December 5, 2020

***Pearson v. Kemp,* Case No. 1:20-cv-4809-TCB**

United States District Court for Northern District of Georgia

Expert Report of Jonathan Rodden, PhD and William Marble

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I. Introduction

Dr. Eric Quinnell and Dr. S. Stanley Young (hereafter QY) present several analyses of data from Fulton County, Georgia that they claim show "unexplainable statistical anomalies" and vote patterns that "fail basic sanity and mathematical fidelity checks." Their analyses are based on data from Edison Research, a market research firm that gathers vote data and distributes it to news outlets. QY make a number of unfounded assumptions about the data, which render their conclusions suspect. Moreover, even granting their assumptions, none of their analyses show "unexplainable statistical anomalies." In fact, they closely mirror patterns that we would expect to see in a fair election. None of their analyses provide any evidence whatsoever of fraudulent activity.

II. Qualifications

Jonathan Rodden is Professor of Political Science and Senior Fellow at the Center for Economic Policy Research and the Hoover Institution at Stanford University. For a full description of his qualifications, see Section II of the other report by Dr. Rodden filed in this case and the curriculum vitae attached thereto. Mr. Marble is a PhD candidate in the political science department at Stanford University. He received a B.A. in political science and economics from the University of Pennsylvania with a minor in mathematics. He has published papers in top political science journals, including *Journal of Politics, Political Science Research and Methods*, and the statistics journal *Political Analysis*. He has been awarded with a number of grants from Stanford University and the Stanford Institute for Economic Research, as well as a computational social science grant from the Russell Sage Foundation. His research uses statistical tools to study voting behavior, public opinion, political geography, and campaigns. For his work teaching statistical methods to PhD students, he won a Stanford teaching award. During the 2014 midterm elections,

he worked with the NBC News Decision Desk as part of the University of Pennsylvania's Program on Opinion Research and Election Studies.

III. Data from Edison Research is Not Official Data

QY present analysis of the Edison Research data feed. Edison Research is a consumer research firm that conducts exit polls and collects vote return data for the National Election Pool consortium of news networks.[1] On Election Night and in the days after Edison provides periodic updates of vote counts to news organizations. QY's analyses all revolve around the timing of updates provided by Edison, and specifically the cumulative share of each candidate's absentee votes that were counted by different times on Election Day and thereafter in Fulton County, Georgia.

While Edison's data feed facilitates disseminating information about election results, it does not represent official election results. It is unclear the extent to which individual batches of Edison updates reflect the actual running total of votes counted by election officials at different points in time. QY present essentially no description of the Edison data, how it is collected, how it is distributed, or why "anomalies" in the Edison data should be used to infer anything about the integrity of official vote return data, nor have they provided the Edison data.

Moreover, innocent human errors in Edison's Election Night reporting occasionally occur. For example, in the 2018 Wisconsin Senate race, one of Edison's batch update included an error where a large batch of votes were assigned to the wrong candidate.[2] The error was quickly caught and corrected by Edison and news networks, but the fact that such an error can occur in the raw

[1] https://web.archive.org/web/20201201125532/https://www.edisonresearch.com/election-polling/, accessed Dec. 4, 2020.
[2] Stephen Pettigrew and Charles Stewart III. 2020. "Protecting the Perilous Path of Election Returns: From the Precinct to the News." *The Ohio State Technology Law Journal* 16(2): 587-638.

feed from Edison casts doubt on whether anomalies in the Edison live updates reflect actual anomalies, let alone outright fraud, in the official vote tabulation.

IV. Quinnell and Young Make Faulty Assumptions

Edison's data feed may not reflect official results. Nonetheless, for the sake of argument, we will maintain QY's assumption that Edison's live updates reflect the actual timing of counting votes within Fulton County. QY's report centers around the timing of when each candidate's absentee votes were counted within each precinct — as proxied by the times at which Edison reported batches of ballots.[3]

A statistic QY return to repeatedly is the share of a precinct's absentee ballots that are included in Edison's first batch of results — which were reported on November 4 at 12:59 AM.[4] They assume that this first batch of results reflects all of the absentee votes that were returned in the weeks prior to Election Day. This assumption is not supported by any evidence about how Fulton County officials count ballots. Instead, QY make this assumption on two bases: first, because election officials in Georgia are allowed to process absentee ballots before Election Day; and second, because the next several Edison updates do not contain any absentee ballots.

This assumption is certainly incorrect. Figure 1 plots the cumulative share of absentee ballots in Fulton County that were received by date, according to records kept by Georgia's

[3] Somewhat confusingly, clusters of what are typically referred to as "precincts" are occasionally called "counties" in QY's report and elsewhere. We adopt the term "precinct" to avoid confusion.

