.011]	[0.009]	[0.015]	[0.027]	[0.013]
Age			0.959***	0.957***	0.989***	0.786***	0.792***			0.467***	0.462***	0.499***	0.403***	0.372***
			(0.253)	(0.229)	(0.244)	(0.209)	(0.190)			(0.042)	(0.039)	(0.045)	(0.036)	(0.038)
			[0.000]	[0.000]	[0.000]	[0.000]	[0.000]			[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Income			-0.163	-0.009	-0.114	-0.185	0.010			0.074**	0.132***	0.081***	0.050*	0.058*
			(0.188)	(0.171)	(0.191)	(0.164)	(0.177)			(0.030)	(0.032)	(0.031)	(0.030)	(0.030)
			[0.388]	[0.961]	[0.552]	[0.264]	[0.957]			[0.016]	[0.000]	[0.010]	[0.100]	[0.054]
Education			0.315*	0.319**	0.282	0.387**	0.297*			0.084***	0.143***	0.084***	0.101***	0.107***
			(0.169)	(0.155)	(0.174)	(0.159)	(0.174)			(0.026)	(0.026)	(0.027)	(0.027)	(0.026)
			[0.068]	[0.046]	[0.112]	[0.019]	[0.093]			[0.002]	[0.000]	[0.002]	[0.000]	[0.000]
Racial Proportion: Asian				-39.308***							-27.700***			
				(6.867)							(3.741)			
				[0.000]							[0.000]			
Racial Proportion: Black					-8.326							3.540***		
					(7.415)							(0.826)		
					[0.267]							[0.000]		
Racial Proportion: Hispanic						-18.547***							-7.125***	
						(6.220)							(1.098)	
						[0.004]							[0.000]	
Racial Proportion: White							17.405***							4.953***
							(3.241)							(0.828)
							[0.000]							[0.000]
Lagged Turnout	0.145***	0.146***	0.123***	0.115***	0.117***	0.122***	0.108***	0.809***	0.808***	0.648***	0.559***	0.645***	0.557***	0.574***
	(0.021)	(0.021)	(0.021)	(0.019)	(0.023)	(0.019)	(0.019)	(0.017)	(0.017)	(0.024)	(0.025)	(0.024)	(0.032)	(0.028)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Constant	40.752***	40.674***	1.124	-2.500	-0.018	8.769	-9.885	18.612***	18.530***	-0.239	-0.037	-2.041	6.299***	2.253*
	(1.058)	(1.106)	(8.974)	(8.307)	(8.825)	(7.615)	(8.273)	(0.549)	(0.546)	(1.447)	(1.387)	(1.610)	(1.368)	(1.282)
	[0.000]	[0.000]	[0.901]	[0.765]	[0.998]	[0.255]	[0.238]	[0.000]	[0.000]	[0.869]	[0.979]	[0.206]	[0.000]	[0.080]
N	112	112	112	112	112	112	112	1,321	1,321	1,321	1,321	1,321	1,321	1,321
Adjusted R^2	0.486	0.482	0.596	0.688	0.601	0.648	0.725	0.677	0.678	0.724	0.747	0.727	0.733	0.731
Clusters	49	49	49	49	49	49	49	410	410	410	410	410	410	410

Note: Outcome variable is voter turnout in analysis year election as a percentage, calculated as number of total votes cast over total population in a geographic area. Treatment is a binary variable indicating the implementation of strict photo identification requirements for voting. Midterm Election is a binary variable indicating off year election. Age is measured as the median age of the geographic area. Income is measured as the median income of the geographic area. Education is the percent of the geographic area with a bachelor's degree, or higher. Racial proportions are measured as what proportion of the population is of the specified race in the geographic area. Lagged Turnout refers to the previous election for House elections. Lagged Turnout for Senate elections refers to the previous election wherein the incumbent ran. Robust standard errors in parentheses, p-values in brackets. Robust standard errors clustered at the State level for Senate elections, District level for House elections. *** p<0.01, ** p<0.05, * p<0.1.

