The Durable Deterrent Effects of Strict Photo Identification Laws[*]

Justin Grimmer[†]
Department of Political Science
Stanford University

Jesse Yoder[‡]
Department of Political Science
Stanford University

July 1, 2019

Abstract

An increasing number of states have adopted laws that require voters to show photo identification to vote. We show that the deterrent effect of strict ID laws on turnout persists even after the laws are repealed. To assess the persistent effect of ID laws on turnout we leverage administrative data from North Carolina and a photo ID law that was in effect for a primary election, but not the subsequent general election. Using exact matching and a difference-in-differences design, we show that the photo ID law caused a 1 percentage point turnout decrease for voters without a North Carolina ID law in the primary election. After the law was suspended this effect persisted: those without an ID were 2.6 percentage points less likely to turnout in the general election. The general election effect is robust to a variety of alternative explanations and we show is consistent with aggregate analyses that find a null effect of voter ID laws. Our results suggest that photo ID laws' deterrent effect persists because voters lack information about the changing requirements for voting, creating confusion that keeps them from voting.

Contents

"The proposed [voter ID] law puts up barriers to voting that will trap honest voters in confusion and discourage them [...]."

- Roy Cooper, Governor of North Carolina (2018)[1]

1   Introduction

A growing number of states have enacted laws that require voters to show photo identification (ID) to cast a ballot.[2] Meanwhile, a flurry of legal challenges and scholarly analyses have sought to estimate the effect of the voter ID laws. Do strict ID laws deter voters from turning out, and if so, how? In this paper we demonstrate that photo ID laws deter voters while in place and continue to deter voters *even after those laws are repealed.* The deterrent effect occurs both because voters without identification are deterred from voting once they arrive at the polls and because voters without photo identification decide to not turnout at all. Because voters without identification may be unaware the requirements for voting have changed, they may continue to decide to not turnout to vote even after the law has changed.

To assess the persistent effect of voter ID laws, we use administrative data from North Carolina and exploit variation in a photo ID law that was in effect for the 2016 primary election but not the 2016 general election. The North Carolina legislature passed a law in 2013 requiring photo ID to vote starting in the 2016 primary election. To inform voters without state-issued identification of the law change, the North Carolina State Board of Elections (NCSBE) sent a mailer to all voters who lacked a state-issued ID, informing them that photo identification would be required to vote. To assess the effect of this law, we use exact matching on a variety of individual characteristics, including turnout history prior to the ID law, and a difference-in-differences design, to find that the strict photo voter ID caused a 1 percentage point decline in turnout for voters without an ID in the primary election among those who did not match to a state-issued ID. After the primary election

---

in July 2016 an appellate court overturned the photo ID law, removing the requirement for photo identification to vote. But there was no subsequent letter sent to inform voters that photo identification was no longer required. The suspension of the law and the lack of information about the change created the potential for voters to be confused about what was required to vote in the general election. Even though the photo ID law was suspended, individuals without an ID were 2.6 percentage points less likely to turnout in the general election than voters with identification. We show this deterrent effect alters the composition of the electorate: the law caused minorities and Democrats to be underrepresented in the electorate.

Our study differs from existing research which compares turnout in states that do and do not implement voter ID laws, using either aggregate state-level turnout or self-reported turnout data. These designs have led to mixed results, either finding no effects on aggregate turnout (Mycoff, Wagner, and Wilson 2009; Hood and Bullock 2012; Highton 2017; Cantoni and Pons 2019) or negative effects on turnout (Vercellotti and Anderson 2006; Alvarez, Bailey, and Katz 2008; Barreto, Nuño, and Sanchez 2009; Alvarez, Bailey, and Katz 2011; Hajnal, Lajevardi, and Nielson 2017), with studies finding a negative effect of voter ID laws on turnout often finding that racial minorities are disproportionately affected. These research designs, however, are often unable to identify which individuals lack proper identification under voter ID laws. This limits the ability of studies of aggregate turnout to assess the effect among the population most likely to be affected by the law—those who lack identification. While other studies sometimes use survey research to learn who holds identification, this group is so small that it is difficult to estimate the effect with policy-relevant precision (Erikson and Minnite 2009; Grimmer et al. 2018).[3]

---

[3]Many studies have used surveys to estimate the rate at which individuals have ID required to vote under different voter ID laws, often finding that rates of having inadequate photo ID under a strict photo ID requirement range from about 1 to 15 percent (Hood and Bullock 2008; Ansolabehere 2012; Barreto and Walker 2012; Barreto and Sanchez 2012; Beatty 2012; Hobby et al. 2015). These studies often find racial minorities are less likely to have ID compared to other registered voters.

We address these methodological obstacles in previous studies by linking an administrative voter file from North Carolina with information about which registered voters held a state-issued photo ID, along with voters' turnout history from 2008 through 2016, race, and age. Our data also enables us to assess whether voters were deterred after they arrived at the polls, or if the ID laws caused them to avoid turning out altogether. We use administrative data on voters who cast provisional ballots in North Carolina because they failed to provide adequate ID to vote on Election Day as a measure of who was deterred from voting after arriving at the polls.

This data, along with a unique feature of North Carolina's voter ID law – that it was in place for the 2016 primary election but repealed by a court decision and not in place for the 2016 general election – allows us to differentiate between two potential mechanisms by which the law could affect turnout in North Carolina. The first potential effect is mechanical—individuals show up to the polls but are then turned away when they are asked to show their identification and then lack proper identification (Henninger, Meredith, and Morse 2018; Fraga and Miller 2018). The second is an overall deterrent effect—voter ID laws might deter voters prior to voting because they believe, perhaps incorrectly, that they lack the required identification for voting.

We find that the North Carolina ID law dampened turnout among those without photo IDs and we show that the overall effect is due both to deterrent and mechanical effects of the law. In our most stringent specification to estimate the deterrent effect of the law—exact matching across those with and without IDs on prior turnout history, race declared at registration, and a coarsened age measure—we find that voters without identification were 1 percentage point less likely to turnout in the primary election. The mechanical and deterrent effect are similarly sized: both are non-negligible, but small. Across the entire state of North Carolina, 1,169 potential 2016 primary voters had provisional ballots rejected for lack of proper identification. And using a simple set of assumptions to calculate the number of voters affected by the deterrent effect, we find the law causes approximately 1,300

individuals without identification to not vote. This accounts for approximately 0.1% of the total votes cast in the election.

Even after the law was struck down, the overall deterrent effect of the law continued to cause voters without identification to be less likely to vote. Again using our most stringent exact matching specification to estimate the deterrent effect, we find that those without identification were 2.6 percentage points less likely to participate in the general election. This effect is unlikely to be due to non-ID holders having differential turnout trends, as we deploy a variety of stringent specifications and robustness checks. We show the effect of the voter ID law is to change the composition of the electorate, even though the magnitude of the compositional change is small. We show that the law has the biggest effect for occasional voters and because minority voters and Democrats are less likely to hold valid identification, the law causes them to be underrepresented in the electorate.

These findings also help reconcile two seemingly disparate findings in the voter ID literature, but which we argue need not be mutually exclusive and are estimating two different quantities of interest. The first quantity of interest is the effect of voter ID laws on turnout among those without ID. Our findings – along with other recent work that combines individual-level information on who actually lacks ID in Rhode Island, measured at scale (Esposito, Focanti, and Hastings 2019) – show that voter ID laws cause a decrease in turnout among those without ID, leaving minorities and Democrats disproportionately burdened because they are less likely to have photo ID. The second quantity of interest is the effect of voter ID laws on overall turnout. We show that the effects of voter ID laws on overall turnout are very small because very few voters lack photo ID. This is consistent with recent work using a nationwide voter file panel (Cantoni and Pons 2019). Both of these theoretical quantities are important, and our work furthers our understanding on both of these fronts. Moreover, this paper illustrates that the widely varying findings in the voter ID literature stem from the combination of lack of clarity about which is the estimand of interest along with limited data and to estimate either of these quantities with precision.

The general election finding shows that debates and policy disputes about voter ID laws could dampen turnout, even when photo identification laws are removed. This has important implications for assessing turnout in states where voter ID laws are still actively debated. For example, in the wake of North Carolina's strict photo ID law being struck down in 2016, voters in North Carolina approved a ballot measure in November 2018 to amend the state constitution to require to require photo identification to vote.[4] While the new requirements are already the subject of pending lawsuits,[5] North Carolina Governor Roy Cooper signed a bill into law in March 2019 to delay the voter ID requirements until 2020.[6] Given the turbulent nature of debates and implementation of voter ID laws along with our findings, officials and researchers should carefully consider how these processes affect who votes, regardless of if or when these requirements are actually implemented.

2 Voter ID Laws in North Carolina and Their Effect on Voter Turnout

In 2013, North Carolina passed legislation to implement a strict photo voter ID law, beginning with the 2016 election.[7] In accordance with the law, in 2015 the North Carolina State Board of Elections (NCSBE) generated a list of registered voters who did not match to a state-issued photo ID issued by the North Carolina Division of Motor Vehicles (DMV) at the time of the 2014 general election.[8] Using this list, the NCSBE sent a mailer to each of these registrants, which stated that photo ID would be needed to vote in 2016, listed resources for obtaining free photo ID, and provided a postage pre-paid response card where recipients could indicate they needed assistance in acquiring a photo ID.[9] Registered voters

---

[4]https://dashboard.ncleg.net/api/Services/BillSummary/2017/H1092-SMBK-165(sl)-v-4
[5]https://www.wunc.org/post/nc-naacp-challenges-new-voter-id-law-federal-court
[6]https://www.wfae.org/post/gov-cooper-signs-law-delay-voter-id#stream/0
[7]https://www.ncleg.net/Sessions/2013/Bills/House/PDF/H589v9.pdf
[8]https://moritzlaw.osu.edu/electionlaw/litigation/documents/NAACPPlaintiffsPreTrialBrief011916.pdf
[9]https://www.ncmd.uscourts.gov/sites/ncmd/files/opinions/13cv658moo_0.pdf.

were required to show an acceptable form of photo ID to cast a ballot, which included a North Carolina driver's license, U.S. passport, or U.S. military ID card, among others. If voters were unable to present acceptable photo ID, they could cast a provisional ballot, which would only be counted if the voter took additional action after Election Day by presenting ID in person at their County Board of Elections.[10] In July 2016, after the 2016 primary but before the general election, the 4th U.S. Circuit Court of Appeals overturned the voter ID law, citing its discriminatory intent.[11] After the ruling the ID law was not in place for the 2016 general election. While the court ruling blocked the enforcement of voter ID laws in the general election, it did not require a new letter to voters without identification to inform them that identification was no longer required to vote.