[4] QY do not indicate what time zone Edison uses for its timestamps. In Edison's county-level time series data, which we have obtained, the timestamp is followed by a "Z," indicating "Zulu" or Greenwich Mean Time. Assuming Edison's precinct-level time series data follows the same standard, the first batch of results was actually reported on at 8:59 PM Eastern Daylight Time on November 3 (Election Day). This interpretation makes more sense, as news outlets began reporting results — which are based on Edison's data — on Election Night well before 1:00 AM the next morning.

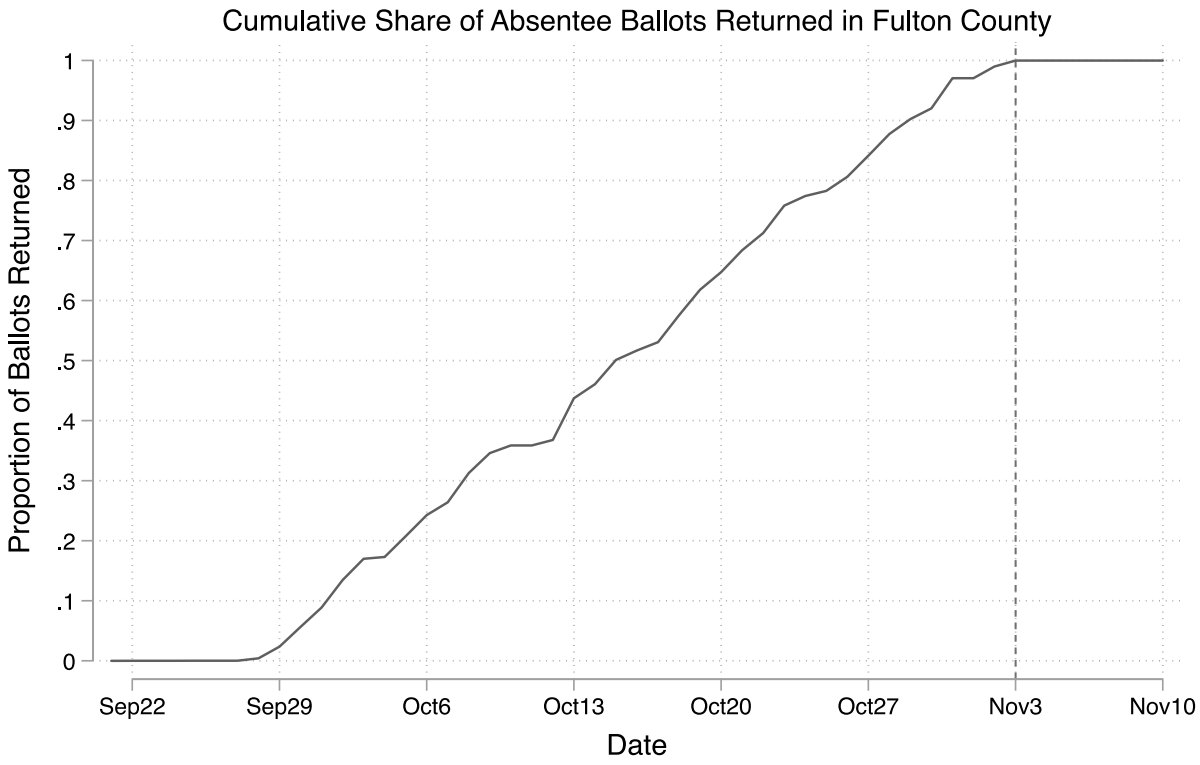
Secretary of State.[5] Nearly all absentee ballots in Fulton County — nearly 99% — were returned before November 3. Edison's first batch of election results, in contrast, contained only about 50% of the eventual total number of absentee votes. QY's presumption that this batch contains all of the absentee votes received before Election Day is obviously incorrect. Without a doubt, there were many ballots received before Election Day that were not counted until after that first batch.

It is important to note that we have no information, and evidently QY also have no information, about the specific procedure by which absentee ballots are counted in Fulton County, which matters a great deal for the story that QY are trying to tell. They are not explicit about their assumptions, but their discussion seems to indicate that they believe all of the Trump and Biden absentee ballots were in one, large, mixed-up pile, so that the probability of a particular ballot being counted at a particular time should be equal for Democrats and Republicans. This assumption evidently drives their claim that the Democratic and Republican ballots should have exactly the same likelihood of being counted before or after specific points in time.

There are several obvious reasons to doubt this assumption. We know that election officials are required to attribute each absentee ballot to a precinct. One possibility is that as the ballots come in, they are pre-sorted by precinct—or by groups of precincts—so that during the counting process, it would be likely that many of a precinct's voters would be counted in clumps.

[5] These data are drawn from the Georgia Secretary of State's website, which provides a version of the state's voter file that includes a column indicating when a voter's absentee ballot was returned: https://elections.sos.ga.gov/Elections/voterabsenteefile.do

Figure 1: Share of Fulton County absentee ballots returned by each date.