These results illuminate the most substantial effects of strict photo ID laws. These laws do not appear to exert any influence above the normal midterm decline in voter turnout for Senate elections. Rather, the results here indicate that the effect of voter ID laws are concentrated in Midterm House elections. The effect of these laws is to decrease turnout by between 1.5 and 2 percent below the baseline midterm effect. This effect remains significant even with the inclusion of the other demographic factors.

7 Discussion

These results provide suggestive evidence in favor of the first hypothesis' proposed aggregate effect of voter ID laws, although these findings are far from confirmatory. This analysis finds no support for the primary focus of this research, that voter ID laws disportionately affect minority turnout. However, this research provides a novel finding that the primary impact of voter ID laws is not due to a racial, socioeconomic, or even age effect. Rather, voter ID laws disproportionately decrease turnout for Midterm House elections.

This finding meets with the theoretical expections of this research. The percieved benefits of an electoral victory are smaller than those in General elections. Midterm elections recieve less attention, and grassroots mobilization efforts may also be lower. This has the effect of decreasing both the 'B' and 'D' terms, while the relative costs of accessing pertinent information are higher, increase the 'C' term. The voter ID laws that form the focus of this research are necessarily the result of State legislation. It may be the case that any racial effects are concentrated in State elections. Future research will examine this possibility, as well as incorporate the results of the 2020 General Election.

The potential policy implications of these findings are consequential for the conduct of American elections. Voter ID laws appear to decrease aggregate turnout, especially in Midterm elections. Despite the comparatively lower attention they are paid, these elections are neither inconsequential nor predetermined. The Consitution envisions the House of Representatives as the most democratically accountable body to the citizenry. The evidence presented herein suggests that voter ID requirements, especially of the strict photo variety, undermine this connection to a significant extent. The normative desire for an engaged citizenry is stimied by these restrictions. The adoption of such laws must be carefully weight against the negative effects shown herein.

8 References

Alvarez, R. Michael, Delia Bailey, and Jonathan N. Katz. 2008. "The Effect of Voter Identification Laws on Turnout. *California Institute of Technology Social Science Working Paper*, (1267R)

Ansolabehere, Stephen. 2009. "Effects of Identification Requirements on Voting: Evidence from the Experiences of Voters on Election Day." *PS: Political Science & Politics* 42(1): 127-130.

Baretto, Matt A., Stephen A. Nuño, and Gabriel R. Sanchez. 2009. "The Disproportionate Impact of Voter-ID Requirements on the Electorate: New Evidence from Indiana." *PS: Political Science and Politics* 24(1): 111-116.

Bhatti, Yosef, Kasper M. Hansen, and Hanna Wass. 2012. "The Relationship between Age and Turnout: A Roller-Coaster Ride." *Electoral Studies* 31(3): 588-593.

Brady, Henry E., Sidney Verba, and Kay L. Schlozman. 1995. "Beyond SES: A Resource Model of Political Participation." *American Political Science Review* 89(2): 271-294.

Crawford v. Marion County Election Bd. 553 U.S. 181 (2008).

Downs, Anthony. 1957. "An Economic Theory of Political Action in a Democracy." *Journal of Political Economy* 65(2):135-150.

Fraga, Bernard L. 2016. "Candidates or Districts? Reevaluating the Role of Race in Voter Turnout." *American Journal of Political Science* 60(1): 97-122.

Gelman, Andrew, and Jennifer Hill. 2007. *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge University Press: New York.

Gerber, Alan S., Donald P. Green, and Ron Shachar. 2003. "Voting may be Habit Forming: Evidence from a Randomized Field Experiment." *American Journal of Political Science* 47(3): 540-550.

Greene, Steven. 1999. "Understanding Party Identification: A Social Identity Approach." *Political Psychology* 20(2): 393-403.

Grimmer, Justin, Eitan Hersh, Marc Meredith, Jonathan Mummolo, and Clayton Nall. 2018. "Obstacles to Estimating Voter ID Laws' Effect on Turnout." *Journal of Politics* 80(3): 1045-1051.

Hajnal, Zoltan, Nazita Lajevardi, and Lindsay Nielson. 2017. "Voter Identification Laws and the Suppression of Minority Votes." *Journal of Politics* 79(2): 363-379.

