

DECLARATION OF DR. MARC MEREDITH

I. Executive Summary

1. The plaintiffs in this case have asked me to investigate how the number and placement of polling locations is likely to affect the number of ballots cast in the November 3, 2020 (henceforth 2020 general) election in Pennsylvania. My conclusions are that:

- a. The cost of in-person voting increases when a potential voter's polling location is not located in the same building that it is normally located in, when a potential voter must spend more time traveling to the polling location, and when a potential voter must spend more time waiting in line at their polling location before casting a ballot.
- b. Increases in the cost of in-person voting will cause some potential voters to cast a mail ballot instead of an in-person ballot, while causing other potential voters to abstain instead of casting an in-person ballot.
- c. Racial and ethnic minorities are more likely to be disenfranchised by increases in the costs of in-person voting, in part because they are generally less trusting of mail ballots.

2. I reach these conclusions based on my application of political science research on the calculus of voting, survey data about trust in election administration, previous research on how the placement of polling locations affect voter turnout, and my analysis of how the consolidation of polling locations in Allegheny County and Philadelphia County affected turnout in the June 2, 2020 (henceforth 2020 primary) election. My report proceeds as follows. Section II highlights my background and qualifications. Section III documents my sources of information. Section IV presents the calculus of voting, a widely applied framework within political science to understand

why someone chooses to vote or abstain from voting. Section V expands upon the calculus of voting to describe how a potential voter selects their method for casting a ballot. Section VI describes published research on how the placement of polling locations affects turnout. Section VII details how I reach my conclusion that the consolidation of polling locations in Allegheny County and Philadelphia County in the 2020 primary election reduced turnout, particularly among racial and ethnic minorities. Section VIII concludes. Section IX is a technical appendix that details how I estimated the race and ethnicity of registrants and calculated the distance between a registrant's residence and their polling locations, and presents tables of the regression analysis visualized in Section VII. Section X details the works that I referenced when preparing this report. Section XI contains my current curriculum vitae.

II. Background and Qualifications

A. Credentials

3. I am a tenured associate professor in the Department of Political Science at the University of Pennsylvania. I also hold a courtesy appointment in the Business Economics group at the Wharton School of Business at the University of Pennsylvania. Prior to starting my position at the University of Pennsylvania in 2009, I was a visiting lecturer at the Massachusetts Institute of Technology Department of Political Science.

4. I have extensive training in economics, political science, and statistics. I received a B.A. in Economics and Mathematical Methods in the Social Sciences from Northwestern University in 2002, an M.A. in Economics from Northwestern University in 2002, an M.A. in Political Science from Stanford University in 2006, and a Ph.D. in Business Administration from the Political Economics group in the Stanford Graduate School of Business in 2008. My

coursework in these degree programs trained me in how to apply economic and statistical modeling to understand the behavior of voters and politicians.

5. At both the Massachusetts Institute of Technology and the University of Pennsylvania, I have taught a number of different courses in statistical theory and statistical programming to both undergraduates and Ph.D. students. At the University of Pennsylvania, I also frequently teach a large survey course on American Politics to undergraduates and courses on the public policy process to both undergraduate and master's in public administration students. I received the Henry Teune Award for outstanding teaching in the undergraduate political science program in 2014 and the Fels Institute Teaching Award for outstanding teaching in the Master's in Public Administration program in 2017.

B. *Publications*

6. Since receiving my Ph.D., I have continued to expand my expertise in American elections and statistics through my work on numerous research projects. I am an author on 20 peer-reviewed journal articles, and I am currently working on many additional projects that I anticipate will generate numerous peer-reviewed articles. Much of my peer-reviewed work is published in the leading journals for scholars of American Politics or interdisciplinary science journals, including *American Political Science Review*, *American Journal of Political Science*, the *Journal of Politics*, and the *Proceedings of the National Academy of Science*. One of these articles received the Best Paper on Public Policy award from the American Political Science Association in 2014.¹ One strand of my research that is particularly relevant for this case uses information contained in voter registration databases to understand the causes of voter turnout. One of my most-cited articles

¹ Alan S. Gerber, Gregory A. Huber, Marc Meredith, Daniel. R. Biggers & David J. Hendry, *Can Incarcerated Felons Be (Re)integrated into the Political System? Results from a Field Experiment*, 59 Am. J. Pol. Sci. 912 (2015).

uses data on turnout from state voter registration databases to establish that voting in one election increases the chance that someone will vote again in future elections.² I also authored a number of additional studies that examine the administration and consequences of criminal disenfranchisement laws.³ By combining information in voter registration and criminal justice databases, I generated widely-cited estimates of ex-felon turnout and showed how ex-felon turnout is affected by state policy. Some of my other published work within this strand of research examines how specific election administration processes, like mail-in balloting and voter identification requirements, affect voter turnout.⁴

C. *Professional Recognition*

7. My expertise on American politics is frequently recognized within the academy. While a professor at the University of Pennsylvania, I have received highly competitive visiting scholar appointments at the Institute for Advanced Study in Toulouse, Nuffield College at Oxford University, and the Center for the Study of Democratic Politics at Princeton University. Many top universities, including the University of California-Berkeley, Columbia University, Harvard University, Princeton University, and Yale University, have invited me to present in their colloquia. I also recently presented my research on voter identification laws before the Michigan Advisory Committee to the U.S. Commission on Civil Rights. My expertise is also frequently drawn upon to evaluate conference submissions, peer-review submissions, and candidates for

² Marc Meredith, *Persistence in Political Participation*, 4 Q. J. Pol. Sci. 187 (2009).

³ Marc Meredith & Michael Morse, *The Politics of the Restoration of Ex-Felon Voting Rights: The Case of Iowa*, 10 Q.J. Pol. Sci. 41 (2015); Alan S. Gerber, Gregory A. Huber, Marc Meredith, Daniel R. Biggers & David J. Hendry, *Does Incarceration Reduce Voting? Evidence about the Political Consequences of Spending Time in Prison*, 79 J. Po. 1130 (2017).

⁴ Marc Meredith & Neil Malhotra, *Convenience Voting Can Affect Election Outcomes*, 10 Election L. J. 227 (2011); Daniel J. Hopkins, Marc Meredith, Michael Morse, Sarah Smith & Jesse Yoder, *Voting but for the Law: Evidence from Virginia on Photo Identification Requirements*, 14 J. Empirical Legal Stud. 79 (2017); Justin Grimmer, Eitan Hirsch, Marc Meredith, Jonathan Mummolo & Clayton Nall, *Obstacles to Estimating Voter ID Laws' Effect on Turnout*, 80 J. Pol. 1045 (2018).

tenure. Since the start of 2017, I have reviewed 65 journal articles and 7 external promotion cases. I served as the co-chair of the host committee for the 2019 Election Science, Reform, and Administration Conference at the University of Pennsylvania.

8. Journalists frequently cite my expertise on American elections. In the last two years, numerous leading outlets, including *The New York Times*, *Newsweek*, *The Wall Street Journal*, and *The Washington Post*, quoted me about criminal disenfranchisement laws. In addition, the National Public Radio program “This American Life” did a segment on my research on election fraud as part of an episode entitled “Things I Mean to Know,” while *Slate* and *Vox* published articles that I have written summarizing my academic research on voter fraud and criminal disenfranchisement to a broader audience.⁵ I also consult for the NBC News Decision Desk, where, as a senior analyst, I help generate statistical models and apply them with a team to determine NBC’s projections of winning candidates on election nights.

D. Previous work and compensation

9. I previously testified as an expert witness in *Common Cause v. Brehm* (Case No. 1:17-cv-06770-AJN) (S.D.N.Y.). I also submitted a declaration in *Crossey v. Boockvar* (Case No. 266 M.D. 2020) (Pa. Commw. Ct.), *Common Cause Indiana v. Lawson* (Case No. 1:20-cv-1825), and *Middleton v. Andino* (Case No. 3:20-cv-01730-JMC). Plaintiffs’ counsel is compensating me at

⁵ Sharad Goel, Marc Meredith, Michael Morse, David Rothschild, & Houshmand Shirani-Mehr, *Chasing Electoral Ghosts: We Looked At 130 Million Ballots From The 2012 Election And Found Practically Zero Evidence Of Fraud*, *Slate* (Nov. 7, 2016), available at <https://slate.com/news-and-politics/2016/11/we-looked-at-130-million-ballots-from-the-2012-election-and-found-zero-fraud.html> (last accessed on Jul. 28, 2020); Marc Meredith & Michael Morse, *Why Letting Ex-Felons Vote Probably Won’t Swing Florida: We Analyzed Ex-Felons With Voting Rights. Their Party Affiliation Is More Mixed Than You Might Think*, *Vox* (Nov. 2, 2018), available at <https://www.vox.com/the-big-idea/2018/11/2/18049510/felon-voting-rights-amendment-4-florida> (last accessed on Jul. 28, 2020).

the rate of \$350/hour for my work in this case. This compensation is in no way dependent on the conclusions that I reach. A complete version of my curriculum vitae is presented in Section XI.

III. Sources of Information

10. This declaration is informed by information contained in two copies of the Pennsylvania Full Voter Export (henceforth voter file) purchased on May 23, 2020 and July 22, 2020, respectively. Given that the registration deadline for the 2020 primary was on May 18, the May 23 voter file is close to a comprehensive listing of all registrants who were eligible to vote in the 2020 primary. Within the May 23 voter file, I used information on a registrant's surname, address, precinct, and vote history in the 2016 primary election, 2016 general election, 2018 general election, and 2019 general election. Section IX details how I determine the longitude and latitude of each registrant's address in Allegheny and Philadelphia counties, which is used to identify which census block group a registrant resides in. Section IX also details how I combine information about a registrant's surname and census block group of residence to impute information about their race and ethnicity. The July 22 voter file is used to measure which registrants in the May 23 voter file voted in the 2020 primary and, if so, which vote method they used.

11. My declaration is also informed by data on the addresses of polling locations for Allegheny County in the 2018 general election⁶ and 2020 primary election⁷ and Philadelphia

⁶ Data downloaded from <http://openac-alcogis.opendata.arcgis.com/datasets/alleggheny-county-polling-place-locations-november-2018> on Jul. 16, 2020.

⁷ Data downloaded from https://www.allegghenycounty.us/uploadedFiles/Allegheny_Home/Dept-Content/Elections/Docs/2020%20Primary%20Election%20Polling%20Places.pdf on Jul. 15, 2020.

County in the 2018 general election⁸ and 2020 primary election⁹. Section IX details how I determine the longitude and latitude of each polling location's address and combine this information with information about the longitude and latitude of a registrant's address to calculate the distance between a registrant's residence and their polling location.

12. I use data on the racial demographics of county subdivisions in Pennsylvania from American Community Survey.¹⁰

13. Finally, I draw from my scholarly expertise and experience with election administration, as well as a number of academic, governmental, legal, and media sources. All of these sources, and the methodologies that I use to analyze them, are standard within political science. A complete listing of the works that I relied upon is included in Section X of this declaration.

IV. The Calculus of Voting

14. Political scientists have long understood that a potential voter's decision about whether to vote or abstain from voting in an election is determined by the potential voter's evaluation of whether the benefits from voting are greater than the costs. This is referred to as the calculus of voting.¹¹ This section highlights two key points about voting costs that are established by political science research. These include:

⁸ Data downloaded from https://files7.philadelphiavotes.com/polling-places/2018_General_Polling_Places.xlsx on Jul. 16, 2020.

⁹ Data downloaded from https://files.philadelphiavotes.com/announcements/Polling_Places_by_Zone.xlsx#_ga=2.27266233.44264721.1596047534-563019210.1594835037 on Jul. 22, 2020.

¹⁰ Data downloaded from https://data.census.gov/cedsci/table?q=United%20States&g=0100000US_0400000US42.060000&tid=ACSDP5Y2018.DP05&hidePreview=true on Jul. 30, 2020.

¹¹ Anthony Downs, *An Economic Theory of Political Action in a Democracy*, 65 J. Pol. Econ. 135 (1957); William Riker & Peter Ordeshook, *A Theory of the Calculus of Voting*, 62 Am. Pol. Sci. Rev. 25 (1968).