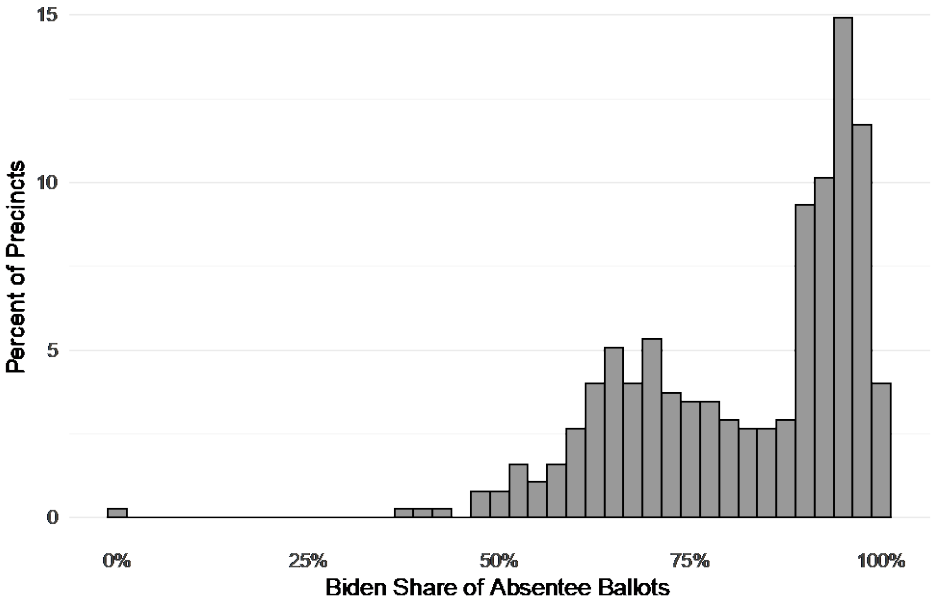
Another possibility is that there is no pre-processing into piles by precinct, but something like this happens as a matter of course due to the way ballots are collected and delivered to election administrators, either by U.S. Postal Service, or from the process of bringing in ballots from the various ballot dropbox locations in Fulton County. It extremely likely that ballots are arriving in a way that is geographically "lumpy." That is to say, a ballot from Chattahoochee Hills is likely to be close in the pile with other ballots from Chattahoochee Hills. A ballot from the urban core of Atlanta is likely to be in the pile near other ballots from urban Atlanta. This is very likely to be true of ballots sent in the mail, since they are retrieved from specific neighborhoods by letter carriers, or taken in bunches by postal workers from "blue boxes" or post office drop points. And

it is almost certainly true of ballots retrieved from ballot drop-boxes, which are scattered in locations throughout the county.

Unless, through some strange process, the ballots are shuffled like a deck of cards as they come in, we can probably assume that there is some geographic correlation in the time at which ballots are counted. Given that partisans are not randomly or uniformly distributed geographically, this geographic "lumpiness" in ballot counting matters a great deal. Consider some important facts about Fulton County: 1) There were far more Democratic than Republican absentee ballots overall, because Fulton County is largely Democratic, and because Republicans were strongly discouraged by their leaders from voting absentee, 2) of 384 precincts, there are only 6 precincts where Trump received a majority of absentee ballots cast, and 3) there are 165 precincts where over 90 percent of the absentee ballots were for Biden.

To see this more clearly, we include in Figure 2 a histogram of Biden's share of absentee ballots cast in Fulton County precincts. It is clear that there are not very many Trump absentee ballots to count in the first place, and they are relatively clustered in a handful of precincts where Biden *still* receives a majority. Because of this, if there is any geographic "lumpiness" to the counting of votes over time, we would anticipate large spikes of Biden votes showing up whenever a clump of voters drawn from the overwhelmingly Democratic precincts happened to be counted. We would not expect corresponding spikes for Trump.

Figure 2: Distribution of Biden Share of Absentee Votes Cast, Fulton County Precincts



V. The Share of Absentee Ballots Counted Before November 3 Is Not Suspicious

QY make the faulty assumption that absentee ballots reported in Edison's first update reflect ballots received and counted before November 3, and absentee ballots reported in subsequent Edison updates reflect ballots received after November 3 (para. 8).[6] This interpretation is faulty for the reasons pointed out above: the vast majority of absentee ballots were returned prior to November 4. The reason is that, by Georgia law, absentee ballots need to be returned by 7:00 PM on Election Day (November 3) in order to be counted.[7] It is our understanding that the only

[6] Actually, QY refer to these ballots as being received before and after November 4, which was the day after Election Day. Due to the time zone issue noted in footnote 4, we instead refer to November 3 in summarizing their arguments.