Hajnal, Zoltan, John Kuk, and Nazita Lajevardi. 2018. "We All Agree: Strict Voter ID Laws Disproportionately Burden Minorities." *Journal of Politics* 80(3): 1052-1059.

Heller, Lauren R., Jocelyne Miller, and E. Frank Stephenson. 2019. *Atlantic Economic Journal* 47(2): 147-157.

Hood, M. V., and Charles Bullock. 2012. "Much Ado about Nothing? An Empirical Assessment of the Georgia Voter Identification Statute." *State Politics and Policy Quarterly* 12(4): 394–414.

Huddy, Leonie, Lilliana Mason, and Lene Aarøe. 2015 "Expressive Partisanship: Campaign Involvement, Political Emotion, and Partisan Identity." *American Political Science Review* 109(1): 1-17.

Karp, Jeffrey A., and David Brockington. 2005. "Social Desirability and Response Validity: A Comparative Analysis of Overreporting Voter Turnout in Five Countries." *Journal of Politics* 67(3): 825-840.

Kelly, Caroline. 1988. "Intergroup Differentiation in a Political Context." *British Journal of Social Psychology* 27(4): 319-332.

Mycoff, Jason D., Michael W. Wagner, and David C. Wilson. 2009. "The Empirical Effects of Voter-ID Laws: Present or Absent?" *PS: Political Science & Politics* 42(1): 121–126.

Pryor, Ben, Rebekah Herrick, and James A. Davis. 2019. "Voter ID Laws: The Disenfranchisement of Minority Voters?" *Political Science Quarterly* 134(1): 63-83.

Riker, William H., and Peter C. Ordeshook. 1968. "A Theory of the Calculus of Voting." *American Political Science Review* 62(1): 25-42.

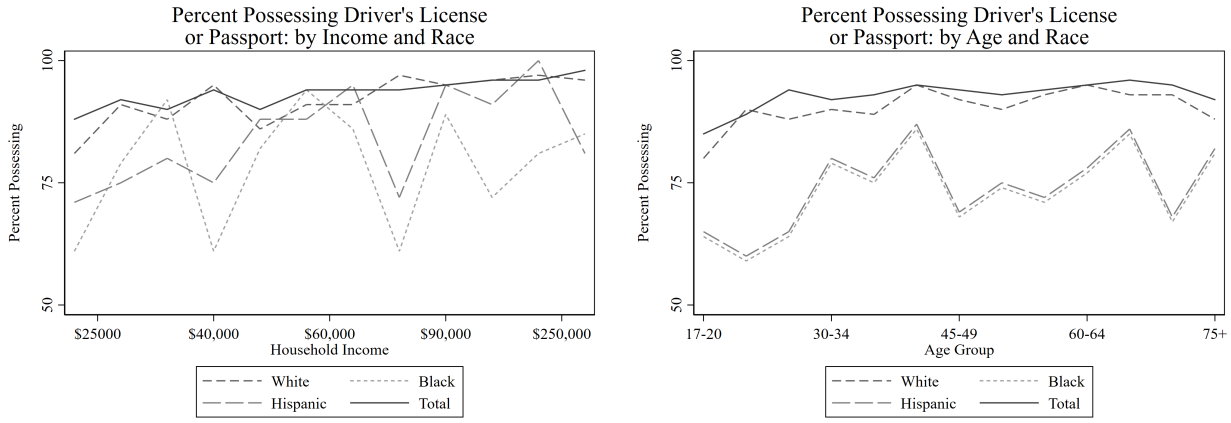
Spicuzza, Mary, and Matthew DeFour. 2014. "Gov. Scott Walker says he would call voter ID special session." *Wisconsin State Journal*, 12 March, 2014.

U.S. Election Assistance Commission. 2005. *Building Confidence in U.S. Elections. Report of the Commission on Federal Election Reform.* https://www.eac.gov/assets/1/6/Exhibit%20M.PDF

Vercellotti, Timothy, and David Anderson. 2006. "Protecting the Franchise, or Restricting it? The Effects of Voter Identification Requirements on Turnout." Manuscript, Rutgers University.