- a. Voting costs are not limited to monetary costs, but more frequently refer to the opportunity costs of the time that potential voters spend registering to vote, acquiring information and documentation that is needed to vote, and finally, actually voting (see Section IV.A) and
- b. Increases in voting costs can cause a would-be voter to abstain (see Section IV.B).

A. *What are voting costs*

15. Potential voters incur many costs in order to cast a ballot. Many of these costs depend on potential voters' life circumstances, such as whether they are forgoing wages in order to vote or have conflicting obligations on their time.¹² Other costs relate to the ease of getting to the polls, such as access to public transit or the effects of inclement weather.¹³ Political scientists have also documented how the decision to vote or abstain is affected by the specific processes voters must navigate in order to cast a ballot.

16. To illustrate how costs on a potential voter's time and resources can affect their calculus of voting, consider the costs imposed by the process of returning a mail ballot. The National Conference of State Legislatures currently identifies 16 states that require local election officials to affix mail-ballot envelopes with pre-paid postage.¹⁴ Research shows that affixing postage to mail-in ballot envelopes can cause some potential voters to vote who would abstain from voting if they had to affix postage to their mail-ballot envelope themselves.¹⁵ Affixing

¹² Sidney Verba, Kay Schlozman, & Henry E. Brady, *VOICE AND EQUALITY: CIVIC VOLUNTARISM IN AMERICAN POLITICS*, Harvard University Press: Cambridge (1995); Ariel White, *Family Matters? Voting Behavior in Households with Criminal Justice Contact*, 113 *Am. Pol. Sci. Rev.* 607 (2019).

¹³ Brad T. Gomez, Thomas G. Hansford & George A. Krause, *The Republicans Should Pray for Rain: Whether, Turnout, and Voting in U.S. Presidential Elections*, 69 *J. Pol.* 649 (2007).

¹⁴ The National Conference of State Legislatures, *Voting Outside the Polling Place: Absentee, All-Mail, and Other Voting at Home Options*, Table 12 (2020), available at <https://www.ncsl.org/research/elections-and-campaigns/absentee-and-early-voting.aspx> (last accessed on Apr. 30, 2020).

¹⁵ Mark Schelker & Marco Schneider, *The Elasticity of Voter Turnout: Investing 85 Cents per Voter to Increase Voter Turnout by 4 percent*, 49 *Electoral Stud.* 65 (2017).

postage to mail-in ballots in advance reduces the monetary cost someone incurs to return a mail-in ballot. But arguably more consequential is the potential reduction in transaction costs associated with affixing a stamp.¹⁶ For those who already possess stamps, these transaction costs are negligible. In contrast, the transaction costs may be substantial for individuals who rarely send mail or have difficulty gaining access to stamps, which may be particularly challenging for people with limited mobility.¹⁷ Election officials also express specific concerns about whether young people, who as a group are less likely to mail things, will have access to the necessary postage to affix to absentee ballots.¹⁸ The broad lessons illustrated by this example are that the costs imposed by the same process can vary substantially among individuals, and that a cost that is negligible for one voter may be significant for another.

B. Increases in voting costs can cause abstention

17. Increases in the cost of voting do not affect all citizens equally. When deciding whether to cast a ballot, a potential voter assesses whether the benefits that she receives from voting are greater than the costs that she must incur to cast that ballot. Some citizens are habitual voters, because they vote in almost every election and would likely continue to do so even if the costs of voting were substantially higher. Other citizens are classified as habitual non-voters, because they would likely continue to abstain from voting even if the costs of voting were negligible. A final group of citizens are marginal voters, for whom the benefits from voting are

¹⁶ U.S. Election Assistance Commission, *Free or Reduced Postage for the Return of Voted Absentee Ballots*, at 26-27 (2008), available at https://www.eac.gov/sites/default/files/document_library/files/free_absentee_ballot_postage_study_public_meeting_february_7_2008_1.pdf (last accessed on Apr. 30, 2020).

¹⁷ *Ibid.* at 3.

¹⁸ Ashley Collman, *College Students Say They Can't Send In Their Absentee Ballots Because They Don't Know Where to Buy Stamps*, Business Insider (Sept. 19, 2018), available at <https://www.businessinsider.com/young-voters-dont-know-where-to-buy-stamps-for-absentee-ballots-2018-9> (last accessed on Apr. 30, 2020).

sometimes greater than, and other times less than, the costs of voting. It is for these marginal voters that even relatively small changes in the cost of voting can affect whether they vote.

18. The amount of time it takes to cast a ballot can affect whether a marginal voter decides to vote or abstain. According to a nationwide statistical survey, the average voter casting an in-person ballot on Election Day in the 2012 presidential election spent about 12 minutes in line before voting.¹⁹ However, this study showed significant variability on either side of that average wait time. Slightly more than one-third of voters reported not waiting at all, while about one-eighth reported waiting 30 minutes or more. The Presidential Commission on Election Administration, tasked with providing proposals to improve election administration following the 2012 presidential election, recommended that election officials should attempt to give everyone an opportunity to vote within 30 minutes of showing up to their polling location.²⁰

19. Whether a marginal voter needs to wait more or less than 30 minutes to vote could affect whether they cast a ballot. Recent advances in data collection have allowed political scientists to demonstrate how line lengths affect the number of would-be voters who “renege,” which refers to a potential voter who arrives at a polling location with the intention of voting but leaves without casting a ballot. Because people who renege rarely leave a paper trail of doing so, massive teams of poll watchers are needed to generate a sample size sufficient to obtain a reliable estimate of the frequency with which renegeing occurs. A seminal study found that about 1.9 percent of potential voters reneged in a sample of 11,858 potential voters observed in 30 polling

¹⁹ Charles Stewart III, *Waiting to Vote in 2012*, 28 J. L. & Pol. 439 (2013).

²⁰ “The American Voting Experience: Report and Recommendations of the Presidential Commission on Election Administration” (2014), available at https://www.eac.gov/sites/default/files/eac_assets/1/6/Amer-Voting-Exper-final-draft-01-09-14-508.pdf (last accessed on Jun. 16, 2020).

locations during the 2008 California presidential primary.²¹ This study found that renegeing was particularly likely to occur when more people were waiting to get checked in by a poll worker, consistent with long lines being one of the most important determinants of whether someone reneges. A more recent study analyzing the 2016 presidential election found that at least 1.8 percent of potential voters reneged in a sample of over 100,000 potential voters at 528 polling locations.²² This study also found that renegeing was more likely to occur when more people were in line to vote.

20. Renegeing is just one way in which increasing the cost of voting through longer wait times affects the voting experience. The studies of renegeing cited in the previous paragraph would not capture a would-be voter who never got into line because they observed or learned from some other source that there was a lengthy wait to vote. Political science research also shows that voters who wait longer in line are also less likely to believe that their vote is counted and more likely to express skepticism about the integrity of the electoral process.²³ This is likely one of the reasons why voters who wait a longer time to vote are less likely to vote in the future than voters whose wait times were shorter.²⁴

21. The 2020 primary demonstrates how reducing the number of polling locations can increase the amount of time it takes to cast a ballot. As Philadelphia City Commissioner Al

²¹ Douglas M. Spencer & Zachary S. Markovits, *Long Lines at Polling Stations? Observations from an Election Day Field Study*, 9 Election L. J. 3 (2010).

²² Robert M. Stein et al., *Waiting to Vote in the 2016 Presidential Election: Evidence from a Multi-County Study*, 73 Pol. Res. Q. 439 (2020).

²³ Bridgett A. King, *Waiting to Vote: The Effect of Administrative Irregularities at Polling Locations and Voter Confidence*, 41 Pol'y Stud. 230 (2020).

²⁴ Stephen Pettigrew, *The Downstream Consequences of Long Waits: How Lines at the Precinct Depress Future Turnout*, Univ. of Pa. Working Paper (2017), available at <https://www.dropbox.com/s/7eis5yychwqstw/pettigrew%20-%20lines%20and%20turnout.pdf?dl=0> (last accessed on Jun. 16, 2020); and David Cottrell, Michael C. Herron & Daniel A. Smith, *Voting Lines, Equal Treatment, and Early Voting Check-In Times in Florida*, Dartmouth Univ. working paper (2017), available at <http://www.dartmouth.edu/~herron/evid.pdf> (last accessed on Jun. 16, 2020).

Schmidt tweeted, “Consolidated polling locations and check-in tables have added to the regular stress of the morning set-up process. Our staff is working diligently to troubleshoot any initial bumps.”²⁵ One logistical challenge that occurs when more registrants are assigned to vote at the same polling location is that it becomes increasingly likely that registrants are voting on different sets of races, and hence need different ballots. Media reports highlight that having the right ballots became an issue at a consolidated polling location in Philadelphia’s 50th Ward causing lines of up to 90 minutes to form.²⁶ Another logistical challenge that becomes tougher when more potential voters are simultaneously trying to vote at the same polling location is parking. Media reports highlighted issues with potential voters being unable to find parking near a consolidated polling location at Penn Hills Public Library in Allegheny County, which ultimately contributed to a judge extending the close of that polling location by an hour.²⁷ Finally, the logistical challenges associated with equipment issues can become more problematic when more potential voters are using a polling location.²⁸

V. Voting Costs and Vote Method

22. Voting costs affect not only the decision to vote or abstain, but also which method you use to vote. Research shows that when the cost at voting at polling location on Election Day

²⁵ Commissioner Al Schmidt (@Commish_Schmidt), Twitter (Jun. 2, 2020, 8:53 AM), https://twitter.com/Commish_Schmidt/status/1267801444469682179.

²⁶ Michaelle Bond, Julia Terruso & Justine McDaniel, *Polling Locations in Northwest Philly Got The Wrong Voting Machines, Causing Confusion and Long Lines: ‘It Was A Mess’*, Philadelphia Inquirer (Jun. 2, 2020), available at <https://www.inquirer.com/politics/election/northwest-philadelphia-voting-lines-2020-pa-primary-20200602.html> (last accessed on Jul. 30, 2020).

²⁷ Paula Reed Ward, 8:40 p.m.: *ACLU Asked Court for Penn Hills Extension*, Pittsburgh Post-Gazette (Jun. 2, 2020) available at <https://www.post-gazette.com/news/politics-local/2020/06/02/Primary-election-western-pennsylvania/stories/202006020068+&cd=2&hl=en&ct=clnk&gl=us> (last accessed on Jul. 30, 2020).

²⁸ Justine McDaniel & Alejandro Alvarez, *Voters Wait in East Falls After Machines Break*, Philadelphia Inquirer (Jun. 2, 2020) available at <https://www.inquirer.com/politics/election/live/pa-2020-primary-election-philadelphia-live-updates-results-20200602.html> (last accessed on Jul. 30, 2020).

increases, people are more likely to use early in-person voting or vote-by-mail.²⁹ Research also shows the cost of using a new vote method decreases as people gain experience with it.³⁰

23. The risk of getting infected, or infecting others, with COVID-19 increase the costs of in-person voting relative to mail voting for some potential voters. Potential voters who perceive higher risks associated with in-person voting and who possess less tolerance for these risks are experiencing a greater increase in the cost of in-person voting relative to potential voters who perceive lower risks associated with in-person voting and who possess greater tolerance for these risks.