We use variation in the voter ID law's implementation for the 2016 primary and general elections to estimate the persistent effect of voter ID laws among those who lack identification. The effect of the North Carolina law on those without identification combines two distinct ways the laws could deter voters: a mechanical effect that occurs at the polls and an overall deterrent effect that causes individuals to not turnout at all.

Consider first the mechanical effect. The passage of the law imposes a requirement that voters show valid identification when they arrive at the polls. As a result, anyone who lacks valid identification and arrives at the poll will be mechanically turned away from voting, so long as the poll worker asks a potential voter to provide identification (Cobb, Greiner, and Quinn 2010). Recent studies have estimated the mechanical effect using information about who casts provisional ballots in order to estimate a lower bound on the total effect of the voter ID law (Henninger, Meredith, and Morse 2018; Fraga and Miller 2018).

Voter ID laws also can deter individuals from voting because individuals infer they lack proper identification and decide to not arrive at the polls at all. We group together the ways the law could affect the decision to cast a ballot at all into the deterrent effect. Before the

---

[10] For a full explanation of acceptable forms of ID and procedure for casting provisional ballots for lack of ID in North Carolina for the 2016 primary, see Hopkins et al. (2017).

[11] http://pdfserver.amlaw.com/nlj/7-29-16%204th%20Circuit%20NAACP%20v%20NC.pdf

law was implemented in North Carolina, the letter from the NCSBE provided information to registered voters without identification about what would be necessary to vote. Potential voters without identification would learn that they would either need to acquire identification, use an official non-state issued ID, or be unable to turn out to vote. From this letter, then, potential voters might infer that they lack the identification necessary to vote and decide to not turnout. Other coverage of the law may also provide information to voters about is needed to vote—including media coverage or information from campaigns.[12]

Once the law was struck down by the appellate court the mechanical effect immediately is removed, but the deterrent effect remains until voters learn about the change in rules about required identification. One impediment to learning about the change is that there was no official notice from the state: the appellate court struck down the law, but did not order a second letter sent to voters about the different requirements. Political campaigns or the media could provide information to voters, but this will necessarily be less likely to reach potential voters than the information from the NCSBE. For example, as we show in Appendix A.3 newspaper coverage of the voter ID law in both North Carolina and national news sources tended to occur when the appellate court decision was made, rather than immediately prior to election day when voters are most interested in the campaign. This would limit the chance for voters without identification to incidentally learn that the requirements for voting had been relaxed. And without this information, potential voters might incorrectly believe they lack the required identification, causing the effect of the law to persist.[13]

Our study, therefore, examines the mechanical and information deterrent effect of a law after it is implemented in North Carolina. We interpret our treatment as the differential effect of the law on those without identification, relative to those with photo ID. We focus

---

[12]Necessarily, this deterrent effect will also include effects that make an individual more likely to turnout to vote. For example, the law could anger voters and cause them to be more likely to vote (Valentino and Neuner 2017) or campaigns could exert effort to mobilize voters.

[13]While prior experimental work finds that providing information about strict photo ID requirements voting requirements increases turnout (Citrin, Green, and Levy 2014), the letter from the NCSBE was qualitatively different and is likely to elicit different effects. Citrin, Green, and Levy (2014) measures the effect on a population of registered voters, not just those without identification, and Citrin, Green, and Levy (2014) provided the information to registered voters closer to the election than the NCSBE sent their letter.

on this interpretation because imposing a strict photo ID law could affect the turnout decision of all registered voters and our design is unable to address potential changes in voting behavior for individuals who hold valid identification. As we mentioned above, individuals could be angered by the law increasing turnout among those who already hold valid identification (Valentino and Neuner 2017), campaigns might exert compensatory effort to turn out individuals with valid ID, or increased controversy around the law might cause more voters to be more interested in the election. Our interpretation—as the differential effect of the law for those without identification—is necessarily different than the policy question of what turnout would have been if the voter ID law had never been put in place. As we explain below, we can impose assumptions about the broader effect of the law to generate estimates for this different policy question. Further, our results provide important insights into who is deterred given the law is put in place.

Measuring Who Holds Identification To measure our treatment of interest, who lacks the required identification, we combine administrative data from North Carolina voter files – which includes information on a voter's address, age, race, and turnout history in every primary and general election from 2008 to 2016 – with individual-level administrative data on who possesses a state-issued ID.[14] We use the unique identifier the NCSBE generated to identify voters without identification, which we use to merge to the voter file to measure an individual's lack of ID.

Our measure of who lacks photo ID, then, is the list of voters who the NCSBE identified as possibly lacking ID through this matching process. This strategy for measuring our treatment variable of who lacks photo ID is vulnerable to measurement error, but several features of the matching process suggest the measurement error is likely to be small. First, it is possible that some individuals without state-issued ID could still have photo ID required to vote, such as a US passport or valid military ID. In that case, voters with acceptable ID

---

[14]All of this information is publicly available and provided by the North Carolina State Board of Elections (NCSBE).

would be coded as treated, leading us to over-estimate the number of voters who actually lack acceptable photo ID. We can measure this indirectly because the North Carolina State Board of Elections sent a mailer to each voter that did not match to state ID records. For registrants on the state's no match list, about 8.6% responded to the NCSBE mailer claiming they had photo ID.[15] Measurement error in coding our treatment variable of who lacks ID would attenuate our estimate of the effect of law on those without ID.

A second source of measurement error comes from matching voters to DMV records. There could be either false positives, where two records are linked but correspond to different individuals, or false negatives, where individuals are not linked but are present in both datasets. Individuals are nearly always unique within characteristics available in the voter file (Ansolabehere and Hersh 2017), which makes the risk of false positives extremely low when merging across these types of administrative data. We have reason to believe the rate of false positives is extremely low in our case: in North Carolina the voter registration records and DMV ID records both contain driver's license or state ID numbers, as well as full social security number, full date of birth, first name, last name, and full address.[16] The NCSBE used exact matching on driver's license number or full social security number in the vast majority of its matches, making the risk of false positives low. False negatives would come from missingness or typographical errors in variables used for matching, but we again have reason to believe the false negative rate is low. Over 80% of voter file registrants report their DMV-issued ID number, and individuals report the last 4 digits of their social security number on both the voter registration form and DMV-issued ID forms.

Even if the matching process had no merge error, people who possess ID might lack access to it on Election Day (Henninger, Meredith, and Morse 2018). For example, voters could show up to the polls but have lost or forgotten their photo ID. In that case, we would underestimate the number of individuals without photo ID. To the extent that this happens

---

[15]https://www.ncmd.uscourts.gov/sites/ncmd/files/opinions/13cv658moo_0.pdf.

[16]The NCSBE implemented the same matching criteria as described in this report: https://canons.sog.unc.edu/wp-content/uploads/2013/12/St-Bd-voter-ID-report.pdf

on Election Day, it would attenuate our estimates of the effect of the voter ID law among those without ID because individuals in our control group (coded as having ID) would be deterred. Overall, given the quantity and quality of identifying information in both the voter file and the DMV ID records, we suspect that the measurement error in our treatment variable is likely to be small.

Table 1 shows descriptive statistics for the full voter file compared to registrants who do not match to an ID. About 2.2% of registrants fail to match, indicating that they might lack adequate ID to vote under the strict ID law. The composition of registrants without ID differs from the full voter file: those lacking ID have lower turnout on average, and they are more likely to be non-white as well as registered Democrats. The standard deviation of birth year is also larger among those without ID, which comports with previous survey work showing those who lack ID often tend to be young or elderly (e.g., Stewart III 2013).

We also rely on individual-level data from the NCSBE on which voters cast a provisional ballot. Not only can we observe whether a provisional ballot was cast and ultimately counted, but we can also observe the stated reason for needing to cast a provisional ballot. We use this to estimate the mechanical effect of the voter ID law – that is, how many voters are turned away at the polls for lack of ID on Election Day.

3 Strict Photo ID Laws Decrease Turnout Among Those Without ID

In this section, we show that North Carolina's voter ID law decreased turnout among those without ID. In our most stringent specification, the ID law decreased turnout by about 1 percentage point among those without ID. This decrease seems to come primarily through a psychological effect, like confusion, rather than through a mechanical effect where voters without ID are turned away at the polls on Election Day.

Table 1 – Descriptive Statistics, Individual Level, 2008–2016.

	Mean (1)	Deviation (2)	Minimum (3)	Maximum (4)
	A. Full Voter File (# Voters = 4,861,171)			
Voted	0.491	0.500	0	1
Hispanic	0.018	0.132	0	1
Black	0.226	0.418	0	1
White	0.724	0.447	0	1
Other Non-White	0.033	0.177	0	1
Democrat	0.411	0.492	0	1
Republican	0.326	0.469	0	1
Unaffiliated	0.263	0.440	0	1
Birth Year	1964	17	1910	1999
	B. No DMV Match (# Voters = 108,822)			
Voted	0.397	0.489	0	1
Hispanic	0.037	0.189	0	1
Black	0.382	0.486	0	1
White	0.528	0.499	0	1
Other Non-White	0.053	0.224	0	1
Democrat	0.589	0.492	0	1
Republican	0.209	0.407	0	1
Unaffiliated	0.202	0.401	0	1
Birth Year	1962	23	1910	1998

The unit for voted an individual-year. Panel A presents descriptive statistics for the full file of North Carolina voters registered before the treatment window. In this panel, every observation is a voter within an election period. Panel B presents descriptive statistics for the individuals in the voter file who do not match to a DMV identification record.