9 Appendices

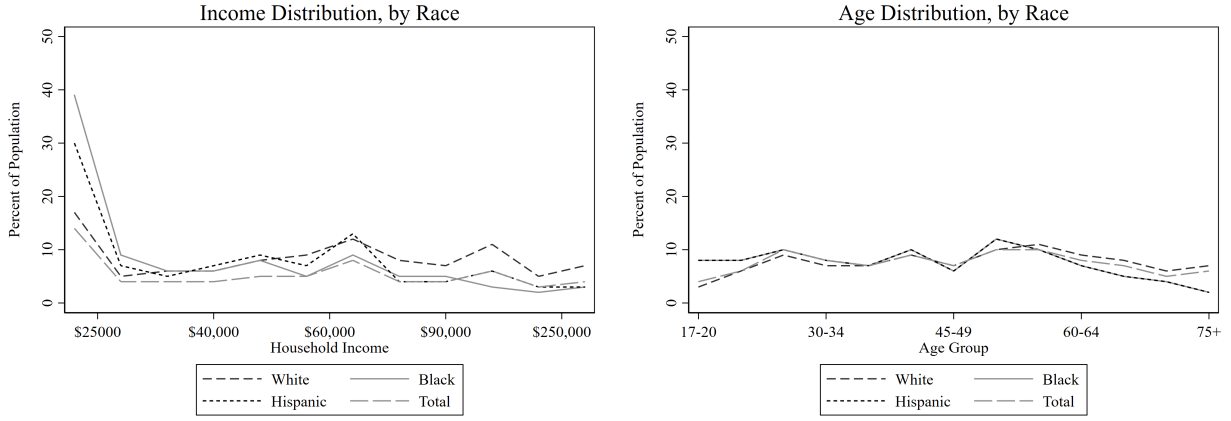
9.1 Appendix A: Disparities in ID Possession and Income by Race and Age