24. The increased cost of in-person voting caused by COVID-19 has caused voters to cast mail ballots at record rates in elections that have taken place since April 2020. Figure 1 compares mail-ballot usage in the 2016 and 2020 presidential primaries for which there is data available on the number of votes cast by mode in both elections. It demonstrates that roughly half of the ballots in Pennsylvania's 2020 primary were cast by mail. Figure 1 highlights that Pennsylvania was not unique in experiencing a dramatic increase in the use of mail balloting. Wisconsin had 964,443 mail ballots counted in its April 7 election, which constituted about 62 percent of the total ballots cast. As a point of comparison, fewer than 200,000 mail ballots were counted in the 2016 general election in Wisconsin, which constituted about 5 percent of the total ballots cast.³¹ In Georgia's primary on June 9, mail ballots comprised more than half of the ballots cast, up from about 6

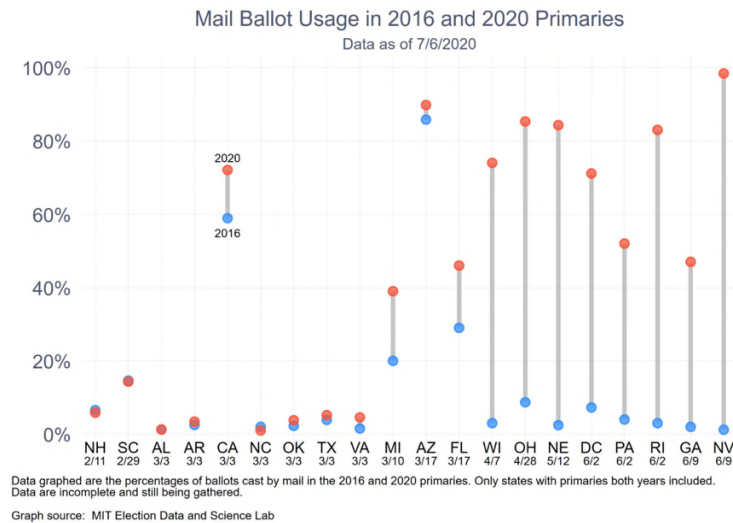
²⁹ Joshua D. Clinton, Nick Eubank, Adriane Fresh & Michael E. Shepherd, *Polling Place Changes and Political Participation: Evidence from North Carolina Presidential Elections, 2008-2016*, Duke Univ. Working Paper (2019), available at https://www.dropbox.com/s/gh8uk6rv95kinclu/PPChange_ClintonEubankFreshShepherd.pdf?dl=0 (last accessed on Apr. 27, 2020).

³⁰ Marc Meredith & Zac Endter, *Aging into Absentee Voting: Evidence from Texas*, Univ. of Pa. Working Paper (2017), available at <https://www.sas.upenn.edu/~marcmere/workingpapers/AgingIntoAbsentee.pdf> (last accessed on Apr. 27, 2020).

³¹ Wisconsin Elections Commission, "April 7, 2020 Absentee Voting Report", available at <https://elections.wi.gov/sites/elections.wi.gov/files/2020-05/April%202020%20Absentee%20Voting%20Report.pdf> (last accessed on May 21, 2020), p. 4, 6.

percent of the ballots cast in the 2018 midterm election.³² Moreover, research shows that the share of the ballots cast by mail in a Georgia county was significantly related to share of the population that had died from COVID-19 in the county.³³

Figure 1: Share of Ballots Cast by Mail in 2016 and 2020 Presidential Primaries³⁴



25. While COVID-19 is causing a substantial number of voters to shift from casting in-person ballots to mail ballots, some potential voters continue to prefer to vote in person despite COVID-19. Menger and Stein provide empirical support for four reasons why some people prefer to cast a ballot in person rather than putting it in the mail.³⁵ First, some voters do not like having to return their mail ballot before the campaign is over. Second, some voters do not sufficiently

³² Mark Niesse, *Absentee Voting Program Embraced by Georgia Voters, Then Abandoned*, Atlanta Journal Constitution (Jun. 29, 2020) available at <https://www.ajc.com/news/state--regional-govt--politics/absentee-voting-program-embraced-georgia-voters-then-abandoned/hkNttNsgXlaYZXjUatnvjK/> (last accessed on Jun. 29, 2020).

³³ M.V. (Trey) Hood III and Audrey Haynes. 2020, “Mail it in: An Analysis of the Peach State’s Response to the Coronavirus Pandemic”, Paper presented at the Annual Meeting of the Election Science, Reform, and Administration Conference. Gainesville, FL available at <https://www.dropbox.com/s/swr1clzifamrsri/ESRA%202020%20%28Haynes%20%26%20Hood%29.pdf?dl=0> (last accessed on Jul. 1, 2020).

³⁴ Figure downloaded from Charles Stewart III, *Mail Ballot Watch*, Election Updates Blog (Jul. 6, 2020) available at <https://electionupdates.caltech.edu/2020/07/06/mail-ballot-watch/> (last accessed on Jul. 9, 2020).

³⁵ Andrew Menger & Robert M. Stein, *Choosing the Less Convenient Way to Vote: An Anomaly in Vote by Mail Elections*, Pol. Res. Q. 196 (2020).

trust the United States Post Service (USPS) to deliver the ballot. Third, some voters with a history of voting at a polling location do not want to disrupt their voting routine. Finally, some voters enjoy the social aspect of voting in person.

26. I conclude that another reason why some potential voters prefer in-person voting is that they assess that mail ballots are less likely to be counted than ballots cast in person. Research shows people casting mail ballots are less confident than people casting ballots in person that their ballot was counted as intended.³⁶ Data suggest that voters casting mail ballots have reasons to worry about whether their ballot counts as intended. The 2016 Election Administration and Voting Survey show that over 300,000 mail ballots were rejected in the 2016 presidential election because of an issue with the ballot, representing about 0.75 percent of the mail ballots cast.³⁷ Mail ballots can be rejected because they are received too late, are missing some required information or documentation, or were not properly secured in their mail ballot envelopes. The share of mail ballots being rejected has been substantially higher in many states during the 2020 primaries, as states struggled to keep up with voter demand for mail ballots and voters with less experience casting mail ballot made more administrative errors.³⁸

³⁶ R. Michael Alvarez, Thad E. Hall & Morgan H. Llewellyn, *Are Americans Confident Their Ballots Are Counted?*, 70 J. Pol. 754 (2008).

³⁷ Election Administration and Voting Survey, 2016, available at https://www.eac.gov/sites/default/files/eac_assets/1/6/2016_EAVS_Comprehensive_Report.pdf (last accessed on April 28, 2020), Table 2.

³⁸ Pam Fessler and Elena Moore, *Signed, Sealed, Undelivered: Thousands Of Mail-In Ballots Rejected For Tardiness*, NPR Morning Edition (Jul. 13, 2020) available at <https://www.npr.org/2020/07/13/889751095/signed-sealed-undelivered-thousands-of-mail-in-ballots-rejected-for-tardiness> (last accessed on Jul. 13, 2020); Elise Viebeck and Michelle Ye Hee Lee, *Tens of Thousands of Mail Ballots Have Been Tossed Out in This Year's Primaries. What Will Happen in November?*, Washington Post (Jul. 16, 2020) available at https://www.washingtonpost.com/politics/tens-of-thousands-of-mail-ballots-have-been-tossed-out-in-this-years-primaries-what-will-happen-in-november/2020/07/16/fa5d7e96-c527-11ea-b037-f9711f89ee46_story.html (last accessed on Jul. 27, 2020).

27. Concerns about whether mail ballots will be received too late to count are likely to be particularly salient in Pennsylvania because of what occurred in the 2020 primary election. Because Pennsylvania received an unprecedented number of mail-ballot requests, many counties fell behind on distributing mail ballots.³⁹ While mail ballots usually must be received by Election Day to count, the governor issued an executive order on the day before the election to permit six counties to count ballots that were postmarked by Election Day and received within seven days of the election.⁴⁰ A judge extended the ballot receipt deadline in one additional county.⁴¹ Ultimately, as many as 75,700 mail ballot were received Election Day, all of which would have been rejected if the normal Election-Day cutoff was in place. Moreover, there has been slowdown of mail distribution in Philadelphia caused by staffing shortages due to COVID-19, increased parcels, and new USPS policies prioritizing minimizing labor costs over the timely delivery of mail.⁴² All of this is likely to increase the number of Pennsylvanians who choose to vote in-person on Election Day rather than by mail ballot out of concern that their mail ballot will not count.

28. I conclude that potential voters who are racial and ethnic minorities, and especially Black potential voters, will be more likely than White potential voters to hold a strong preference for casting an in-person ballot. I reach this conclusion based on three primary factors. First, the

³⁹ Chad Pradelli, *Action News Data: Huge Disparities Found Among Pa. Voters for Mail-in Ballot Wait Times*, 6ABC (May 27, 2020) available at <https://6abc.com/absentee-ballot-vote-by-mail-in-voting-election/6215538/> (last accessed on Jun. 5, 2020).

⁴⁰ Executive Order Commonwealth of Pennsylvania No. 2020-02, *Subject: Extension of Deadline for Receipt of Absentee and Mail-In Ballots in Certain Counties*, available at <https://www.governor.pa.gov/wp-content/uploads/2020/06/20200601-EO-Deadline-Extention.pdf> (last accessed on Jun. 5, 2020).

⁴¹ Jonathan Lai, *Courts Extend Pa. Mail Ballot Deadlines in Bucks and Delaware Counties*, Philadelphia Inquirer (Jun. 2, 2020) available at from <https://www.inquirer.com/politics/election/bucks-delaware-county-mail-ballot-deadlines-extended-20200602.html> (last accessed on Jun. 5, 2020).

⁴² Ellie Rushing, *Mail Delays Are Frustrating Philly Residents, and a Short-Staffed Postal Service is Struggling to Keep Up*, Philadelphia Inquirer (Aug. 2, 2020) available at <https://www.inquirer.com/news/philadelphia/usps-tracking-in-transit-late-mail-delivery-philadelphia-packages-postal-service-20200802.html> (last accessed on Aug. 3, 2020).

suppression of Black voters, both historically and contemporaneously in the United States, make Black potential voters less trusting that their votes are counted fairly.⁴³ Second, Black potential voters have less previous exposure to mail ballots. The Current Population Survey shows that only 11 percent of Black voters in the 2018 general election used a mail ballot, as compared to 23.5 percent of non-Hispanic Whites.⁴⁴ Third, minorities are more likely to have their mail ballots rejected than Whites. Research shows, for example, mail ballots received on time in Florida and Georgia's 2018 general elections were more than twice as likely to be rejected when cast by a Black voter than a White voter.⁴⁵ Menger and Stein's finding that minority voters are more likely than White voters to prefer in-person voting supports this conclusion.⁴⁶

VI. Polling Locations and Voter Turnout

29. Political science research shows that potential voters face a different cost of voting depending on the location at which they are assigned to vote. This section establishes three primary points about how the selection of polling locations affect the cost of voting:

- a. Assigning potential voters to a new polling location adds a search cost that makes those potential voters less likely to vote in person on Election Day (Section VI.a);

⁴³ Bridgett A. King, *Waiting to Vote: The Effect of Administrative Irregularities at Polling Locations and Voter Confidence*, 41 Pol'y Stud. 230-248 (2020).

⁴⁴ United States Census Bureau, *Voting and Registration in the Election of November 2018*, Table 14 (2019), available at <https://www2.census.gov/programs-surveys/cps/tables/p20/583/table14.xlsx> (last accessed on Jul. 27, 2020).

⁴⁵ Anna Baringer, Michael C. Herron, Daniel A. Smith, *Voting by Mail and Ballot Rejection: Lessons from Florida for Elections in the Age of the Coronavirus*, Univ. of Fla. Working paper available at https://electionscience.clas.ufl.edu/files/2020/04/Baringer_Herron_Smith_VBM_FL.pdf (last accessed on Jul. 24, 2020); Enrijeta Shino, Mara Suttman-Lea, and Daniel A. Smith, 2020, *Voting by Mail in a VENMO World: Assessing Rejected Absentee Ballots in Georgia*, Paper presented at the Annual Meeting of the Election Science, Reform, and Administration Conference. Gainesville, FL available at <https://electionscience.clas.ufl.edu/2020/05/19/new-paper-voting-by-mail-in-a-venmo-world/> (last accessed on Jul. 24, 2020).

⁴⁶ Andrew Menger & Robert M. Stein, *Choosing the Less Convenient Way to Vote: An Anomaly in Vote by Mail Elections*, Pol. Res. Q. 196 (2020).

- b. Increasing the amount of time that a potential voter spends traveling to a polling location makes that potential voter less likely to vote in person on Election Day (Section VI.b); and
- c. When it becomes more costly to vote in person on Election Day some potential voters shift to casting early in-person or mail ballots, while other potential voters abstain from voting altogether (Section VI.c).