3.1 Evidence for a Mechanical Effect

First, we estimate the mechanical effect of the voter ID law, where a voter shows up to the polls intending to cast a ballot but does not have their vote counted because they do not meet the requirements of the new ID law. This mechanical effect can only plausibly decrease the turnout rate (Henninger, Meredith, and Morse 2018; Fraga and Miller 2018). Conditional on a voter showing up to the polls, the ID law could decrease turnout if voters are challenged to present appropriate ID and fail to do so, or if they produce valid ID and are

inappropriately rejected.[17] In North Carolina, this mechanical effect is present in the 2016 primary, the only election for which the voter ID law is actually in place.[18] In the event that a voter fails to present photo ID, they can cast a provisional ballot, which is only counted if the voter takes additional action after Election Day to present adequate ID. To estimate the mechanical effect, in Figure 1 we plot the share of provisional ballots cast by reason for each election. The figure on the left shows provisional ballots for primary elections, while the figure on the right shows them for general elections. In each year, the vast majority of provisional ballots are cast because potential voters are not found as being registered. The blue line shows provisional ballots that were rejected for lack of ID account for a very small share of rejected ballots, even in the 2016 primary, where they comprised less than 10% of rejected ballots. Overall, a total of 1,169 provisional ballots were rejected for lack of ID in the 2016 primary election, just 0.05% of the 2,332,428 total votes cast statewide in that election.

3.2 Evidence for a Deterrent Effect

Here, we estimate the deterrent effect of the voter ID law, which yields conflicting theoretical predictions. On one hand, voters without ID might abstain from voting because they infer – correctly or incorrectly – that they do not have adequate ID to vote and are not willing to pay the costs of acquiring acceptable ID.[19] On the other hand, the voter ID law might anger or otherwise motivate voters, making them more likely to participate (e.g., Claibourn and Martin 2012; Valentino and Neuner 2017). This anger effect could occur even with voters

---

[17]For more discussion of how voter ID requirements are applied on Election Day, see Atkeson et al. (2014).

[18]In the 2016 primary election, 1,169 provisional ballots were ultimately not counted with the reason listed being that adequate ID was not provided by the voter. For the 2010, 2012, and 2014 primary elections, these counts were 7, 134, and 3, respectively. Possible reasons for non-zero values when the law was not in effect include misreporting the reason for the provisional ballot, or poll workers – who exercise considerable discretion – inappropriately asking voters to present ID in these elections. For example, over one-third of New Mexico poll workers indicated they had asked voters that approached without ID to present photo identification during the 2008 general election, contrary to New Mexico election law (Atkeson et al. 2014).

[19]These costs could include the time it takes to gather information about the law's requirements along with the effort to apply for an acceptable ID.

Primary Elections   **General Elections**
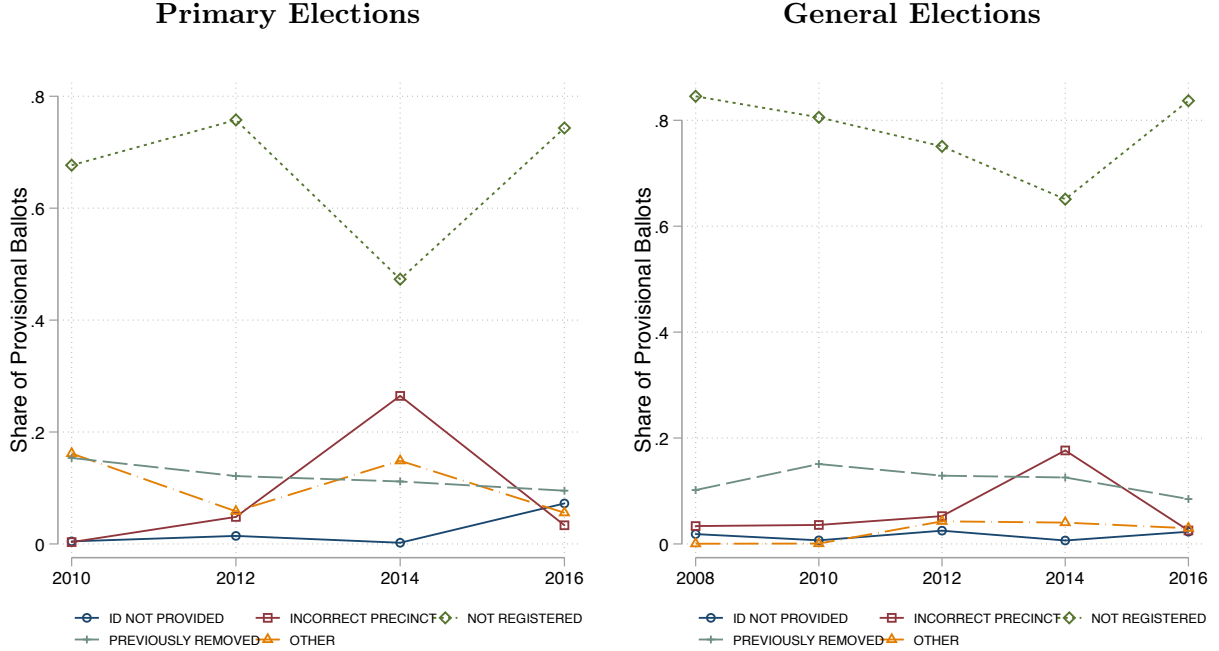
Figure 1 – **Reasons for Provisional Ballots** The left panel plots the share
of provisional ballots cast for different reasons in primary elections. The right plots
the same series for general elections. The blue line indicates the share of provisional
ballots cast because the voter lacked proper ID. The only election for which the
ID law was in effect was the 2016 primary, where about 10% of provisional ballots
were cast for lack of ID.

who were identified as not holding a state-issued ID. This could occur if voters obtain a new
ID or if they use an alternative form of identification.

In the absence of a randomized experiment where some voters have access to identification
and others do not, we have to rely on observed ID holding and turnout behavior to estimate
the deterrent effect. Specifically, we estimate equations of the form

$$Turnout_{it} = \beta * \text{No DMV Match}_i * 2016 + \gamma_i + \delta_t + \epsilon_{it}, \tag{1}$$

where $Turnout_{it}$ is an indicator for whether individual i turns out to vote in the election at
time t. The variable No DMV Match$_i * 2016$ is an indicator for whether individual i does not
match to photo ID and the election year is 2016, the year the voter ID law goes into effect.
We include individual and year fixed effects, modeled by γ_i and δ_t, respectively.[20] This is a

---

[20]The equation does not include No DMV Match$_i$ because it is absorbed by the individual fixed effects.

difference-in-differences design, which relies on the common trends assumption. For this to be satisfied, it must be that the change in turnout behavior for treated units (those without ID) would have been the same as controls units (those with ID), had they not been treated. There are likely many ways in which those who have photo ID and do not have photo ID are different, and these differences might drive changes in turnout behavior. Specifically, the main concern for our design is that there are compositional differences between those who have ID and those who do not, as we show in Table 1. Voters without ID are more likely to be Democrats, minorities, young, old, and low-turnout. If trends in turnout behavior are different on the basis of any of these compositional differences, this would bias the estimate in Equation (1). After showing results from the simplest version of the difference-in-differences design, we employ a number of strategies to adjust for these compositional differences and make the common trends assumption more plausible.

Table 2 shows the effect of the voter ID law on primary election turnout. In column 1, we estimate Equation (1), simply including individual and year fixed effects. This specification, therefore, estimates the counterfactual turnout trends for those without ID using all voters with ID. The estimate suggests that the voter ID law caused a 9.2 percentage point decline in primary election turnout among those without ID relative to those with ID. We have reason to be skeptical of this baseline specification. Because there are many observable differences between those who have photo ID and those who do not, the two groups are likely to have different turnout trends. As a first way to address this, in columns 2, 3, and 4 we include race-by-year, age-by-year, and race-by-age-by-year fixed effects, respectively. This means that in column 4, for example, we compute counterfactual trends for individuals without ID using only voters with ID that are the same age and race. The point estimate in column 4 shrinks substantially to a 5.9 percentage point decline in primary turnout among those without ID.

Trends in turnout behavior, however, still might be different among those with and without ID, even within age and racial group. In fact, we can show some evidence for this:

Table 2 – Effect of Voter ID Law on Primary Election Turnout Among Those Without ID, Individual Level, 2008–2016.

	Voted in Primary (0-1)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No DMV Match * 2016	-0.092	-0.085	-0.066	-0.059	-0.013	-0.012	-0.010
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	24,761,730	24,761,730	24,745,780	24,745,770	24,761,730	24,761,730	24,761,730
# Voters	4,952,346	4,952,346	4,949,156	4,949,154	4,952,346	4,952,346	4,952,346
Individual FEs	Yes	Yes	Yes	Yes	No	No	No
Year FEs	Yes	No	No	No	Yes	Yes	Yes
Race by Year FEs	No	Yes	No	No	No	No	No
Age by Year FEs	No	No	Yes	No	No	No	No
Race by Age by Year FEs	No	No	No	Yes	No	No	No
Exact Match on Turnout	No	No	No	No	Yes	Yes	Yes
Exact Match on Race	No	No	No	No	No	Yes	Yes
Exact Match on Age Bin	No	No	No	No	No	No	Yes

Robust standard errors clustered by individual in parentheses. Main effects for No DMV Match and 2016 are absorbed by fixed effects. Exact matching on turnout matches units based on all primary and general elections from 2008-2014. For exact matching on age, we construct a separate age bin for each group of voters who were under 18 for a given set of elections, so the cohort of voters who became newly eligible to participate in 2010, 2012, 2014, and 2016 each have their own age bin. For voters who were eligible for all elections since 2008, we construct age deciles.

in Figure 2 we plot the mean turnout rate in each primary and general election from 2008 to 2016 separately for those who have and do not have ID, including race by birth year fixed effects. Even within race and birth year, those who do not have photo ID (in red) have slightly different turnout trends in the pre-treatment period (2008-2014) than those who have ID (in blue).