(a) ID by Income and Race

(b) ID by Age and Race

Figure 3: ID Possession, by Race, Income, and Age



(a) Income of Population

(b) Age of Population

Figure 4: Income and Age Distributions, by Race

9.2 Appendix B: Demographic Composition and Turnout Rates

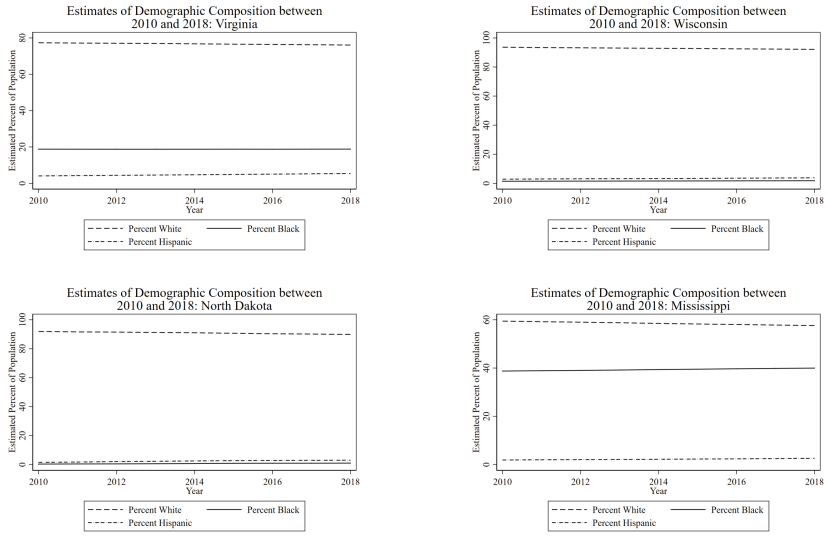


Figure 5: Demographic Trends: Mississippi, N. Dakota, Virginia, and Wisconsin

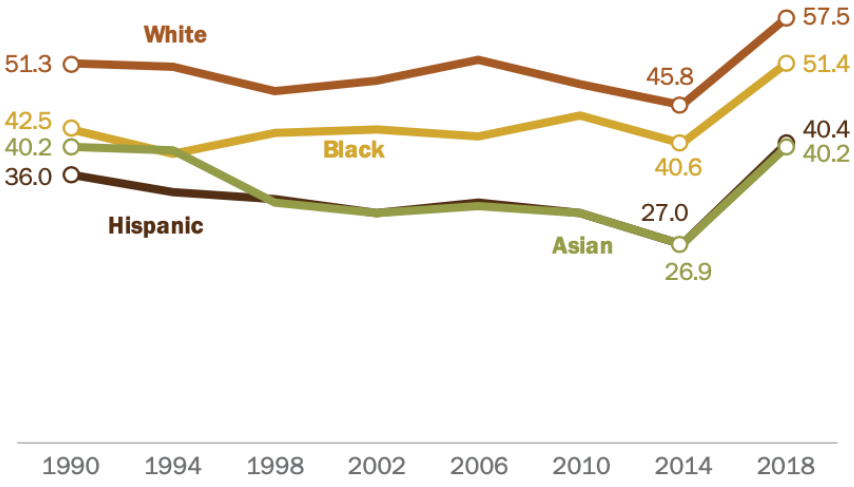


Figure 6: Turnout Rates over Time, by Race

9.3 Appendix C: Parallel Trends of Turnout and Registration Rates

Turnout rate calculated as total number of votes cast over total population. States with dashed lines indicate treatment: adoption of strict photo ID laws. Vertical dashed lines indicate year when ID law was implemented in treated state.