A. Assigning a voter to vote at a new polling location reduces in-person voting on Election Day

30. Political science research shows that in-person voting on Election Day drops when a potential voter is assigned to vote at a new polling location. A seminal study in the leading political science journal examined how turnout decisions in the 2003 California gubernatorial recall election in Los Angeles County were affected by whether the registrant was assigned to vote at a new polling location.⁴⁷ Polling location consolidation caused about two-thirds of registered voters to be assigned to vote at a different polling location in this election than where they were assigned to vote in the previous year's gubernatorial election. The study compared the turnout decisions of potential voters who had to travel roughly the same distance between their residence and their polling location in both elections but varied whether their polling location was the same in both elections. Doing so allowed the researchers to estimate the consequence of the additional search costs associated with learning about a new polling location, without having to account for difference in travel time to the polling location. This study concluded that potential voters were about two percentage points less likely to cast an in-person ballot on Election Day when they were

⁴⁷ Henry Brady & John McNulty, *Turning out to Vote: The Costs of Finding and Getting to the Polling Place*, 105 Am. Pol. Sci. Rev. 115 (2011).

assigned to vote at a new polling location. A number of subsequent studies confirm that potential voters are less likely to vote in-person on Election Day when they are assigned to vote at a new polling location. Two percentage points represents the median estimated reduction in in-person voting on Election Day. McNulty, Dowling, and Ariotti and Amos, Smith, and Ste. Claire find more than a two-percentage point decline, while Clinton, Eubank, Fresh, and Shepherd and Yoder estimate less than a two-percentage point decline.⁴⁸

B. Greater travel distance to a polling location reduces in-person voting on Election Day

31. Political science research establishes that in-person voting drops when a registrant has to pay higher travel costs to reach their polling location. Peer-reviewed work has long demonstrated that the rate of in-person voting is lower when a registrant has to travel further to reach their polling location.⁴⁹ Clearly establishing that this was because living farther from a polling location increased the cost of traveling to the polls proved challenging, because election administrators may set up more polling locations in neighborhoods in which people are more likely to vote in-person. However, recent work comparing registrants on different sides of precinct boundaries shows that potential voters who live in the same neighborhood are more likely to vote when their polling location is closer to their residence.⁵⁰ This same work also shows that having a

⁴⁸ John McNulty, Conor Dowling, & Margaret Ariotti, *Driving Saints to Sin: How Increasing the Difficulty of Voting Dissuades Even the Most Motivated Voters*, 17 *Pol. Analysis* 435 (2009); Brian Amos, Daniel A. Smith, Casey Ste. Claire, *Reprecincting and Voting Behavior*, 39 *Pol. Behav.* 133 (2017); Joshua D. Clinton, Nick Eubank, Adriane Fresh & Michael E. Shepherd, *Polling Place Changes and Political Participation: Evidence from North Carolina Presidential Elections, 2008-2016*, Duke Univ. Working Paper (2019), available at https://www.dropbox.com/s/gh8uk6rv95kinclu/PPChange_ClintonEubankFreshShepherd.pdf?dl=0 (last accessed on Apr. 27, 2020); Jesse Yoder, *How Polling Place Changes Reduce Turnout: Evidence from Administrative Data in North Carolina*, Stan. Univ. Working Paper (2018) available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3178184 (last accessed on Jul. 27, 2020).

⁴⁹ J.G. Gimpel & J.E. Schuknecht, *Political Participation and the Accessibility of the Ballot Box*, 22 *Pol. Geography* 471 (2003); Joshua J. Dyck & James G. Gimpel, *Distance, Turnout, and the Convenience of Voting*, 86 *Soc. Sci. Q.* 531 (2005).

⁵⁰ Enrico Cantoni, *A Precinct Too Far: Turnout and Voting Costs*, 12 *Am. Econ. J. Appl. Econ.* 61 (2020).

polling location closer to a potential voter's residence is more consequential for turnout in less-White and lower-income neighborhoods.

C. Some potential voters abstain because in-person voting on Election Day becomes more costly

32. Political science research finds that some potential voters respond to increases in the cost of voting in-person on Election Day by switching to mail ballots or early in-person voting, while other potential voters abstain because of these increased costs. Studies reach different conclusions about how often potential voters shift to mail ballots or early in-person voting instead of abstention. Clinton et al. show that most of the potential voters who were dissuaded from voting in-person on Election Day when their polling location moved between two presidential elections in North Carolina switched to using early in-person voting.⁵¹ In contrast, Brady and McNulty's study of the 2003 California recall election in Los Angeles County, California shows that about 60 percent of the potential voters who were dissuaded from voting in-person on Election Day because their polling locations changed abstained from voting altogether.⁵² Because early in-person voting was not an option, the other 40 percent of potential voters shifted to mail ballots. Amos, Smith, and Ste. Clair find similar results among potential voters who were dissuaded from voting in-person on Election Day in Manatee County, Florida in the 2014 midterm election because of a polling location change between the 2012 and 2014 general elections, despite both mail ballots and early in-person voting being available.⁵³

⁵¹ Joshua D. Clinton, Nick Eubank, Adriane Fresh & Michael E. Shepherd, *Polling Place Changes and Political Participation: Evidence from North Carolina Presidential Elections, 2008-2016*, Duke Univ. Working Paper (2019), available at https://www.dropbox.com/s/gh8uk6rv95kincu/PPChange_ClintonEubankFreshShepherd.pdf?dl=0 (last accessed on Apr. 27, 2020).

⁵² Henry Brady & John McNulty, *Turning out to Vote: The Costs of Finding and Getting to the Polling Place*, 105 Am. Pol. Sci. Rev. 115 (2011).

⁵³ Brian Amos, Daniel A. Smith & Casey Ste. Claire, *Reprecincting and Voting Behavior*, 39 Pol. Behav. 133 (2017).

33. Based on the totality of the evidence contained within existing research, I conclude that the search costs associated with a change in polling location usually will reduce turnout. This is particularly expected when the change in polling location results from precinct consolidation, making it so that many potential voters will experience an increase in both search costs and the cost of traveling to the polls. I assess that the magnitude of the reduction in turnout also will depend on the accessibility of in-person early voting and mail ballots and the effectiveness of the information campaign that election administrators engaged in to inform registrants about the polling location changes. Because early in-person voting is not an option in Pennsylvania, the consequences of consolidating polling locations is particularly severe for those potential voters who do not trust that mail ballots get counted. And as I discuss in the Conclusion, the process through which polling locations were consolidated in Pennsylvania's 2020 primary greatly reduced the ability of potential voters to be informed about the changes in polling locations.

VII. The Consolidation of Polling Locations in the 2020 Primary Election Reduced Turnout Among Minority Potential Voters in Allegheny and Philadelphia Counties

34. Allegheny and Philadelphia counties experienced two of the largest reductions in Pennsylvania in the number of polling location during the 2020 primary election. Allegheny County, which typically uses about 850 polling locations, used 147 polling locations in the 2020 primary.⁵⁴ Philadelphia County went from using 831 polling locations during the 2019 general election to 190 polling locations in the 2020 primary election.⁵⁵ This section establishes three key

⁵⁴ PublicSource Staff, *Allegheny County Voters Identify 5 Issues to Address Before November Presidential Election*, Public Source (Jun. 4, 2020) available at <https://www.publicsource.org/allegheny-county-voters-identify-5-issues-to-address-before-november-presidential-election/> (last accessed on Jul. 30, 2020).

⁵⁵ Jonathan Lai, *Philly Will Have Way Fewer Polling Places for Next Month's Primary Because of Coronavirus. Find Yours Here*, Philadelphia Inquirer (May 12, 2020) available at <https://www.inquirer.com/politics/election/philadelphia-new-polling-places-2020-primary-20200512.html> (last accessed on Jul. 30, 2010).

points about how this consolidation of polling locations affected potential voters in these two counties in this election.

- a. About 60 percent of registrants in Philadelphia and 70 percent of registrants in Pittsburgh experienced a change in their polling location that increased the distance between their residence and their polling location (Section VII.a);
- b. Experiencing a polling location change reduced turnout in the 2020 primary election among registrants, and particularly minority registrants, in Allegheny County and Philadelphia County (Section VII.b); and
- c. Minorities are likely to be disproportionately burdened in the 2020 presidential election if the share of stable polling locations in a municipality are negatively correlated with the population of the municipality (Section VII.c).

A. Most registrants in Allegheny and Philadelphia Counties had to travel further than normal to get to their polling location in the 2020 primary election

35. I establish in this subsection that a majority of registrants in Allegheny and Philadelphia Counties experienced an increase in the distance between their residence and their assigned polling location in the 2020 primary election relative to the 2018 general election. Section IX provides the technical details on how I calculate the distance between most registrants' addresses of registration from these two counties in the May 23 voter file and the polling location that someone who lived at that address of registration would have been assigned to vote at in these two elections. Registrants assigned to vote at different polling location in these two elections are classified into one of four categories based on this distance. "Closer registrants" reside more than

.1 miles closer to their assigned polling location in the 2020 primary than their assigned polling location in the 2018 general. “Minimal change registrants” experienced a change of less than .1 miles in the distance between their residence and their polling location in the 2018 and residence and their polling location in the 2020. “Further registrants” reside .1 and .5 miles further from their assigned polling location in the 2020 primary than their assigned polling location in the 2018 general. Finally, “much further registrants” more than .5 miles further from their assigned polling location in the 2020 primary than their assigned polling location in the 2018 general.⁵⁶

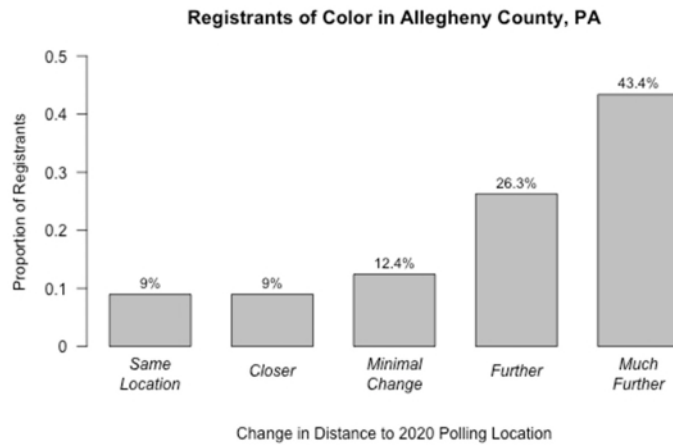
36. Figure 2 show that almost three quarters of Allegheny registrants of color were assigned to vote at a polling location in 2020 primary that was either further or much further than the polling location that they were assigned to vote at in the 2018 general. Because the Pennsylvania voter file does not contain information on the race and ethnicity of a registrant, Section IX explains how I use a commonly employed technique in political science to estimate the probability that a registrant is from one of five racial and ethnic backgrounds based on their surname and their census block of residence.⁵⁷ For the purpose of the graphs in this section, I define a registrant of color as a registrant who I estimate has less than a 50 percent chance of being non-Hispanic White and a White registrant as a registrant who I estimate has greater than a 50 percent change of being non-Hispanic White. Only about 9 percent of registrants of color were assigned to vote in the same polling location in the 2018 general and 2020 primary, while 43

⁵⁶ I select .1 and .5 miles as the cutoffs based on the amount of time that it would take someone who is walking 3 miles per hour to walk these distances. Someone walking 3 miles per hour will spend 2 minutes walking .1 miles and 10 minutes walking .5 miles. Thus, a closer registrant should be able to walk to their polling place at least 2 minutes faster, a further registrant will need 2 to 10 additional minutes to walk to their polling place, and a much further registrant will need at least 10 additional minutes to walk to their polling place.

⁵⁷ Kosuke Imai & Kabir Khanna, *Improving Ecological Inference by Predicting Individual Ethnicity from Voter Registration Records*, 24 *Political Analysis* 263 (2016).

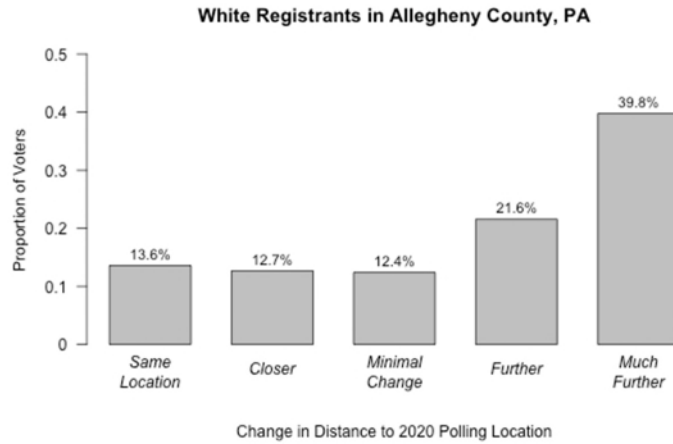
percent were assigned to vote at a polling location in the 2020 primary that was more than .5 miles further from their residence than the location that they were assigned to vote in the 2018 general.