To add to the plausibility of the common trends assumption even more, we exactly match individuals on the basis of their pre-treatment turnout history. This constructs a control group more likely to provide accurate counterfactual trends because we constrain the trends to be the same in the pre-treatment periods. We have pre-treatment turnout history for every voter from every primary and general election in 2008, 2010, 2012, and 2014. This means that we can put each voter into one of $2^8 = 256$ unique pre-treatment turnout histories. For every individual without ID, we can find control units with the same pre-treatment turnout history. In column 5 of Table 2, we implement this exact matching design, where we average the differences in 2016 primary turnout among those without ID and those with ID for each of these turnout histories, weighting the estimate by the number of treated observations in
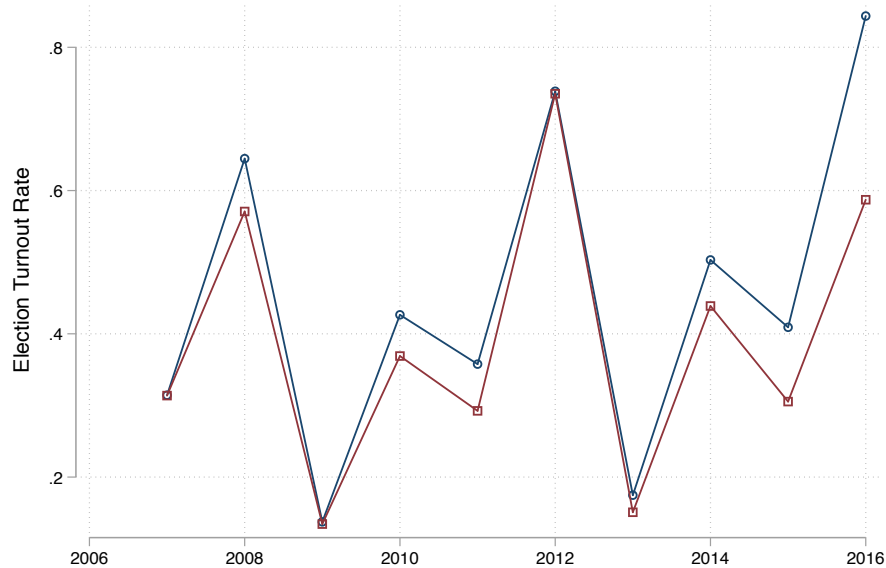
**Figure 2 – Turnout by ID Holding Status, Controlling for Birth
Year and Race.** Mean election turnout for primary and general elections from
2008 through 2016 are plotted separately for those who do not match to a DMV-
issued ID record (in red squares) and for those who do match to a photo ID (in
blue circles). We residualize on race by birth year fixed effects, so the figure shows
that trends in turnout among these two groups are different in the pre-treatment
periods (2008-2014) even after controlling for race and birth year.

each bin. After exact matching voters on their pre-treatment turnout, we find that the voter
ID law caused about a 1.3 percentage point decline in turnout among those without ID. In
columns 6 and 7, we further refine the exact match. In column 6, we exact match on turnout
history and race. In column 7, our most stringent specification, we exact match on turnout
history, race, and age decile; we find that the voter ID law caused a precisely estimated 1
percentage point decrease in turnout among those without ID.

3.3 The Deterrent Effect of the Voter ID Law Persisted Even Af-
ter the Law was Overturned

In this section, we explore whether the voter ID law had a deterrent effect *even after it was
repealed.* North Carolina's voter ID law was overturned in July 2016, about three months
before the 2016 general election. As a result of the appellate court striking down the law, the

mechanical effect necessarily goes to zero. But, as discussed above, voters might incorrectly believe that an ID is still required to vote in the general election, resulting in the law still exerting a deterrent effect on voting.

To investigate this deterrent effect, in Table 3 we estimate the effect on turnout of not having ID for the 2016 general election. Each column mirrors the specification described in Table 2, except that the outcome is now voting in the general election. We also adjust the exact matching on turnout to include the 2016 primary. For brevity, we focus on our most stringent specification (column 7), where we use exact matching on turnout history, race, and age.

In this most stringent specification, we find that voters without ID were 2.6 percentage points less likely to vote in the 2016 general compared to individuals with ID. This demonstrates that the deterrent effect of the law persisted after the law was struck down and the effect of the law increased in size. This increase, however, reflects the higher participation rate in general rather than primary elections. In 2016, for example, 36% of registered voters participated in the primary election, while 69% participated in the general election. Therefore, this increase in size reflects the higher baseline rate of vote propensity in North Carolina elections.

3.4   Interpretation of The Voter ID Law's Effect

As we discussed above, interpreting these results requires caution. The quantity that we term the deterrent effect is not estimating how overall turnout change in North Carolina as a result of the voter ID law. Instead, it is the differential effect on turnout for those without ID relative to those with ID. It is possible that the voter ID law could have depressed turnout among all voters, regardless of ID holding status, if voters that did have ID were also confused about the new requirements to vote. Alternatively, it could be that the voter ID law increased overall turnout among all voters if they were angered or otherwise motivated to vote because of the new requirements (e.g., Valentino and Neuner 2017). The quantity

| | Voted in General (0-1) | | | | | | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No DMV Match * 2016	-0.147	-0.150	-0.134	-0.130	-0.030	-0.029	-0.026
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
N	24,761,730	24,761,730	24,745,780	24,745,770	24,761,730	24,761,730	24,745,780
# Voters	4,952,346	4,952,346	4,949,156	4,949,154	4,952,346	4,952,346	4,949,156
Individual FEs	Yes	Yes	Yes	Yes	No	No	No
Year FEs	Yes	No	No	No	Yes	Yes	Yes
Race by Year FEs	No	Yes	No	No	No	No	No
Age by Year FEs	No	No	Yes	No	No	No	No
Race by Age by Year FEs	No	No	No	Yes	No	No	No
Exact Match on Turnout	No	No	No	No	Yes	Yes	Yes
Exact Match on Race	No	No	No	No	No	Yes	Yes
Exact Match on Age Bin	No	No	No	No	No	No	Yes

Robust standard errors clustered by individual in parentheses. Main effects for No DMV Match and 2016 are absorbed by fixed effects. Exact matching on turnout matches units based on each primary and general election from the 2008 primary through the 2016 primary. For exact matching on age, we construct a separate age bin for each group of voters who were under 18 for a given set of elections, so the cohort of voters who became newly eligible to participate in 2010, 2012, 2014, and 2016 each have their own age bin. For voters who were eligible for all elections since 2008, we construct age deciles.

we estimate captures the effect of the ID law on turnout among those without ID relative to those with ID. We believe that, given the compositional differences between the types of voters with and without ID, this theoretical quantity is interesting and important. Later, we estimate the effect of the voter ID law on overall turnout in North Carolina, but it requires assuming that the law had no effect on turnout among those who have ID, a quantity not identified by our design.

4   Who is Deterred by the ID Law?

We have shown that voter ID laws cause a decline in turnout among those without ID and that this effect occurs both because potential voters are turned away on election day and because individuals infer that they lack proper identification to participate. In this section, we evaluate which types of voters are most likely to be deterred by the voter ID law. We first assess the heterogeneous effects of not holding valid identification. We find that not holding identification has the biggest effect for occasional voters, with only small effects for voters who rarely turned out in prior elections or who participated in all prior elections. We also

find that the effect of the voter ID law does not vary substantially by race or by party, but this does not imply that there is not a disproportionate burden for minorities or democrats. Although the effect of not holding identification does not differ from members of different racial groups or partisans, voter ID laws do disproportionately burden Democrats and racial minorities because they are less likely to hold photo identification (see Table 1).

4.1   Voter ID Laws Mostly Deter Occasional Voters

In this section we examine how the effect of not holding voter identification varies depending on a voter's prior turnout history. To examine how the effect varies based on turnout history, we construct strata of treated and control units based on the total number of times a voter casted a ballot in primary and general elections before the law was implemented. The strata that we use for this analysis are similar to the strata we use in our exact matching design, except for ease of presentation we merely count the number of primary and general elections an individual had participated in previously, rather than differentiating based on which primary or general elections the individual had participated in. In Table 4 we estimate the difference in primary turnout among those without ID and those with ID in the 2016 primary election in each of the turnout strata and in Table 5 we estimate the difference in each strata, but for general election turnout.

Looking at the first entry in Table 4, for example, we estimate the difference in turnout among those without ID and those with ID only among voters who had not previously voted in any primary or general election from 2008-2014. We find that the difference in 2016 primary turnout for these types of voters is just 0.2 percentage points. This group has a low baseline probability of voting, so there are few voters who could be deterred from voting because they lack identification. Similarly, looking at the last entry in Table 4, the effect of the voter ID law on turnout among those without ID is just 0.8 percentage points for voters who have voted in every primary and general election from 2008-2014. For voters who regularly turnout to vote the voter ID law is an insufficient barrier to deter these voters from

Table 4 – Effect of Voter ID Law on 2016 Primary Election Turnout, by Pre-Treatment Turnout.