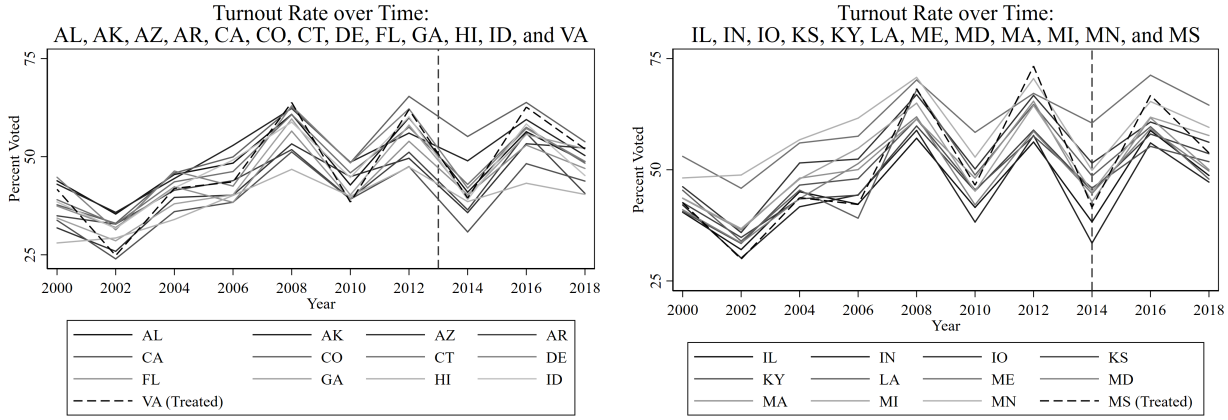


Figure 7: Voter Turnout Trends over Time, by State

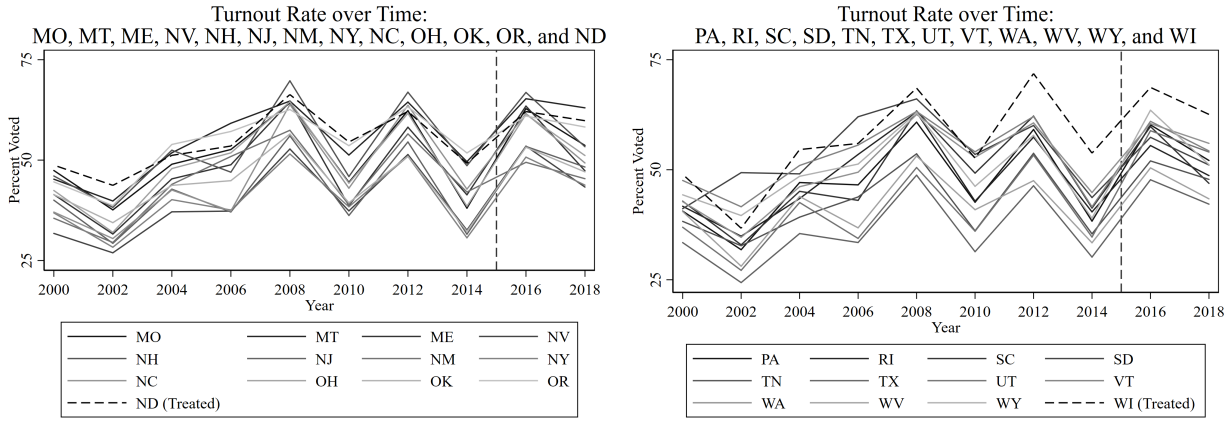


Figure 8: Voter Turnout Trends over Time, by State

9.4 Appendix D: Descriptive Statistics of Key Variables

Table 4: Descriptive Statistics of Variables

	Mean	Median	Standard Deviation	Lower Bound	Upper Bound
Turnout	0.618	0.627	0.095	0.308	0.873
Treatment	0.029	0	0.169	0	1
Asian	0.036	0.216	0.463	0.004	0.436
Black	0.113	0.065	0.128	0.003	0.720
Hispanic	0.111	0.068	0.125	0.009	0.956
White	0.810	0.862	0.148	0.172	0.978
Age	3.644	3.649	0.123	3.199	4.069
Income	3.985	3.953	0.245	3.297	4.901
Education	0.293	0.279	0.104	0.082	0.743
Registration	0.693	0.701	0.038	0.603	0.765

Age and Income measured by taking the natural log (ln10), with Income by thousands.

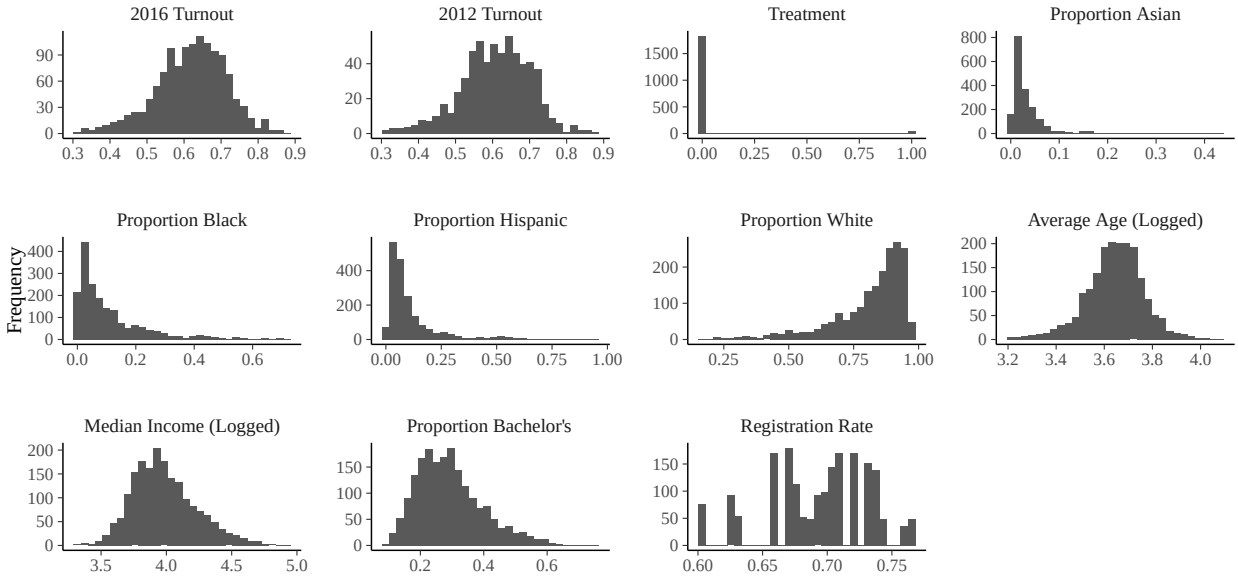


Figure 9: Distributions of Variables

9.5 Appendix E: Results of Interaction between Treatment and Age, Income, and Education: 2010-2018.

Table 5: Effect of Strict Voter ID Laws on Turnout Rates, by Age, Income, and Education: 2010-2018.