Figure 2: Most Registrants of Color in Allegheny County Lived Further from Their Assigned Polling Location in the 2020 Primary than in the 2018 General



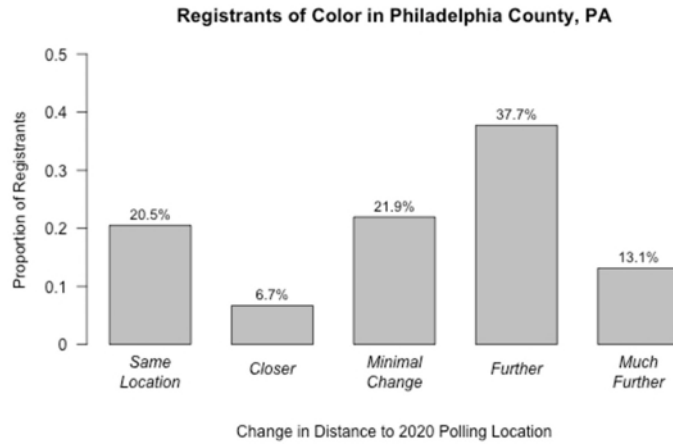
37. Figure 3 shows that White registrants in Allegheny County were less likely than registrants of color to have to travel further in the 2020 primary to reach their assigned polling location than they did in the 2018 general. Only about 40 percent of White registrants were assigned to vote a polling location in 2020 that was located more than .5 miles further from their residence than the polling location that they were assigned to vote at in 2018, which is about 5 percentage points lower than rate among registrants of color. White registrants were also 5 percentage points more likely to retain the same polling location in the 2018 general and 2020 primary as registrants of color.

Figure 3: White Registrants Were Less Likely Than Registrants of Color to Live Further from Their Assigned Polling Location in the 2020 Primary in Allegheny County



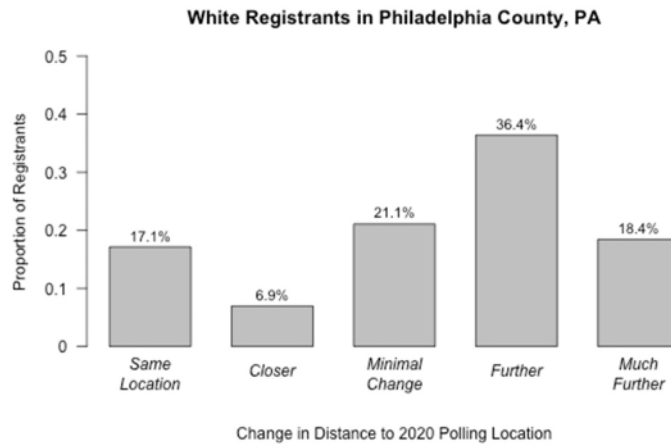
38. It was also the case in Philadelphia County that a majority of registrants of color were assigned to vote at a polling location further from their residence in the 2020 primary than in the 2018 general. Figure 4 shows about 51 percent of registrants of color in Philadelphia County were assigned to vote at a polling location at least .1 miles further from their residence in the 2020 primary than the 2018 general, although most registrants had to travel less than 0.5 additional miles. About 21 percent of registrants of color were assigned to vote in the same polling location in both elections.

Figure 4: Most Registrants of Color in Philadelphia County Lived Further from Their Assigned Polling Location in the 2020 Primary than in the 2018 General



39. Figure 5 shows that the racial differences observed in Allegheny County were reversed in Philadelphia County. About 55 percent of White registrants were assigned to vote a polling location in 2020 that was located more than .1 miles further from their residence than the polling location that they were assigned to vote at in 2018. This rate is about 4 percentage point higher than for registrants of color. White registrants were also 3 percentage points less likely to retain the same polling location in the 2018 general and 2020 primary as registrants of color. Nevertheless, as discussed in the next subsection, polling place consolidation still had a greater impact on participation by registrants of color in Philadelphia County than it did on participation by White registrants.

Figure 5: White Registrants Were More Likely Than Registrants of Color to Live Further from Their Polling Location in the 2020 Primary in Philadelphia County



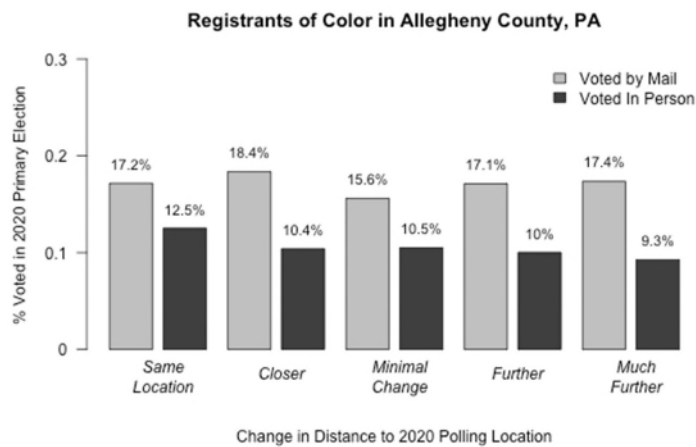
B. Registrants of color were particularly harmed when they experienced a change in their polling location

40. The previous subsection shows that most registrants in both Allegheny and Philadelphia Counties were assigned to vote a different polling location in the 2020 primary election than in the 2018 general election. This subsection demonstrates that this had negative consequences on the ability of registrants of color to cast ballots in the 2020 primary in these counties.

41. Figure 6 shows how the turnout rate of registrants of color in Allegheny County varied depending on the relative distance between their residence and the polling locations that they were assigned to vote at in the 2018 general and 2020 primary elections. The furthest left panel shows that about 30 percent of registrants of color voted in the 2020 primary election when they were assigned to vote at the same location in both of these locations, with about 17 percent casting a mail ballot and 13 percent casting an in-person ballot. This is 2 to 4 percentage points higher than the turnout rate observed in any of the other groups. For example, the furthest right

panel shows about 27 percent of registrants of color voted in the 2020 primary election when they were assigned to vote at a polling location in the 2020 primary that was more than 0.5 miles farther from their residence than their polling location in the 2018 primary. Registrants in this group were equally likely cast a mail ballot as registrants who retained the same polling location, but were about 3 percentage points less likely to vote in person on Election Day. This lends credence to my conclusion that it is the increased search and travel costs associated with in-person voting that are causing people who retained the same polling location to vote more than people who had to travel farther to a new polling location.

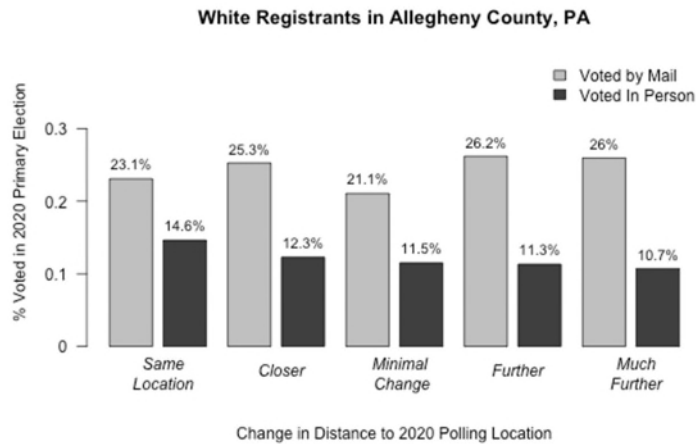
Figure 6: Registrants of Color in Allegheny County Voted Less in the 2020 Primary When Assigned to Vote at a New Polling Location



42. Figure 7 suggests that the stability of polling locations has less of an effect on the turnout calculus of White registrants than registrants of color in Allegheny County. The furthest left panel shows that about 38 percent of white registrants voted in the 2020 primary election when they were assigned to vote at the same location in the 2018 general and 2020 primary elections, with about 23 percent casting a mail ballot and 15 percent casting an in-person ballot. This is roughly similar to the turnout rate in every group except the group that moved to a new polling

location in the 2020 primary that was roughly the same distance from their residence as their polling location in the 2018 general. While the rate of in-person voting was clearly higher for White registrants who retained the same polling location, this was mostly offset by the greater use of mail ballots by registrants assigned to vote at a different polling location in the 2020 primary election than the 2018 general election. An additional implication of Figure 7 is that the turnout rate of White registrants was higher than the turnout rate of registrants of color in Allegheny County, mostly because White registrants were more likely to vote in person than registrants of color.

Figure 7: Turnout of White Registrants in Allegheny County was Less Affected Than Turnout of Registrants of Color by a Change in Polling Location



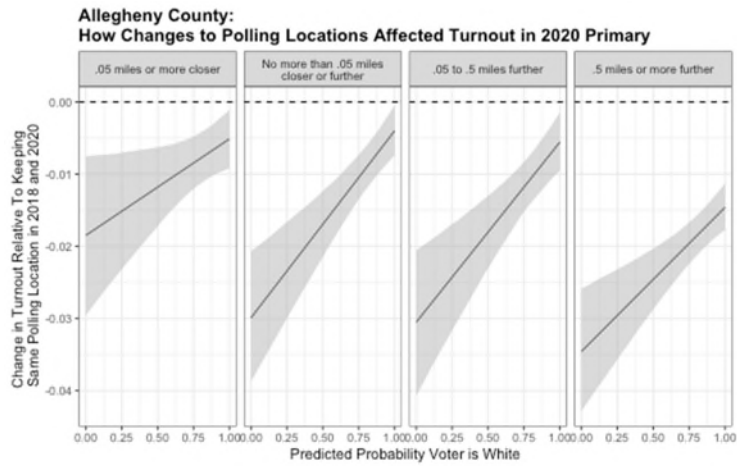
43. I use regression analysis to compare the turnout behavior of registrants assigned to different types of polling locations in the 2020 primary, while also controlling for differences in turnout propensity that might exist between registrants assigned to vote at different types of polling locations. If registrants assigned to different types of voting location differ in their underlying propensity to vote, this should manifest itself in terms of higher rates of voting in previous elections and thus be accounted for by a regression that controls for past vote history. Table 1 in Section IX

reports the results of a regression that controls for a registrant's turnout in the 2016 primary, the 2016 general, the 2018 general, and 2019 general when estimating the relationship between being assigned to vote at a new polling location in 2020 than in 2018. It confirms that there is a statistically significant reduction in turnout for registrants who experience a polling location change and there is a statistically significant larger reduction in the turnout for registrants of color relative to White registrants.

44. Figure 8 uses a graph to demonstrate how the effect of a polling location change varies based on a registrants' race and ethnicity and the type of polling location change. The line on the furthest left panel of Figure 8 shows that in Allegheny County, registrants of color (i.e., registrants with a 0 percent chance of being White) assigned to the same polling location in the 2018 general and 2020 primary elections were about 2 percentage points more likely to vote in 2020 primary election than registrants of color assigned to a new polling location in the 2020 primary that was .1 miles closer to their residence than the polling location that they were assigned to vote at in the 2018 general. The gray bar shows the 95 percent confidence interval. The fact that it does not cross the x-axis indicates that this reduction in turnout is statistically significant at conventional levels.

45. The other three panels in Figure 8 show that registrants of color assigned the same polling location in 2018 general and 2020 primary elections were even less likely to vote in the 2020 primary election when assigned to a new polling location in the 2020 primary that was the same distance or further from their residence than the polling location that they were assigned to vote at in the 2018 general. The magnitude of the decline was about 3 to 3.5 percentage points is statistically significant at conventional levels.

Figure 8: How Polling Location Changes in Allegheny County Affect Turnout by Race and Type of Polling Location Change



Note: These predicted probabilities taken from the regression reported in Table 1 in Section IX.

46. Figure 8 shows that being assigned to vote at a new polling location in 2020 primary election had much less of an effect on White registrants (i.e., 100 percent chance of being White) in Allegheny County. Being assigned to a new polling location in the 2020 primary is associated with a 0.5 to 1.5 percentage point drop in 2020 primary turnout among White registrants, depending on how far the new polling location is located from a registrant’s address relative to the polling location that the registrant was assigned to vote at in the 2018 general.