	# of Pre-Treatment General Elections				
# of Pre-Treatment Primary Elections	0	1	2	3	4
0	0.002	-0.007	-0.010	-0.017	-0.019
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
1	-0.007	-0.014	-0.018	-0.024	-0.016
	(0.004)	(0.002)	(0.001)	(0.001)	(0.001)
2	-0.007	-0.016	-0.027	-0.024	-0.019
	(0.016)	(0.007)	(0.003)	(0.001)	(0.001)
3	-0.016	-0.001	-0.025	-0.032	-0.013
	(0.064)	(0.016)	(0.005)	(0.003)	(0.000)
4		-0.007	-0.009	-0.019	-0.008
		(0.007)	(0.003)	(0.002)	(0.000)

Each cell estimates the effect of the voter ID law on 2016 primary turnout, estimating the effect separately for different pre-treatment turnout patterns. We construct strata of treated and control units based on the total number of times a voter casted a ballot in a pre-treatment primary election (2008-2014) and pre-treatment general election (2008-2014). We implement the same exact matching procedure described in Section 3. Robust standard errors are in parentheses.

participating. For example, voters in this group may have been motivated to obtain valid identification before the 2016 primary or they might use no-excuse absentee voting, which does not require presenting a photo ID.

In contrast to those who rarely or always turnout, we find large effects among voters who only occasionally turnout to vote. Among those voters who only participated half of the elections they were eligible to participate in, 2 primary and 2 general elections from 2008-2014, we find a 2.7 percentage point effect of the voter ID laws. The estimates are much noisier in the lower left portion of the table because there are very few treated units who turn out to vote in many primary elections but very few general elections — and there are no treated units who voted in every primary election but no general election from 2008 through 2014.

Table 5 shows how the effect of the voter ID law on general election turnout varies with an individual's prior turnout history. Again, we find that the voter ID law had little effect

Table 5 – Effect of Voter ID Law on 2016 General Election Turnout, by Pre-Treatment Turnout.

	# of Pre-Treatment General Elections				
	0	1	2	3	4
# of Pre-Treatment Primary Elections					
0	-0.004	-0.044	-0.036	-0.028	-0.011
	(0.000)	(0.002)	(0.001)	(0.002)	(0.000)
1	-0.037	-0.052	-0.046	-0.030	-0.010
	(0.003)	(0.003)	(0.002)	(0.001)	(0.000)
2	-0.052	-0.046	-0.051	-0.030	-0.008
	(0.013)	(0.007)	(0.005)	(0.002)	(0.000)
3	0.004	-0.067	-0.038	-0.037	-0.006
	(0.004)	(0.028)	(0.010)	(0.003)	(0.000)
4		-0.065	-0.034	-0.023	-0.005
		(0.109)	(0.029)	(0.003)	(0.000)

Each cell estimates the effect of the voter ID law on 2016 primary turnout, estimating the effect separately for different pre-treatment turnout patterns. We construct strata of treated and control units based on the total number of times a voter casted a ballot in a pre-treatment primary election (2008-2014) and pre-treatment general election (2008-2014). We implement the same exact matching procedure described in Section 3. Robust standard errors are in parentheses.

among those who rarely participated in previous elections or those who always turned out to vote. The voter ID law caused only a 0.4 and 0.5 percentage point decline in 2016 general election turnout among those who voted in no elections and in all elections before the ID law was implemented, respectively. Again, we find a much larger effect for voters who only participate occasionally in elections: among those who participated in half of the potential elections we find a 5.1 percentage decrease in turnout.

The voter ID law did not seem to deter low propensity or high propensity voters without ID relative to those with ID. Instead, the voter law deterred voters without ID who participated only occasionally before the law went into effect.

4.2 The Effect of the Law Does Not Vary by Race or Party, But There Is Still a Deterrent Effect for Minorities and Democrats

Perhaps one of the most important legal questions about voter ID laws is assessing whether the laws impose a disproportionate burden on racial minorities. And as a public policy question, it is important to know whether the laws change the partisan composition of the election. To make this evaluation, we need to combine information about the rate groups hold valid identification for voting and how the effect of the law varies by group.

We first test for whether the effect of not holding valid identification varies depending on an individuals race and party affiliation. For brevity, we focus only on the effect in the general election, but we show the results for the 2016 primary election in Section A.2 of the Appendix. Table 6 shows the effect of the voter ID law on general election turnout by race. We interact the treatment variable, not holding valid identification, with indicators for whether the voter is listed as Black, Hispanic, and Other Non-White in the voter file. In our most stringent exact matching specification in column 7, we do not find evidence that the effect of the voter ID law on those without ID varies substantially by race, with individuals from all racial groups deterred by the law.

We also investigate whether the effect of the voter ID law varies by party registration. To do so, we include interactions of the treatment variable with indicators for whether the registrant is a registered Democrat or does not affiliate with a political party. Table 7 shows that in our preferred specification, the effect of the voter ID law does not vary substantially by party registration.

Critically, the lack of heterogeneous effects does not imply that the voter ID laws did not affect the composition of the electorate or that they did not disproportionately deter minorities. In fact, combining the results of this analysis and the information in Table 1 suggests that minority voters and Democrats are disproportionately deterred from voting. This is because Table 1 shows that minority voters are less likely to hold the required identification to vote, the homogeneous effects implies that minority voters were less likely to participate in

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Voted in General (0-1)			
No DMV * 2016	-0.148	-0.155	-0.120	-0.131	-0.033	-0.034	-0.029
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
No DMV * 2016 * Black	-0.013	0.031	-0.029	0.028	-0.002	0.007	0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.004)	(0.004)
No DMV * 2016 * Hispanic	0.113	-0.089	-0.004	-0.122	0.003	-0.012	-0.015
	(0.008)	(0.009)	(0.008)	(0.008)	(0.002)	(0.011)	(0.011)
No DMV * 2016 * Other NW	0.019	-0.066	-0.065	-0.089	-0.003	-0.007	-0.010
	(0.007)	(0.007)	(0.007)	(0.007)	(0.002)	(0.009)	(0.009)
N	24,761,730	24,761,730	24,745,780	24,745,770	24,761,730	24,761,730	24,745,780
# Voters	4,952,346	4,952,346	4,949,156	4,949,154	4,952,346	4,952,346	4,949,156
Individual FEs	Yes	Yes	Yes	Yes	No	No	No
Year FEs	Yes	No	No	No	Yes	Yes	Yes
Race by Year FEs	No	Yes	No	No	No	No	No
Age by Year FEs	No	No	Yes	No	No	No	No
Race by Age by Year FEs	No	No	No	Yes	No	No	No
Exact Match on Turnout	No	No	No	No	Yes	Yes	Yes
Exact Match on Race	No	No	No	No	No	Yes	Yes
Exact Match on Age Bin	No	No	No	No	No	No	Yes

Robust standard errors clustered by individual in parentheses. Main effects for No DMV Match and 2016 are absorbed by
fixed effects. Exact matching on turnout matches units based on all primary and general elections from the 2008 primary
through the 2016 primary. For exact matching on age, we construct a separate age bin for each group of voters who were
under 18 for a given set of elections, so the cohort of voters who became newly eligible to participate in 2010, 2012, 2014,
and 2016 each have their own age bin. For voters who were eligible for all elections since 2008, we construct age deciles.

the 2016 primary and general elections as the result of the law. Similarly, because registered
Democrats were less likely to hold valid identification they were disproportionately deterred.
We demonstrate this directly in the next section, showing how many voters were deterred
and how this altered the composition of the electorate .

5   Characterizing the Overall Effect of the ID Law

We find that the deterrent effect of the voter ID law is largest among those who participated
in elections only occasionally before 2016, and we find that the effect of the law does not vary
significantly by race and by party affiliation. Here, we incorporate these findings along with
the composition of voters with and without ID to try to answer three questions about the
effect of the voter ID law in North Carolina. First, what effect did the law have on overall
turnout? Second, what was the total reduction in overall turnout by race and by party

**Table 7 – Effect of Voter ID Law on General Election Turnout
Among Those Without ID, Individual Level, 2008–2016.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Voted in General (0-1)						
No DMV * 2016	-0.151	-0.160	-0.107	-0.119	-0.031	-0.032	-0.031
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
No DMV * 2016 * Dem	-0.020	-0.004	-0.031	-0.004	-0.003	0.000	0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
No DMV * 2016 * Unaffil	0.071	0.056	-0.044	-0.040	-0.002	0.001	0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)
N	24,761,730	24,761,730	24,745,780	24,745,770	24,761,730	24,761,730	24,745,780
# Voters	4,952,346	4,952,346	4,949,156	4,949,154	4,952,346	4,952,346	4,949,156
Individual FEs	Yes	Yes	Yes	Yes	No	No	No
Year FEs	Yes	No	No	No	Yes	Yes	Yes
Race by Year FEs	No	Yes	No	No	No	No	No
Age by Year FEs	No	No	Yes	No	No	No	No
Race by Age by Year FEs	No	No	No	Yes	No	No	No
Exact Match on Turnout	No	No	No	No	Yes	Yes	Yes
Exact Match on Race	No	No	No	No	No	Yes	Yes
Exact Match on Age Bin	No	No	No	No	No	No	Yes

Robust standard errors clustered by individual in parentheses. Main effects for No DMV Match and 2016 are absorbed by fixed effects. Exact matching on turnout matches units based on all primary and general elections from the 2008 primary through the 2016 primary. For exact matching on age, we construct a separate age bin for each group of voters who were under 18 for a given set of elections, so the cohort of voters who became newly eligible to participate in 2010, 2012, 2014, and 2016 each have their own age bin. For voters who were eligible for all elections since 2008, we construct age deciles.

affiliation? Third, how did the voter ID law change the racial and partisan composition of the electorate?