	Senate Elections				House Elections				Presidential Elections			
	Overall Effect	Age Effect	Income Effect	Education Effect	Overall Effect	Age Effect	Income Effect	Education Effect	Overall Effect	Age Effect	Income Effect	Education Effect
	0.952***	0.917***	0.953***	0.954***	0.471***	0.452***	0.470***	0.468***	0.236***	0.217***	0.213***	0.214***
Age	(0.251)	(0.251)	(0.252)	(0.255)	(0.042)	(0.043)	(0.042)	(0.042)	(0.017)	(0.017)	(0.017)	(0.017)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
	-0.160	-0.166	-0.165	-0.165	0.074**	0.064**	0.073**	0.072**	0.036**	0.038**	0.033**	0.036**
Income	(0.183)	(0.188)	(0.186)	(0.189)	(0.030)	(0.030)	(0.030)	(0.031)	(0.015)	(0.015)	(0.016)	(0.015)
	[0.386]	[0.381]	[0.379]	[0.387]	[0.016]	[0.035]	[0.018]	[0.019]	[0.018]	[0.012]	[0.044]	[0.017]
	0.311*	0.317*	0.299*	0.320*	0.083***	0.091***	0.083***	0.086***	0.031***	0.029***	0.030***	0.029***
Education	(0.162)	(0.166)	(0.174)	(0.179)	(0.027)	(0.026)	(0.027)	(0.028)	(0.010)	(0.009)	(0.009)	(0.010)
	[0.061]	[0.062]	[0.091]	[0.080]	[0.002]	[0.001]	[0.002]	[0.002]	[0.001]	[0.002]	[0.001]	[0.004]
Interaction:		1.169				0.347***				-0.030		
Treatment		(1.066)				(0.091)				(0.031)		
and Age		[0.278]				[0.000]				[0.333]		
Interaction:			0.319				0.008				0.017	
Treatment			(0.301)				(0.045)				(0.019)	
and Income			[0.294]				[0.866]				[0.361]	
Interaction:				-0.044				-0.016				0.006
Treatment				(0.185)				(0.030)				(0.012)
and Education				[0.814]				[0.595]				[0.634]
	0.123***	0.119***	0.117***	0.123***	0.650***	0.644***	0.649***	0.650***	0.828***	0.839***	0.838***	0.839***
Lagged Turnout	(0.021)	(0.023)	(0.022)	(0.022)	(0.024)	(0.024)	(0.024)	(0.024)	(0.017)	(0.017)	(0.017)	(0.017)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
General	9.180***	9.302***	9.229***	9.170***	18.698***	18.583***	18.676***	18.683***	–	–	–	–
Election	(0.738)	(0.773)	(0.763)	(0.750)	(0.395)	(0.394)	(0.394)	(0.395)	–	–	–	–
Indicator	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	–	–	–	–
	-7.645	-6.300	-7.155	-7.846	-19.011***	-17.845***	-18.854***	-18.922***	-2.918***	-2.448***	-2.095***	-2.221***
Constant	(8.925)	(8.867)	(8.954)	(9.083)	(1.286)	(1.372)	(1.340)	(1.325)	(0.577)	(0.592)	(0.601)	(0.565)
	[0.396]	[0.481]	[0.428]	[0.392]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]
N	112	112	112	112	1,321	1,321	1,321	1,321	811	810	810	810
R^2	0.620	0.625	0.623	0.620	0.725	0.726	0.725	0.725	0.949	0.953	0.953	0.952
Clusters	49	49	49	49	410	410	410	410	810	766	810	766

Note: Outcome variable is voter turnout in analysis year election as a percentage, calculated as number of total votes cast over total population in a geographic area. Treatment is a binary variable indicating the implementation of strict photo identification requirements for voting. Lagged Turnout refers to the previous election for House and Presidential elections. Lagged Turnout for Senate elections refers to the previous election wherein the incumbent ran. Robust standard errors in parentheses, *p*-values in brackets. Robust standard errors clustered at the State level for Senate elections, District level for House elections, and County level for Presidential elections. *** p<0.01, ** p<0.05, * p<0.1.