47. The remainder of this subsection highlights very similar turnout patterns in Philadelphia County as previous figures demonstrated in Allegheny County. Figure 9 shows that registrants of color were most likely to vote in the 2020 primary when assigned to vote at the same polling location in the 2018 general and 2020 primary elections. This again appears to be because registrants of color were more likely to vote in person when their polling location did not move between these two elections. Figure 10 shows that White registrants were also more likely to vote

in-person when their polling location did not move, but that the greater use of mail ballots among White registrants whose polling location did move largely offset this. Figure 11 confirms that the patterns observed in Figure 9 and Figure 10 hold once I control for a registrant’s turnout in previous elections.

Figure 9: Registrants of Color in Philadelphia County Voted Less in 2020 Primary When Assigned to Vote at a New Polling Location

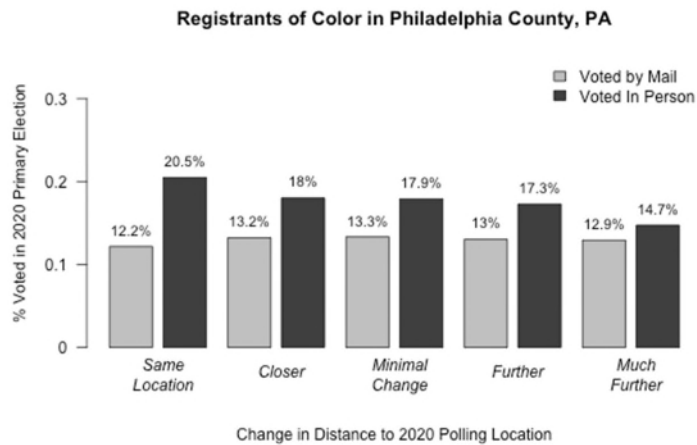


Figure 10: Turnout of White Registrants in Philadelphia County was Less Affected Than Turnout of Registrants of Color by a Change in Polling Location

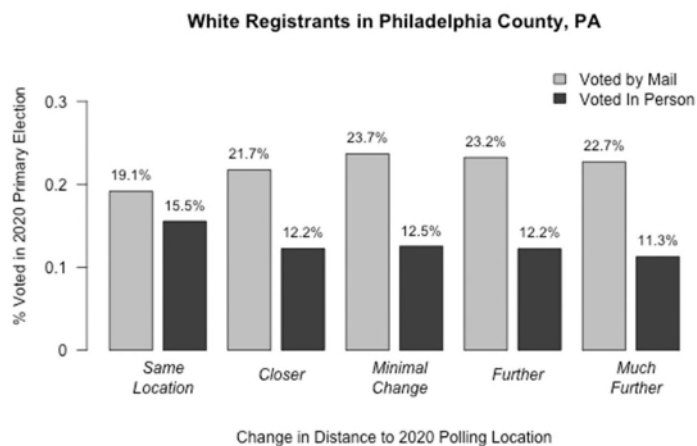
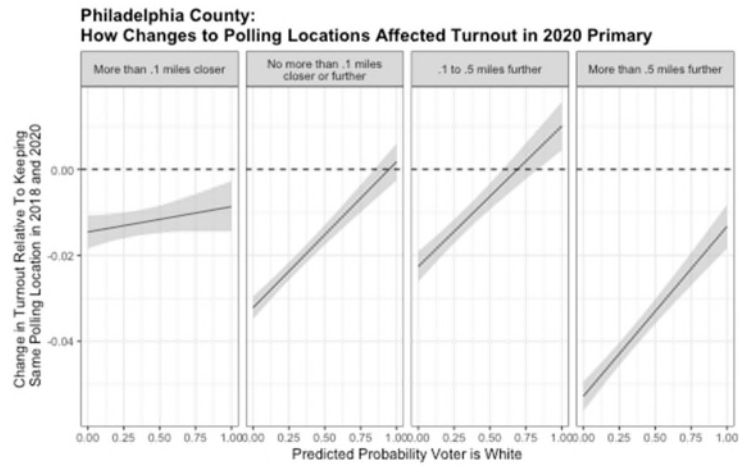


Figure 11: How Polling Location Changes in Allegheny County Affect Turnout by Race and Type of Polling Location Change



Note: These predicted probabilities taken from the regression reported in Table 2 in Section IX.

48. Put together, the results in this subsection show that registrants of color were disproportionately harmed when the cost of in-person voting increased in the 2020 primary because of the consolidation of polling location. In Allegheny County, registrants of color were more likely than White registrants to be assigned to vote at a new polling location, and were more harmed than White registrants when this happened. While White registrants were more likely to be assigned to a new polling location in Philadelphia County, they were more likely to offset this by shifting to mail ballots than registrants of color. One implication of these findings is that election administrators should minimize the consolidation of polling locations, as doing so is likely to negatively affect turnout. But if consolidation does happen, these results show that election administrators need to consider explicitly the disparate racial implications of the consolidation. Even when registrants of color are not disproportionately experiencing a change of polling location because of consolidation, they still are likely to be more harmed by it.

C. Minorities will be particularly harmed when a greater share of polling locations are eliminated in larger municipalities

49. The previous section showed that registrants of color in Allegheny County were more likely than White registrants to be assigned to a different polling location in the 2018 general and 2020 primary elections. This section concludes that this is because Allegheny County did not sufficiently consider population size when allocating polling locations to municipalities, giving every municipality one polling location no matter how big, and most municipalities only got one. This section shows that not keeping the number of polling locations proportional to population size is likely to cause registrants of color to be more likely to experience a change in the polling location than White registrants.

50. Allegheny County did not put much weight on a municipality's population when allocating polling locations for the 2020 primary. The Allegheny County Council approved a plan in which each municipality in Allegheny County besides Pittsburgh would have one polling location and Pittsburgh would have one polling location in each city council district. At least one member of the council voted against this plan because it lacked consideration of the differences in the population of different municipalities.⁵⁸ Ultimately, the number of polling locations within Pittsburgh increased to 18.⁵⁹ This meant that both Penn Hills township and Haysville borough used one polling location in the 2020 primary election, whereas Penn Hills township used 23 and Haysville borough used one in the 2018 general election. Official records show that 10,989, or

⁵⁸ Jamie Martines, *Allegheny County Votes to Consolidate Primary Polling Locations*, Pittsburgh Tribune-Review (Apr. 23, 2020) available at <https://triblive.com/local/pittsburgh-allegheny/allegheny-county-votes-to-consolidate-primary-polling-locations/> (last accessed on Jul. 30, 2020).

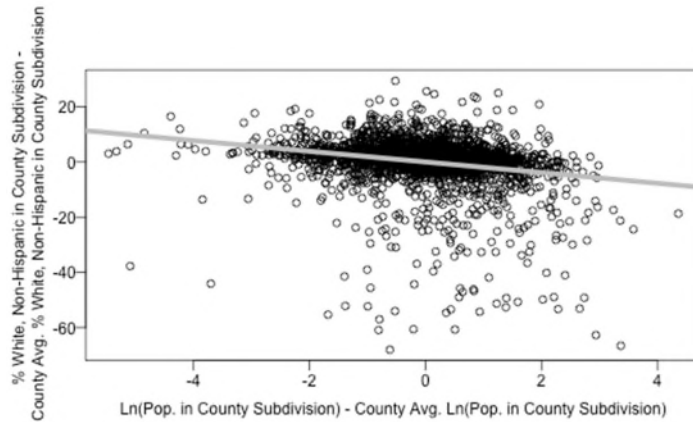
⁵⁹ Julian Routh, *County Announces Consolidated Voting Places for June 2 Pa. Primary*, Pittsburgh Post-Gazette (May 15, 2020) available at <https://www.post-gazette.com/news/vote2020/2020/05/15/allegheny-county-announces-consolidated-voting-places-for-june-2-pa-primary/stories/202005150141+&cd=5&hl=en&ct=clnk&gl=us> (last accessed on Jul. 30, 2020).

about 36 percent, of the 30,278 registered voters in Penn Hills township voted in the 2020 primary, while 27, or about 47 percent, of the 58 registered voters in Haysville borough voted.⁶⁰

51. Figure 12 shows that larger municipalities have a higher proportion of minorities than smaller municipalities throughout Pennsylvania. The unit of analysis in Figure 12 is a Census County Subdivision, which at least in the Allegheny County correspond to the same municipalities that each received at least one polling location. Figure 12 plots a measure of how small a county subdivision is relative to other subdivisions in its county on the x-axis against the share of the population in the county subdivision that is White, non-Hispanic relative to other municipalities in its county on the y-axis. There is a clear negative association in which larger subdivision in county have a higher proportion of minorities than smaller subdivision in the county. Thus, counties assigning the same number of polling locations to all municipalities will be making it so that registrants of color will be voting in municipalities that have fewer polling locations per capita than White registrants.

⁶⁰ My calculation based on data downloaded from <https://results.enr.clarityelections.com/PA/Allegheny/103291/254824/reports/detailtxt.zip> on Jul. 30. 2020).

Figure 12: Residents of More Populous County Subdivisions are Less Likely to be White than Residents of Less Populous Subdivisions in the Same County



52. Based on the information contained in this subsection, I conclude that registrants of color will be disproportionately burdened when the population of a municipality is not taken into account when consolidating polling locations. Previous subsections make it clear that registrants of color are at a heightened risk of disenfranchisement when the cost of searching for, and traveling to, a polling location increases. Thus, everything possible should be done to avoid eliminating or moving a polling location that services a lot of registrants of color. Yet, this is exactly what is likely to happen when polling locations are consolidated and such consolidation is not proportional to population. Registrants of color disproportionately live in well-populated municipalities, and so are more likely to live in municipalities typically serviced by more polling locations. Thus, registrants of color will disproportionately experience a change in their polling locations, and hence be more likely to be disenfranchised, when polling locations in well-populated municipalities are more likely to be consolidated than polling locations in less-populated municipalities.

VIII. Conclusion

53. I conclude that consolidation of polling locations disenfranchised tens of thousands of Pennsylvanians in the June 2020 primary. Roughly 80 percent of Philadelphia County registrants and 90 percent of Allegheny County registrants experienced a change in their polling location, many of which caused a registrant to have to travel more than 0.5 miles further than normal. Consistent with previous peer-reviewed research, data show that roughly two percent of registrants experiencing a change in their polling location abstained from voting because of the increase in voting costs generated by this polling location change. Given that there were roughly 1.9 million registrants in Allegheny County and Philadelphia County, this means that tens of thousands of registrants were disenfranchised in these two counties alone. And the disenfranchisement from polling location consolidation was not limited to these counties. While Allegheny County and Philadelphia County consolidated more polling locations than most other counties in Pennsylvania, polling location consolidation occurred all over the state. And given the previous literature on polling location change and voter turnout described in Section VI, I conclude that polling location changes also caused registrants in other counties to vote less frequently than they would have had their polling location remained the same.

54. I also conclude that the consolidation of polling location particularly disenfranchised registrants of color in the 2020 primary. This happened for at least three reasons. First, counties in which registrants of color disproportionately live were also the counties that consolidated the most polling locations.⁶¹ Second, at least in Allegheny County, registrants of color were more likely to experience a polling location change than White registrants. My analysis indicates this was likely

⁶¹ Emily Previti & Katie Meyer, *With Pa.'s Polling Place Changes, Voters Might Get Conflicting Information on Where to go June 2*, PAMPost (May 23, 2020) available at <https://papost.org/2020/05/23/with-pa-s-polling-place-changes-voters-might-get-conflicting-information-on-where-to-go-june-2/> (last accessed on Jul. 30, 2020).

to happen in any other county that did not factor in a municipality's population when allocating polling locations to that municipality. Third, my analysis shows that minority registrants were more negatively affected by changes to their polling location than White registrants.