To answer the first question, we define the overall effect as the following:

$$\text{Overall Effect} = \text{Mechanical Effect} + \text{Deterrent Effect} \tag{2}$$

where the mechanical effect is given by the number of provisional ballots that were ultimately rejected for lack of adequate photo ID, and the deterrent effect is given by the following equation:

$$\text{Deterrent Effect} = (\text{Deterrent Effect}|\text{No ID}) * (\# \text{ No ID}) + (\text{Deterrent Effect}|\text{ID}) * (\# \text{ ID}) \tag{3}$$

The deterrent effect among those who have photo ID is not identified using our research design. Our estimates in this section, therefore, assume this quantity to be equal to zero.[21]

---

[21]Substantively, this would mean that the implementation of the voter ID law had no effect on turnout among those who have photo ID. This could be violated in a few ways. First, those with photo ID might

We compute the probability of not holding ID simply as the share of registrants that do not match to a DMV record (2.24%), and we compute the information effect using the point estimates from our most stringent specifications (column 7) in Tables 2 and 3 for the primary and general elections, respectively. The overall effect of the voter ID law on primary election turnout in number of votes, therefore, is

$$\text{Overall Effect in Primary} = \text{Mechanical Effect in Primary} + \text{Deterrent Effect in Primary}$$

$$= -1,169 - (0.011) * 119,044$$

$$\approx -1,169 - 1,309$$

$$= -2,478$$

which is about 0.103% of the 2016 primary electorate in North Carolina. This is consistent with Cantoni and Pons (2019), which finds small effects of voter ID laws on overall turnout using a nationwide voter file panel. Even in a large nationwide panel researchers lack the power to detect this sized effect. Similarly, the overall effect in the general election is

$$\text{Overall Effect in General} = \underbrace{\text{Mechanical Effect in General}}_{0} + \text{Deterrent Effect in General}$$

$$= 0 - (0.026) * 119,044$$

$$\approx -3,095$$

which is about 0.065% of the 2016 general electorate in North Carolina.[22]

Reconciling Null and Deterrent Effects   These findings help reconcile two competing claims that can both be true. First, prior research has shown that strict voter ID laws cause a decline in turnout among those without photo ID. And second, strict photo ID laws do

---

nonetheless be confused by the law and be deterred from voting. Second, those with photo ID might be motivated by the ID law, either because they are angry that those without ID could be disenfranchised, or because they are less costly for parties and interest groups to mobilize.

[22]The mechanical effect in the 2016 general election is equal to zero because the strict photo ID law was not in effect for this election.

not cause substantively large declines in overall turnout resulting in null effects for many aggregate level analyses. Our results show that because the vast majority of potential voters hold valid identification, the effect of the voter ID law is to deter only a small number of voters. In an aggregate setting this number of voters is sufficiently small that there is no design, to our knowledge, with sufficient power to detect the effect on this small number of voters.

5.1 How Voter ID Laws Change the Composition of the Electorate

We perform similar calculations to assess how voter ID laws affect partisan and racial composition of the electorate. To do this, we decompose overall turnout effects by race and by party using the following procedure. For the mechanical effect in the 2016 primary election, we simply sum the number of voters who had provisional ballots ultimately rejected for lack of ID for each racial group and for each party affiliation. For the deterrent effect, we multiply our estimated information effect (from column 7 of Tables 2 and 3, respectively) among those without ID by the total number of voters without ID who belong to each racial group and partisan affiliation.[23] Adding the mechanical effect and the deterrent effect gives an estimate of the overall vote reduction, which we summarize in Table 8. Panel A decomposes the vote reduction by race, and Panel B decomposes the vote reduction by party affiliation. For example, we estimate that in the 2016 primary election the strict photo ID law reduced turnout among White voters by about 1,347 votes, 648 of which came through a mechanical effect and 699 of which came through an information effect. It reduced 2016 primary turnout among Black voters by about 916 votes overall. An estimated 37% of the total vote reduction in the 2016 primary were among Black voters, which is much higher than their overall share of the voter file (22.6%). This illustrates how the voter ID law can have disproportionate effects on turnout by race. Black registrants are much more likely to lack ID than White registrants, so they bear a larger burden of the turnout reduction even though the size of

---

[23]This assumes that the effect of the voter ID law among those without ID is constant across race and across party. We find in Tables 6 and 7 that the effects do not seem to vary substantially by these characteristics.

Table 8 – Vote Reduction from Voter ID Law by Race and Party Affiliation

| | A. Decomposition by Race | | | | | |
| | 2016 Primary | | | 2016 General | | |
	Mechanical	Deterrent	Overall	Mechanical	Deterrent	Overall
White	648	699	1,347	-	1,651	1,651
Black	421	495	916	-	1,171	1,171
Hispanic	22	47	69	-	112	112
Other Non-White	78	68	146	-	161	161
Total	1,169	1,319	2,478	-	3,095	3,095

| | B. Decomposition by Party | | | | | |
| | 2016 Primary | | | 2016 General | | |
	Mechanical	Deterrent	Overall	Mechanical	Deterrent	Overall
Democrat	670	755	1,425	-	1,785	1,785
Republican	265	269	534	-	635	635
Unaffiliated	234	286	520	-	675	675
Total	1,169	1,319	2,478	-	3,095	3,095

Note: Each cell presents an estimated total reduction in turnout as a consequence of the voter ID law. Panel A decomposes the effect of the voter ID law by racial group. Panel B decomposes the effect of the voter ID law by party affiliation. The first three columns decompose the effect in the 2016 primary, while the last three columns decompose the effect in the 2016 general. Note that the mechanical effect is zero in the 2016 general election because the law was not in effect for that election.

the effect among those without ID does not vary by race. We find a similar pattern in the 2016 general election, where about 38% of voters deterred by the ID law were Black.

In Panel B we decompose the vote reduction by party affiliation. We find that the ID law reduced turnout among Democrats by about 1,425 votes, 670 of which came from a mechanical effect and 755 of which came from a deterrent effect. As a share of the total vote reduction, Democratic registrants account for about 57.5% of the total vote reduction in the 2016 primary and about 57.7% of the reduction in the 2016 general election. This is much higher than the overall share of Democrats in the North Carolina voter file (41.1%), which suggests that the voter ID law disproportionately reduced turnout among Democrats because they are more likely to lack ID than Republicans.

To situate the vote reductions due to the voter ID law in a broader context we estimate how the law's effects changed the composition of the North Carolina electorate in the 2016

primary and general elections. In Table 9 we show the racial and partisan composition of the North Carolina in the 2016 Primary and 2016 General election under the column "With Law." These are the observed shares of those who voted in each election. To estimate how the racial composition of the electorate would have changed had the ID law not been passed, we add the vote reductions from Table 8 – that is, the number of additional voters we estimate would have participated had the law not been passed – to the observed number of voters in each election. We show the estimated racial (Panel A) and partisan (Panel B) composition of the electorate under the counterfactual scenario without the voter ID law. It shows that, because the effects among those without ID are relatively small, along with the fact that those without ID make up a small portion of the electorate, these vote reductions have only a small effect on the overall composition of the electorate, at least along racial and partisan dimensions. We note, that this interpretation of the findings requires relatively strong assumptions about voter behavior in the absence of the law. Specifically, that the law had no effect on the participation decision of those with the required identification.

6   Conclusion

Voter ID laws have become politically contentious in recent years, with Republican legislatures often implementing strict requirements, and these laws are occasionally softened or overturned as a result of legal challenges (Hicks et al. 2015). How these laws affect voter turnout is an important question, but there is little empirical work on the effects of these laws that uses administrative data on individual turnout over time along with a measure of which individuals actually might lack ID. We leverage information in North Carolina on which voters lack photo ID to estimate the effect of North Carolina's voter ID law on turnout among those identified as possibly lacking photo ID and how the extent to which the law's effects remained in place even after an appellate court struck down the law. We find that the North Carolina voter ID law deterred voters both in the primary and general election and

Table 9 – Change in Composition of Electorate as a Function of ID Law

| | A. Change in Racial Composition | | | |
| | 2016 Primary | | 2016 General | |
	Without Law	With Law	Without Law	With Law
White	77.20%	77.23%	73.35%	73.36%
Black	19.03%	19.01%	21.26%	21.25%
Hispanic	1.31%	1.31%	2.08%	2.08%
Other Non-White	2.45%	2.45%	3.30%	3.30%

| | A. Change in Partisan Composition | | | |
| | 2016 Primary | | 2016 General | |
	Without Law	With Law	Without Law	With Law
Democrat	39.45%	39.43%	39.18%	39.16%
Republican	36.15%	36.16%	32.96%	32.96%
Unaffiliated	24.41%	24.41%	27.86%	27.87%

Note: Each cell presents our estimates of share of the electorate that belongs to a given category with and without the strict photo ID law. Panel A shows the change in the racial composition of the electorate, while Panel B shows the change in the partisan composition of the electorate as a function of the strict photo ID law. The first two columns show comparisons for the 2016 primary election, while the last two columns show comparisons for the 2016 general election

that this occurred both because the law mechanically unable to vote because they lacked the required identification and because the law exerted a general deterrent effect as voters inferred they would be unable to vote and therefore declined to turnout at all.

Our findings also help to reconcile two seemingly disparate claims in the literature on voter ID laws. The first claim is that voter ID laws reduce turnout among those without ID, which particularly burdens racial minorities and Democratic voters. The second claim is that voter ID laws have little discernible effect on overall turnout, even among various subgroups (Cantoni and Pons 2019). Our paper demonstrates both of these claims can simultaneously be true. We find that the voter ID law did deter those without identification from voting. And we find this effect is small enough that studies of aggregate turnout would be unable to detect it. Further, we find that the law alters the composition of the North Carolina electorate, but because the law has relatively small effect the shift in electorate composition is also small.

Our results suggest important policy considerations as states consider voter identification laws and then those laws are contested in courts. Our results suggest that if voters are not informed about changing laws they may continue to be deterred by the incorrect belief that they lack proper identification to vote. Our results point to the need for future research to examine effective ways to inform voters about the changing requirements to cast ballows.

Our findings suggest two important considerations for researchers estimating the effects of voter ID laws. The first is defining the estimand of interest, and the second is implementing an appropriate design to estimate the stated quantity of interest. Whether voter ID laws meaningfully reduce turnout among those without ID and whether voter ID laws meaningfully reduce overall turnout are two important, but very different, questions. To answer the former with the precision necessary to make policy recommendations, treated units (those without ID) should be measured at the individual level and measured at scale. Our findings, along with other recent work in Rhode Island, combines administrative data on who lacks ID with a research design to estimate the effect of the voter ID law using real-world, observed voting behavior (Esposito, Focanti, and Hastings 2019). To answer the latter requires an appropriate research design but not information on who lacks ID (e.g., Cantoni and Pons 2019). That said, given that only a small number of voters lack ID – that is, very few units are treated – the effects of strict voter ID laws on overall turnout are likely to be small unless the laws have broader consequences for those who have photo ID.

References

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

Alvarez, R Michael, Delia Bailey, and Jonathan N Katz. 2011. "An Empirical Bayes Approach to Estimating Ordinal Treatment Effects." *Political Analysis* 19(1): 20–31.

Ansolabehere, Stephen. 2012. Report on Racial Differences in Matching Voter Registration Lists to Driver's License and License to Carry Databases in the State of Texas. Technical report Paper Submitted in *Texas v. Holder*, June 30, No. 12-0128 (D.D.C.).

Ansolabehere, Stephen, and Eitan D Hersh. 2017. "ADGN: An Algorithm for Record Linkage Using Address, Date of Birth, Gender, and Name." *Statistics and Public Policy* 4(1): 1–10.

Atkeson, Lonna Rae, Yann P Kerevel, R Michael Alvarez, and Thad E Hall. 2014. "Who Asks for Voter Identification? Explaining Poll-Worker Discretion." *Journal of Politics* 76(4): 944–957.

Barreto, Matt A., and Gabriel R. Sanchez. 2012. Rates of Possession of Accepted Photo Identification, Among Different Subgroups in the Eligible Voter Population, Milwaukee County, Wisconsin. Technical report Expert Report Submitted on Behalf of Plaintiffs in *Frank v. Walker*, April 23, No. 11-01128 (E.D. Wis.).

Barreto, Matt A.; Gabriel R. Sanchez, and Hannah Walker. 2012. Rates of Possession of Valid Photo identification, and Public Knowledge of the Voter ID Law in Pennsylvania. Technical report Paper Submitted in Applewhite v. Commonwealth, July 16, No. 330 MD 2012 (Pa. Commw. Ct.).

Barreto, 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 & Politics* 42(01): 111–116.

Beatty, Leland. 2012. Technical report Declaration Submitted in League of United Latin American Citizens v. Deininger, April 23, No. 12-00185 (E.D. Wis.).

Cantoni, Enrico, and Vincent Pons. 2019. "Strict ID Laws Don't Stop Voters: Evidence from a US Nationwide Panel, 2008–2016." *National Bureau of Economic Research Working Paper No. 25522* .

Citrin, Jack, Donald P Green, and Morris Levy. 2014. "The effects of voter ID notification on voter turnout: Results from a large-scale field experiment." *Election Law Journal* 13(2): 228–242.

Claibourn, Michele P, and Paul S Martin. 2012. "Creating Constituencies: Presidential Campaigns, the Scope of Conflict, and Selective Mobilization." *Political Behavior* 34(1): 27–56.

Cobb, Rachael V, D James Greiner, and Kevin M Quinn. 2010. "Can voter ID laws be administered in a race-neutral manner? Evidence from the city of Boston in 2008." *Quarterly Journal of Political Science* 7(1): 1–33.

Erikson, Robert S, and Lorraine C Minnite. 2009. "Modeling Problems in the Voter Identification-Voter Turnout Debate." *Election Law Journal* 8(2): 85–101.

Esposito, Francesco Maria, Diego Focanti, and Justine S Hastings. 2019. "Effects of Photo ID Laws on Registration and Turnout: Evidence from Rhode Island." *National Bureau of Economic Research Working Paper No. 25503* .

Fraga, Bernard, and Michael Miller. 2018. "Who Does Voter ID Keep From Voting?".

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

Hajnal, Zoltan, Nazita Lajevardi, and Lindsay Nielson. 2017. "Voter Identification Laws and the Suppression of Minority Votes." *The Journal of Politics* 79(2): 000–000.

Henninger, Phoebe, Marc Meredith, and Michael Morse. 2018. "Who Votes Without Identification? Using Affidavits from Michigan to Learn About the Potential Impact of Strict Photo Voter Identification Laws.".

Hicks, William D, Seth C McKee, Mitchell D Sellers, and Daniel A Smith. 2015. "A Principle or a Strategy? Voter Identification Laws and Partisan Competition in the American States." *Political Research Quarterly* 68(1): 18–33.

Highton, Benjamin. 2017. "Voter Identification Laws and Turnout in the United States." *Annual Review of Political Science* 20: 149–167.

Hobby, Bill, Cong Huang, David Llanos, Chris Mainka, Kwok-Wai Wan, Ching-Hsing Wang, and Isaiah Warner. 2015. "The Texas Voter ID Law and the 2014 Election: A Study of Texas's 23rd Congressional District.".

Hood, MV, and Charles S Bullock. 2008. "Worth a Thousand Words? An Analysis of Georgia's Voter Identification Statute." *American Politics Research* 36(4): 555–579.

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

Hopkins, Daniel J, Marc Meredith, Michael Morse, Sarah Smith, and Jesse Yoder. 2017. "Voting But For the Law: Evidence from Virginia on Photo Identification Requirements." *Journal of Empirical Legal Studies* 14(1): 79–128.

Mycoff, Jason D, Michael W Wagner, and David C Wilson. 2009. "The Empirical Effects of Eoter-ID Laws: Present or absent?" *PS: Political Science & Politics* 42(01): 121–126.

Stewart III, Charles. 2013. "Voter ID: Who Has Them; Who Shows Them." *Okla. L. Rev.* 66: 21.

Valentino, Nicholas A, and Fabian G Neuner. 2017. "Why the Sky Didn't Fall: Mobilizing Anger in Response to Voter ID Laws." *Political Psychology* 38(2): 331–350.

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

Online Appendix

Intended for online publication only.

A.1 Validating the Parallel Trends Assumption

Our estimation of the deterrent effect of the voter ID law on turnout among those without ID, in Tables 2 and 3, relies on the parallel trends assumption being satisfied. In column 1 of these tables, where we simply include individual fixed effects and year fixed effects, it must be the case that individuals who lacked ID would have followed the same turnout trends in 2016 as those who had ID. There are reasons to be skeptical of this assumption, given that there are large differences between the types of people who have photo ID and those who do not. For that reason, in columns 2 through 7 of Tables 2 and 3 we adjust the estimation in a variety of ways to make the parallel trends assumption increasingly plausible. We describe these alternative specifications in more detail in the main body of the paper, but in this section we try to assess whether the parallel trends assumption might be satisfied under each of our specifications.

Table A.1 – Evidence of Pre-Trending: Effect of Voter ID Law Lead on Primary Election Turnout Among Those Without ID, Individual Level, 2008–2016.

| | Voted in Primary (0-1) | | | | | | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No DMV Match * 2016	-0.091	-0.085	-0.066	-0.059			
	(0.001)	(0.001)	(0.001)	(0.001)			
No DMV Match * 2014	0.004	0.003	0.002	0.003	-0.003	-0.003	-0.005
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	24761730	24761730	24745780	24745770	19809384	19809384	19796624
# Voters	4952346	4952346	4949156	4949154	4952346	4952346	4949156
Individual FEs	Yes	Yes	Yes	Yes	No	No	No
Year FEs	Yes	No	No	No	Yes	Yes	Yes
Race by Year FEs	No	Yes	No	No	No	No	No
Age by Year FEs	No	No	Yes	No	No	No	No
Race by Age by Year FEs	No	No	No	Yes	No	No	No
Exact Match on Turnout	No	No	No	No	Yes	Yes	Yes
Exact Match on Race	No	No	No	No	No	Yes	Yes
Exact Match on Age Bin	No	No	No	No	No	No	Yes

Robust standard errors clustered by individual in parentheses. Main effect for No DMV Match is absorbed by fixed effects. Exact matching on turnout matches units based on all primary and general elections from 2008-2012. For exact matching on age, we construct a separate age bin for each group of voters who were under 18 for a given set of elections, so the cohort of voters who became newly eligible to participate in 2010, 2012, and 2014 each have their own age bin. For voters who were eligible for all elections since 2008, we construct age deciles.

To do so, in Table A.1 we mirror the columns in Table 2 but include a lead of the treatment variable to check for evidence of pre-trending. We find that the coefficients on the leads are small, and the coefficients on the main effects in columns 1-4 remain similar to

those in Table 2. This adds to the plausibility of the parallel trends assumption, at least for primary election turnout.

In columns 5-7, because we use exact matching on pre-treatment turnout, we have to adjust the estimation slightly to check for pre-trending. We implement exact matching on 2008-2012 primary and general election turnout, and then we estimate the effect of the voter ID law among those without ID in 2014, which is before the voter ID law went into effect. We see substantively small, but negative, effects on these coefficients, suggesting that turnout among those without ID declined slightly prior to the law being implemented, even after matching exactly on turnout history, race, and age decile. One possible explanation for this is that the North Carolina voter ID law was passed in 2013 but to be implemented starting in 2016. If individuals without ID were confused about when the law went into effect, they could have been deterred from voting even prior to the law being implemented.