55. Finally, I conclude that there were a number of ways in which the implementation of polling location consolidation in Pennsylvania increased the costs of consolidation on registrants experiencing a change in polling location. First, the State permitted consolidation that produced massive differences in the number of registrants using different polling locations within the same county. I highlighted how there was a polling location in Allegheny County serving 58 registrants, while another was serving more than 10,000. It is inefficient to use scarce resources to run a polling location serving so few registrants when so many other registrants are being assigned to polling locations far away from their residence. Second, the polling locations were finalized too close to the election. Polling locations did not have to be made available until the public until 14 days before the election, and many counties announced their plans in the week leading up to this deadline.⁶² Two weeks is not sufficient time for registrants to adjust to the higher in-person voting costs, particularly given that mail ballots need to be requested by 7 days before an election. Third, and relatedly, the state did not ensure that registrants were sufficiently notified of these changes. Media reports highlighted that 11 days before the election, some counties still had not entered their consolidated polling locations into the Department of State's "Polling Place Search" tool.⁶³ A media report noted that there was not always signage directing where to vote for potential voters

⁶² Michael Tanebaum, *Philly Plans Sharp Reduction of Polling Places for June 2 Primary Election*, Philly Voice (May 13, 2020), available at <https://www.phillyvoice.com/philly-polling-places-primary-election-june-2-2020-poll-workers-mail-in-absentee-ballot/> (last accessed on Jul. 30, 2020).

⁶³ Emily Previti & Katie Meyer, *With Pa.'s Polling Place Changes, Voters Might Get Conflicting Information on Where to go June 2*, PApost (May 23, 2020) available at <https://papist.org/2020/05/23/with-pa-s-polling-place-changes-voters-might-get-conflicting-information-on-where-to-go-june-2/> (last accessed on Jul. 30, 2020).

at the polling locations that were eliminated by the consolidation.⁶⁴ This was because some counties were allowed to opt out of mailing notices to registrants whose polling location moved or posting signage at old polling locations redirecting registrants to their new polling location.⁶⁵ I assess that all of these factors likely exacerbated the negative consequences that polling location consolidation had on turnout the 2020 Primary election. Pennsylvania needs to adopt protocols when determining where polling locations will be located in the 2020 general election that limit the disenfranchisement of its citizens, and particularly its citizens of color.

IX. Technical Appendix

A. Geocoding each registrant's address

56. Geocoding refers to the process of identifying the longitude and latitude of a location. In this case, I geocoded the longitude and latitude of the address of every registered voter in the May 23 voter file in Allegheny County and Philadelphia County. Three additional pieces of information are produced for each geocode. First, an accuracy type that reports how the longitude and latitude of the address was identified. The options for accuracy type are:

- a. rooftop: on the exact parcel;
- b. Point: generally, in front of the parcel on the street;
- c. Range interpolated: generally, in front of the parcel on the street;
- d. Nearest rooftop: the nearest rooftop point if the exact point is unavailable;

⁶⁴ Michaëlle Bond, Julia Terruso & Justine McDaniel, *Polling Locations in Northwest Philly Got The Wrong Voting Machines, Causing Confusion and Long Lines: 'It Was A Mess'*, Philadelphia Inquirer (Jun. 2, 2020), available at <https://www.inquirer.com/politics/election/northwest-philadelphia-voting-lines-2020-pa-primary-20200602.html> (last accessed on Jul. 30, 2020); Jan Murphy, *Voter Confusion Abounds in Places Around Pennsylvania Due to Consolidated Polling Places*, PennLive Patriot News (Jun. 2, 2020) available at <https://www.pennlive.com/news/2020/06/voter-confusion-abounds-in-places-around-pennsylvania-due-to-consolidated-polling-places.html> (last accessed on Jul. 30, 2020).

⁶⁵ Emily Previti & Katie Meyer, *With Pa.'s Polling Place Changes, Voters Might Get Conflicting Information on Where to go June 2*, PAMPost (May 23, 2020) available at <https://papost.org/2020/05/23/with-pa-s-polling-place-changes-voters-might-get-conflicting-information-on-where-to-go-june-2/> (last accessed on Jul. 30, 2020).

- e. Street center: A central point on the street;
- f. Place: city-level

57. Second, an accuracy score that measure how much the address was modified in order to match Geocodio's database. This is measured on a zero to one scale, with one indicating that the address matched into the database without any change and a number less than one indicating that some change was necessary in order to match the address to the database. I dropped a small number of registrants from my analysis that had an accuracy score below 0.8. Third, each geocode returns the census block group in which a registrant's address is contained.

B. Imputing the race and ethnicity of registrants

58. I use a technique published in the top journal on political methodology to generate probabilities that each registrant belongs to one of five different racial and ethnic groups using their surname and the census block group of residence obtained from the geocoder. Each registrant is assigned a probability of being White, Black, Hispanic, Asian, and Other. By construction, these five probabilities sum to one for each registrant. The probabilities were calculated using the `wru::predict_race()` function that is part of the R package `wru` and used data on the racial composition of census block groups from the 2010 Decennial Census.⁶⁶ I dropped a small number of registrants from my analysis that could not be assigned race probabilities using this package because it did not recognize their census block group.

C. Calculating the distance between a registrant's residence and polling locations

59. I used the same method to geocode the addresses of polling locations that I used to geocode the addresses of registrants, with one exception. In a few cases, I used Google to get the

⁶⁶ Rdr.io, *predict_race: Race Prediction Function*, available at https://rdr.io/cran/wru/man/predict_race.html (last accessed on Jul. 31, 2020).

longitude and latitude rather than Geocodio. I did this when either the accuracy score returned by Geocodio was less than 0.8 or when the location did not look feasible for that polling location because of the distance registrants would have needed to travel to reach it. After collecting coordinates on all of the polling location, I used the `distGeo()` function in R to measure the distance between a registrant's residence and polling location. This function calculates the shortest distance on an ellipsoid between any two coordinates.⁶⁷

⁶⁷ RDocumentation, *distGeo*, available at <https://www.rdocumentation.org/packages/geosphere/versions/1.5-10/topics/distGeo> (last accessed on Jul. 31. 2020).

D. Regression Tables for Analysis Reported in Figures 8 and Figure 11

Table 1: Allegheny County 2020 Primary Turnout

	<i>Dependent variable:</i>					
	Voted in June 2020 Primary					
	(1)	(2)	(3)	(4)	(5)	(6)
New polling location	-0.015** (0.007)	-0.033 (0.020)	-0.031*** (0.009)			
New polling location is .1 or more miles closer to home				-0.001 (0.007)	-0.012 (0.022)	-0.018** (0.009)
New polling location is similar distance from home				-0.025* (0.013)	-0.046* (0.025)	-0.030*** (0.011)
New polling location is .1 to.5 miles further from home				-0.012* (0.007)	-0.033* (0.020)	-0.030*** (0.009)
New polling location is more than .5 miles further from home				-0.018** (0.008)	-0.034 (0.023)	-0.035*** (0.010)
Predicted probability of being white		0.111*** (0.019)	0.010 (0.008)		0.111*** (0.019)	0.010 (0.008)
Predicted probability of being white X New polling location		0.031 (0.020)	0.022** (0.009)			
Predicted probability of being white X New polling location is .1 or more miles closer to home					0.014 (0.022)	0.013 (0.010)
Predicted probability of being white X New polling location is similar distance from home					0.032 (0.023)	0.020* (0.011)
Predicted probability of being white X New polling location is .1 to.5 miles further from home					0.038* (0.020)	0.028*** (0.009)
Predicted probability of being white X New polling location is more than .5 miles further from home					0.028 (0.024)	0.020* (0.011)
Voted in 2016 primary election			0.202*** (0.002)			0.202*** (0.002)
Voted in 2016 general election			-0.012*** (0.002)			-0.012*** (0.002)
Voted in 2018 general election			0.180*** (0.002)			0.180*** (0.002)
Voted in 2019 general election			0.299*** (0.002)			0.299*** (0.002)
Constant	0.367*** (0.006)	0.274*** (0.019)	0.091*** (0.008)	0.367*** (0.006)	0.274*** (0.019)	0.091*** (0.008)
Observations	868,678	868,678	868,678	868,678	868,678	868,678

Note: Standard errors clustered by division reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

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61. Paula Reed Ward, *8:40 p.m.: ACLU Asked Court for Penn Hills Extension*, Pittsburgh Post-Gazette (Jun. 2, 2020) available at <https://www.post-gazette.com/news/politics-local/2020/06/02/Primary-election-western->

[pennsylvania/stories/202006020068+&cd=2&hl=en&ct=clnk&gl=us](https://www.pennsylvania.gov/stories/202006020068+&cd=2&hl=en&ct=clnk&gl=us) (last accessed on Jul. 30, 2020).

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64. Jesse Yoder, *How Polling Place Changes Reduce Turnout: Evidence from Administrative Data in North Carolina*, Stan. Univ. Working Paper (2018) *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3178184 (last accessed on Jul. 27, 2020).



Marc Meredith, Ph.D.

Dated: 8/6/2020

XI. Current Curriculum Vitae

Updated: 3/27/2020

Marc Meredith

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Education

Ph.D. in Political Economics, Stanford Graduate School of Business, June 2008

Dissertation Committee: Daniel Kessler, B. Douglas Bernheim, Keith Krehbiel

M.A. in Political Science, Stanford University, June 2006

M.A. in Economics, Northwestern University, June 2002

B.A. in Economics and Mathematical Methods in Social Science (w/ honors),
Northwestern University, June 2002

Employment

University of Pennsylvania

Associate Professor (with tenure) of Political Science and (secondary appointment) Business Economics and Public Policy, 7/2014 –

Undergraduate Chair of Political Science, 7/2015 – 6/2018

Faculty Director of Undergraduate Research for Center for Undergraduate Research,
1/2020 -

Assistant Professor of Political Science and (secondary appointment) Business Economics and Public Policy, 7/2009 – 6/2014

NBC Decision Desk

Election Analyst, 10/2014 –

Massachusetts Institute of Technology

Visiting Lecturer of Political Science, 7/2008 – 6/2009

Stanford University

Lecturer of Economics, 4/2006 – 6/2006

Federal Reserve Bank of San Francisco

Research Associate, 6/2002 – 8/2003

Visiting Appointments

Oxford University

Visiting Scholar, Nuffield College, 3/2019 – 5/2019

Institute for Advanced Study in Toulouse

Visiting Scholar, 1/2019 – 3/2019

Princeton University

Visiting Scholar, *Center for the Study of Democratic Politics*, 9/2012 – 6/2013

Peer Reviewed Journal Articles

- Goel, Sharad, **Marc Meredith**, Michael Morse, David Rothschild, and Houshmand Shirani-Mehr. First View. "One Person, One Vote: Estimating the Prevalence of Double Voting in U.S. Presidential Elections." *American Political Science Review*.
- Gillion, Daniel Q., Jonathan M. Ladd, and **Marc Meredith**. First View. "Party Polarization, Ideological Sorting and the Emergence of the Partisan Gender Gap." *British Journal of Political Science*.
- Bartanen, Brendan, Jason A. Grissom, Ela Joshi, and Marc Meredith. 2018. "Mapping Inequity in Local Political Representation: Evidence from Ohio School Boards." *AERA Open* 4(4): 1-19.
- Grimmer, Justin, Eitan Hirsch, **Marc Meredith**, Jonathan Mummolo, and Clayton Nall. 2018. "Obstacles to Estimating Voter ID Laws' Effect on Turnout." *Journal of Politics* 80(3): 1045-1051
- Meredith, Marc** and Michael Morse. 2017. "Discretionary Disenfranchisement: The Case of Legal Financial Obligations." *Journal of Legal Studies* 46(2): 309-338.
- Gerber, Alan S., Gregory A. Huber, **Marc Meredith**, Daniel R. Biggers, and David J. Hendry. 2017. "Does Incarceration Reduce Voting? Evidence about the Political Consequences of Spending Time in Prison." *Journal of Politics* 79(4): 1130-1146.
- 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.
- Gerber, Alan S., Gregory A. Huber, **Marc Meredith**, Daniel R. Biggers, and David J. Hendry. 2015. "Felony Status, Participation, and Political Reintegration: Results from a Field Experiment." *American Journal of Political Science* 59(4): 912-926.
- Meredith, Marc** and Michael Morse. 2015. "The Politics of the Restoration of Ex-Felon Voting Rights: The Case of Iowa." *Quarterly Journal of Political Science* 10(1): 41-100.
- Ansolahehere, Stephen, **Marc Meredith**, and Erik Snowberg. 2014. "Micro-Economic Voting: Local Information and Micro-Perceptions of the Macro-Economy." *Economics and Politics* 26(3): 380-410.
- Meredith, Marc**. 2013. "Exploiting Friends-and-Neighbors to Estimate Coattail Effects." *American Political Science Review* 107(4): 743-765.
- Ansolahehere, Stephen, **Marc Meredith**, and Erik Snowberg. 2013. "Asking About Numbers: Why and How." *Political Analysis* 21(1): 48-69.
- Meredith, Marc** and Yuval Salant. 2013. "On the Causes and Consequences of Ballot-Order Effects." *Political Behavior* 31(1): 175-197.
- Previous version published as SIEPR Discussion Paper No. 06-29

Gerber, Alan S., Daniel P. Kessler, and **Marc Meredith**. 2011. "The Persuasive Effects of Direct Mail: A Regression Discontinuity Approach." *Journal of Politics* 73(1): 140-155.