Table A.2 – Evidence of Pre-Trending: Effect of Voter ID Law Lead on General Election Turnout Among Those Without ID, Individual Level, 2008–2016.

| | Voted in General (0-1) | | | | | | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No DMV Match * 2016	-0.153	-0.155	-0.140	-0.135			
	(0.001)	(0.001)	(0.001)	(0.001)			
No DMV Match * 2014	-0.021	-0.018	-0.024	-0.022	-0.008	-0.008	-0.007
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
N	24761730	24761730	24745780	24745770	19809384	19809384	19809384
# Voters	4952346	4952346	4949156	4949154	4952346	4952346	4952346
Individual FEs	Yes	Yes	Yes	Yes	No	No	No
Year FEs	Yes	No	No	No	Yes	Yes	Yes
Race by Year FEs	No	Yes	No	No	No	No	No
Age by Year FEs	No	No	Yes	No	No	No	No
Race by Age by Year FEs	No	No	No	Yes	No	No	No
Exact Match on Turnout	No	No	No	No	Yes	Yes	Yes
Exact Match on Race	No	No	No	No	No	Yes	Yes
Exact Match on Age Bin	No	No	No	No	No	No	Yes

Robust standard errors clustered by individual in parentheses. Main effect for No DMV Match is absorbed by fixed effects. Exact matching on turnout matches units based on all primary and general elections from the 2008 primary through the 2014 primary. For exact matching on age, we construct a separate age bin for each group of voters who were under 18 for a given set of elections, so the cohort of voters who became newly eligible to participate in 2010, 2012, and 2014 each have their own age bin. For voters who were eligible for all elections since 2008, we construct age deciles.

Next, in Table A.2 we do the same checks for pre-trending using general election turnout as the outcome. Here, the results are similar: using our exact matching approach in columns 5-7, those who did not match to a DMV record saw a small decline in turnout in 2014, before the voter ID law went into effect. Again, this is consistent with the idea that if individuals were confused about the timing of the law's implementation, the deterrent effects of the voter ID law on those without ID could manifest prior to the law going into effect.

A.2 Exploring Heterogeneity in the Effect by Race and Party Registration

In this section, we explore heterogeneity in the effect of the voter ID law for primary elections.

First, in Table A.3 we estimate whether the effect of the voter ID law varies by race, but we use primary election turnout as the outcome rather than general election turnout, as in Table 6 in the main body of the paper. Similar to the effects in general elections, we do not find evidence that the effect of the law varies substantially by race as we implement our most stringent specification (column 7).

Table A.3 – Effect of Voter ID Law on Primary Election Turnout Among Those Without ID, Individual Level, 2008–2016.

				Voted in Primary (0-1)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No DMV * 2016	-0.081	-0.097	-0.048	-0.062	-0.012	-0.015	-0.011
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
No DMV * 2016 * Black	-0.033	0.028	-0.044	0.012	-0.005	0.006	0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)
No DMV * 2016 * Hispanic	0.046	0.018	-0.001	-0.016	0.008	0.003	-0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.001)	(0.008)	(0.008)
No DMV * 2016 * Other NW	-0.018	0.019	-0.054	-0.016	0.000	0.005	0.002
	(0.005)	(0.006)	(0.005)	(0.006)	(0.001)	(0.007)	(0.007)
N	24761730	24761730	24745780	24745770	24761730	24761730	24745780
# Voters	4952346	4952346	4949156	4949154	4952346	4952346	4949156
Individual FEs	Yes	Yes	Yes	Yes	No	No	No
Year FEs	Yes	No	No	No	Yes	Yes	Yes
Race by Year FEs	No	Yes	No	No	No	No	No
Age by Year FEs	No	No	Yes	No	No	No	No
Race by Age by Year FEs	No	No	No	Yes	No	No	No
Exact Match on Turnout	No	No	No	No	Yes	Yes	Yes
Exact Match on Race	No	No	No	No	No	Yes	Yes
Exact Match on Age Bin	No	No	No	No	No	No	Yes

Robust standard errors clustered by individual in parentheses. Main effects for No DMV Match and 2016 are absorbed by fixed effects. Exact matching on turnout matches units based on all primary and general elections from 2008-2014. For exact matching on age, we construct a separate age bin for each group of voters who were under 18 for a given set of elections, so the cohort of voters who became newly eligible to participate in 2010, 2012, 2014, and 2016 each have their own age bin. For voters who were eligible for all elections since 2008, we construct age deciles.

Next, in Table A.4 we explore whether the effect of the voter ID law varies by party in primary elections, mirroring the Table on general election voting in Table 7. Again, we do not find evidence that the effect of the ID law is meaningfully different for Republicans, Democrats, and unaffiliated registrants. Again, we stress that homogeneity in the effect size does not mean that the law did not affect the composition of the electorate: because those without ID are more likely to be Democrats and unaffiliated voters than those with ID (Table 1), the law seems to have decreased turnout among , Because those without ID are more likely to be Democrats voters than those with ID, the overall effect of the law decreased (albeit slightly) the share of Democratic voters in the electorate.

Table A.4 – Effect of Voter ID Law on Primary Election Turnout Among Those Without ID, Individual Level, 2008–2016.

	Voted in Primary (0-1)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No DMV * 2016	-0.045	-0.056	-0.010	-0.020	-0.009	-0.015	-0.014
	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.002)
No DMV * 2016 * Dem	-0.079	-0.050	-0.080	-0.053	-0.007	0.001	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.002)
No DMV * 2016 * Unaffil	-0.006	-0.001	-0.048	-0.042	-0.003	0.004	0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.002)
N	24761730	24761730	24745780	24745770	24761730	24761730	24745780
# Voters	4952346	4952346	4949156	4949154	4952346	4952346	4949156
Individual FEs	Yes	Yes	Yes	Yes	No	No	No
Year FEs	Yes	No	No	No	Yes	Yes	Yes
Race by Year FEs	No	Yes	No	No	No	No	No
Age by Year FEs	No	No	Yes	No	No	No	No
Race by Age by Year FEs	No	No	No	Yes	No	No	No
Exact Match on Turnout	No	No	No	No	Yes	Yes	Yes
Exact Match on Race	No	No	No	No	No	Yes	Yes
Exact Match on Age Bin	No	No	No	No	No	No	Yes

Robust standard errors clustered by individual in parentheses. Main effects for No DMV Match and 2016 are absorbed by fixed effects. Exact matching on turnout matches units based on all primary and general elections from 2008-2014. For exact matching on age, we construct a separate age bin for each group of voters who were under 18 for a given set of elections, so the cohort of voters who became newly eligible to participate in 2010, 2012, 2014, and 2016 each have their own age bin. For voters who were eligible for all elections since 2008, we construct age deciles.

A.3   News Coverage of the Voter Identification Law

In order to provide a baseline assessment of how the North Carolina voter identification law was covered, we engage in a simple analysis of newspaper coverage. To do this, we use two different kinds of news sources. To approximate coverage in North Carolina, we use the relatively small paper: The Star News, in Wilmington. And to approximate what national coverage looks like, we used The New York Times, Washington Post, and USA Today. Using the papers we first searched for all stories that contained the words "campaign" and "North Carolina".

From this set of stories we did a simple regular expression search for instances of "voter id". This will capture a variety of uses of the word. Obviously, this might include stories other than those about the requirements for voting or the controversy surrounding the law, but a reading of the stories suggests that this captures stories that cover the North Carolina law.

Figure A.1 counts the number of stories covered in the Star News (left-histogram) and the national papers (right-histogram). We have labeled the date of the appellate court ruling and the date of the election. This shows that a large share of the coverage comes right as the appellate court decision was made, three months before the election. And subsequently there was little coverage in the local paper, even as election day approached. The national

Figure A.1 – News Coverage of North Carolina Voter ID Law
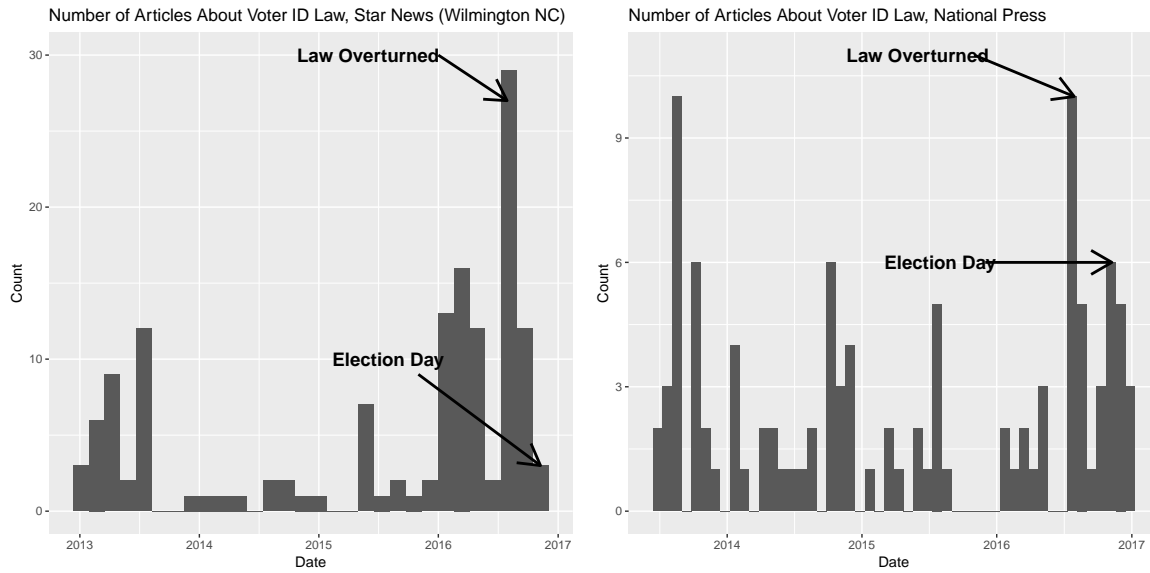
papers covered voter identification more, but those stories tended to not focus on the specific requirements in North Carolina.

Together, Figure A.1 suggests that voters without identification would not find easily accessible information about the changing requirements for voting. Voters could seek the information out, but it does not appear that the information would happened to be discovered by voters not explicitly looking for the information.