Previous version published as NBER Working Paper 14206

Meredith, Marc and Neil Malhotra. 2011. "Convenience Voting Can Affect Election Outcomes." *Election Law Journal* 10(3): 227-253.

Previous version published as Stanford GSB Research Paper No. 2002

Meredith, Marc. 2009. "Persistence in Political Participation." *Quarterly Journal of Political Science* 4(3): 186-208.

Elis, Roy, Neil Malhotra, and **Marc Meredith**. 2009. "Apportionment Cycles as Natural Experiments." *Political Analysis* 17(4): 358-376.

Meredith, Marc. 2009. "The Strategic Timing of Direct Democracy." *Economics and Politics* 21(1): 159-177.

Berger, Jonah, **Marc Meredith**, and S. Christian Wheeler. 2008. "Contextual Priming: Where People Vote Affects How They Vote." *Proceedings of the National Academy of Sciences* 105(26): 8846-8849.

Previous version published as Stanford GSB Research Paper No. 1926

Meredith, Marc. 2004. "Why Do Universities Compete in the Rankings Game? An Empirical Analysis of the Effects of the US News and World Report College Rankings." *Research in Higher Education* 45(5): 443-461.

Invited Journal Articles

Greenberg, Claire, **Marc Meredith**, Michael Morse. 2016. "The Growing and Broad Nature of Legal Financial Obligations: Evidence from Alabama Court Records." *Connecticut Law Review* 48(4): 1079-1120.

Meredith, Marc and Michael Morse. 2014. "Do Voting Rights Notification Laws Increase Turnout?" *The ANNALS of the American Academy of Political and Social Science* 651: 220-249.

Peer Reviewed Book Chapters

Ansolabehere, Stephen, **Marc Meredith**, and Erik Snowberg. 2011. "Sociotropic Voting and the Media." In John Aldrich and Kathleen McGraw (Eds.), Improving Public Opinion Surveys: Interdisciplinary Innovation and the American National Election Studies. Princeton University Press: 175-192.

Invited Book Chapters

Meredith, Marc and Evan Perkowski. 2015. "Regression Discontinuity Design." In Robert Scott and Stephen Kosslyn (Eds.), Emerging Trends in the Social and Behavioral Sciences. John Wiley & Sons, Inc.: 1-16.

Invited Book Reviews

Meredith, Marc. 2015. "The Punishment Imperative: The Rise and Failure of Mass

Incarceration in America by Todd R. Clear and Natasha A. Frost.” Political Science Quarterly 130(1): 166-167.

Working Papers

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

Meredith, Marc and Zac Endter. “Aging into Absentee Voting: Evidence from Texas.”

Meredith, Marc. “A Discouraging Note on the Use of Encouragement Designs to Study Sequential Decision-Making.”

Abernathy, Claire, Jason A. Grissom, **Marc Meredith**, James Sadler. “Holding Local Officials Accountable: School District Performance and School Board Turnover.”

Meredith, Marc. “Heterogeneous Friends-and-Neighbors Voting”

Meredith, Marc and Jason Grissom. “The Value of Partisan Cues in Local Elections: Regression Discontinuity Estimates from Unconventional School Board Races.”

Invited and Conference Presentations (Political Science Unless Otherwise Noted)

2004 – 2005: Midwest Political Science Association Conference (MPSA)

2006 – 2007: MPSA

2007 – 2008: Georgetown, Yale, Emory, Harvard, Princeton, Chicago (Harris), American Political Science Association (APSA), MPSA

2008 – 2009: Berkeley (Haas), Columbia, MIT, Penn (Wharton), Penn, Wisconsin, Yale, MIT American Politics Conference, Yale CSAP Conference, APSA, MPSA

2009 – 2010: Stockholm (IIES), Caltech, APSA, MPSA, State Politics and Policy Conference (SPPC)

2010 – 2011: Cornell, Harvard/MIT (Positive Political Economy), Chicago (Harris), Temple, Columbia, Analyst Institute, APSA, MPSA, Society for Political Methodology Conference

2011 – 2012: NYU, Analyst Institute, Yale CSAP Conference, Stanford Strategy and the Business Environment (Discussant), MPSA, SPPC

2012 – 2013: Penn (Economics), Harvard/MIT (Positive Political Economy), Wisconsin, Princeton, Emory, Yale Detaining Democracy Conference, Princeton Political Impact of Media Conference (Discussant), Law and Society Conference, Yale CSAP Conference (Discussant)

2013 – 2014: Vanderbilt, Wisconsin, Pittsburgh, Virginia (Batten), Texas (McCombs), Yale, Rochester, APSA, Empirical Legal Studies Conference, Columbia Political Economy Conference (Discussant), MPSA (Section Chair), SPPC, Yale CSAP Conference (Discussant)

2014 – 2015: Princeton, Berkeley, Penn (Wharton), MPSA

2015 – 2016: UConn (Law), Dartmouth, Azavea, APSA, MPSA, European Political Science Association Conference (EPSA)

- 2016 – 2017: Yale (Behavioral Science), Harvard, Vanderbilt Urban Political Economy Conference, Princeton Rethinking Voter Turnout Workshop, MPSA (Section Chair)
- 2017 – 2018: Columbia Political Economy Conference (Discussant), Election Sciences, Reform, & Administration Conference (ESRA)
- 2018 – 2019: Institute for Advanced Study in Toulouse, American Sociological Society Computational Pre-Conference, APSA (Discussant), Microsoft Research Digital Economic Conference, ESRA (Host Committee)
- 2019 – 2020: APSA (Discussant),

Teaching Experience

- Election Law (undergraduate): Spring 2014
- Government and Legal Environment of Business (MBA): Spring 2011, Spring 2012
- Introduction to American Politics (undergraduate): Fall 2011, Fall 2015, Fall 2017, Fall 2018
- Policy Making and Public Institutions (MPA): Spring 2016, Spring 2018
- Policy Making and Public Institutions (undergraduate): Spring 2017, Spring 2020
- Political Economics (undergraduate): Spring 2007
- Quantitative Research Methods (undergraduate): Fall 2010, Fall 2011, Fall 2013, Spring 2015, Spring 2016, Spring 2018, Fall 2018
- Quantitative Research Methods I (graduate): Fall 2008, Fall 2010
- Quantitative Research Methods II (graduate): Spring 2010, Spring 2012, Spring 2015, Spring 2020
- Quantitative Research Methods III (graduate): Spring 2009, Spring 2014
- State and Local Politics (undergraduate): Fall 2009\

Departmental Service

- American Politics Workshop Co-organizer: 2011-2012, 2014-2015, 2015-2016, 2016-2017
- Comprehensive Exam Committee: American Politics (2011, 2013 (chair), 2014, 2017), Methods (2012), Political Communication (2010)
- Committee on Associated Faculty: 2009-2010
- Dissertation Committee: Joshua Darr (2015 PhD, placed at LSU), Ellen Donnelly (2015 PhD, placed at the University of Delaware), Alex Garlick (2016 PhD (chair), placed at College of New Jersey), Eunji Kim (2019 PhD, placed at Vanderbilt), Patricia Posey (2019 PhD, placed at University of Chicago), Laura Silver (2016 PhD, placed at US State Department), Ashley Tallevi (2017 PhD (co-chair), placed at Facebook), Emily Thorson (2013 PhD, placed at George Washington University, now at Syracuse)
- Promotion Committee: 2014-2015, 2015-2016, 2016-2017, 2017-2018, 2018-2019, 2019-2020
- Search Committee: Political Identity (2014)
- Senior Thesis Advisor: Maryam Alireza (2013), Richard Diurba (2018), August Gebhard-Koenigstein (2019), Yoni Gruskin (2011), Ketaki Gujar (2020), Phoebe Henninger (2018), Urja Mittal (2014), Riley Morrison (2020), Michael Morse (2013), James Sadler (2013), Joseph Sachi (2019), Joseph Sageman (2017), Lucas Salzman (2014), Eric Selzer

(2019), Mark Steiner (2020), Jack Weisman (2019), Max Wheeling (2011), Kevin Yang (2020) Jesse Yoder (2016)

Undergraduate Chair: 2015-2018

Undergraduate Executive Committee: 2010-2012, 2013-2015, 2015-2018 (chair)

School and University Service

Penn Undergraduate Research Mentor: 2011, 2013

SAS Committee on Undergraduate Academic Standing: 2014-2016

SAS Learning, Culture, and Social Change Strategic Planning Committee: 2013-2014

SAS Quantitative Exploration of Evolving Systems Strategic Planning Committee: 2014-2015

SAS Teaching Awards Committee: 2017-2018, 2019-2020 (chair)

SAS Undergraduate Pre-Major Advisor: 2010-2012, 2014-2016, 2016-2018

Search Committee for Executive Director of the Center for Undergraduate Research and Fellowship: 2018

Senior Thesis Advisor: Claire Greenberg (2017, PPE), Rebecca Molinoff (2020, PPE), Amelia Storck (2016, Visual Studies)

University Faculty Review Committee for Undergraduate Research: 2016-2017, 2017-2018, 2018-2019, 2019-2020 (chair)

University Scholars Faculty Council: 2019-2020

Vice Provost for Education Fellowship Selection Committee: 2018-2019, 2019-2020

Disciplinary Service

Book Conference Participant: “Primaries and Candidate Quality” by Shigeo Hirano and James M. Snyder Jr., “Southern Slavery and its Political Legacy” by Avidit Acharya, Matthew Blackwell, and Maya Sen, “Who Wants to Run?” by Andrew Hall

Book Reviewer: CQ Press, University of Chicago Press

Editorial Board Member: American Politics Research (2017-), Journal of Politics (2019-)

External Promotion Reviewer: Columbia University (X2), Massachusetts Institute of Technology, Microsoft Research, University of California Berkeley, University of California Los Angeles (X2), University of California Riverside, University of California San Diego, University of Chicago (X3)

Grant Reviewer: National Science Foundation, Research Council of Canada, Belgium FNRS

Journal Reviewer: American Economic Review, American Journal of Political Science (X19), American Law and Economics Review, American Politics Research (X10), American Political Science Review (X16), B.E. Journal of Economic Analysis & Policy, British Journal of Political Science (X8), Comparative Political Studies, Congress and the Presidency, Criminology, Criminal Justice, Law & Society, Criminal Justice Studies, East European Politics and Societies and Cultures, Econometrica, Economics and Politics (X6), Education Policy, Election Law Journal (X4), Electoral Studies (X5), Empirical Economics, European Journal of Political Economy, European Journal of Political Research (X2), International Journal of Health Care Economics and Finance, International Journal of Public Opinion Research, International Political Science Review, Journal of Economic Behavior and Organization, Journal of Elections, Public Opinion,

and Parties (X4), Journal of Experimental Political Science (X5), Journal of Empirical Legal Studies (X2), Journal of Political Economy, Journal of Politics (X27), Journal of Public Administration Research and Theory, Journal of Public Economics (X3), Journal of Public Policy, Journal of Theoretical Politics, Legislative Studies Quarterly (X3), Nature (X2), Quarterly Journal of Economics, Quarterly Journal of Political Science (X10), PLOS ONE, Political Analysis, Political Behavior (X10), Political Communication, Political Psychology (X2), Political Research Quarterly (X6), Political Science Research and Methods (X4), Politics and Governance, Politics, Groups, and Identities, Polity, PS, Proceedings of the National Academy of Sciences (X5), Public Choice (X7), Public Opinion Quarterly (X8), Research and Politics, Review of Economics and Statistics, Social Problems (X2), State Politics and Policy Quarterly (X4), Statistics, Politics and Policy, Time-sharing Experiments for the Social Sciences, Yale Law Journal