[7] https://www.acluga.org/en/take-action/2020-election-dates-and-deadlines

ballots received after November 3 that might be counted are military voters' ballots, which must be received by November 6.

This simple fact undermines QY's contention that the number of ballots received before November 3 is "curiously close" to the number of absentee ballots received after November 3. It simply cannot be the case that all ballots received prior to November 3 were reported in Edison's first batch of updates. Instead, this first batch of results, which contained roughly 50% of the total absentee ballots, must have included roughly half of the absentee votes received before November 3 — because, again, nearly all ballots were returned before that date. A more likely explanation is that election officials had the capacity to process about half of the absentee ballots received before Election Day in time to report those votes to Edison Research by the time Edison issued its first batch of results.

However, suppose we grant QY's assumption that the first batch of results contained all of the absentee votes received before November 3. Even if roughly equal numbers of absentee ballots had been returned before Election Day as on Election Day, there is absolutely no reason why this would be indicative of fraud. QY provide no comparison data — for example, from other states or counties — to suggest that this pattern is anomalous.

VI. Small Precincts Are Likely to Have 0% or 100% of Trump Absentee Votes Counted by Election Day

There is no reason to think that the absentee votes reported by Edison in its first batch update reflect all of the absentee votes received before Election Day. Instead, it more likely reflects constraints on the speed with which election administrators can count votes.

Nonetheless, QY make a series of claims about statistical anomalies evident in data on the share of a candidate's absentee votes within each precinct that was included in Edison's first batch

of results. We show that their claims of data irregularities are baseless: there is absolutely nothing anomalous about the distribution of votes that were counted before Election Day. Using simple arguments from probability theory as well as a simple numerical simulation of a fair election, we show that the patterns documented in QY's report are similar to what we would expect in a fair election.

QY present analysis showing that there is a relatively large number of precincts where nearly 100% of Trump's absentee votes were counted in Edison's first batch of results. Meanwhile, there were no precincts in which over 71% of Biden's absentee votes were reported in Edison's first batch of results. QY suggest that this pattern is unusual and indicative of data irregularities, claiming that there is less than 0.01% probability of observing a precinct in which all of Trump's absentee votes are received before Election Day. In fact, this pattern is not surprising in the least and their probability calculation is based on fundamentally flawed assumptions. What QY fail to consider is that there are very many precincts in Fulton County that received very few absentee votes for Trump — making it very probable that, in some precincts, close to 0% or 100% of Trump's absentee votes would arrive before Election Day.

QY note — and we corroborate, using official vote data from Fulton County[8] — that there were 23 precincts out of 384 total in which Trump received no absentee votes at all. There were an additional 13 precincts in which Trump received only a single absentee vote, and 115 precincts — nearly a third of all precincts — in which he received fewer than 10 absentee votes. In contrast, there are very few precincts in which Biden received only a small number of absentee votes —

[8] https://results.enr.clarityelections.com/GA/Fulton/105430/web.264614/#/summary

only 10 precincts in which he received no absentee votes, and only 21 in which he received fewer than 10 absentee votes.[9]

With such a large number of precincts where Trump received few absentee votes, it is very probable that in some of them, 0 or 100% of the votes were counted before Election Day. As an analogy, consider a series of coinflips — akin to a voter's decision about whether to cast their absentee vote early enough for it to be counted before Election Day or not. If we flip the coin only 3 times, it is relatively probable that we end up with all heads or all tails — specifically, there is a 12.5% chance of each. Now, imagine that 15 people each flip a coin 3 times. The probability that *at least one* of the 15 comes up with all heads or all tails is very high: over 98%. However, now imagine each person flips 10 coins. The probability of getting all heads or all tails is now very small: less than 0.1%. The probability that *at least* one of 15 people, who each flip 10 coins, getting all heads or all tails is only about 3%.

The large number of precincts with few Trump absentee voters are analogous to 15 people flipping 3 coins each. Not only should we expect to observe some precincts where close to 0 or 100% of Trump's absentee votes were counted before Election Day, it would be surprising if we *did not*. In contrast, there are not many districts with a small number of Biden absentee votes. Therefore, we should see many fewer precincts where close to 0 or 100% of Biden's absentee votes were counted before Election Day — just as it is much less likely for someone flipping 10 coins to get all head or all tails. Simply put, the histograms that are presented in QY's report are roughly what we should expect based on elementary probability theory.[10]

[9] These patterns are to be expected. Fulton is a heavily Democratic county, and there are many small, urban precincts throughout the county in which Trump received no votes.

[10] Technically, the probability of observing 0 heads from n coin flips is given by the equation $p = .5^n$. For 2 coin flips, there is a 25% probability of getting 0 heads. For 6 coin flips, there is a roughly 3% chance of getting 0 heads.

VII. A Simple Simulation Matches the Patterns in QY's Report, Undermining Their Claim to Have Discovered Anomalies

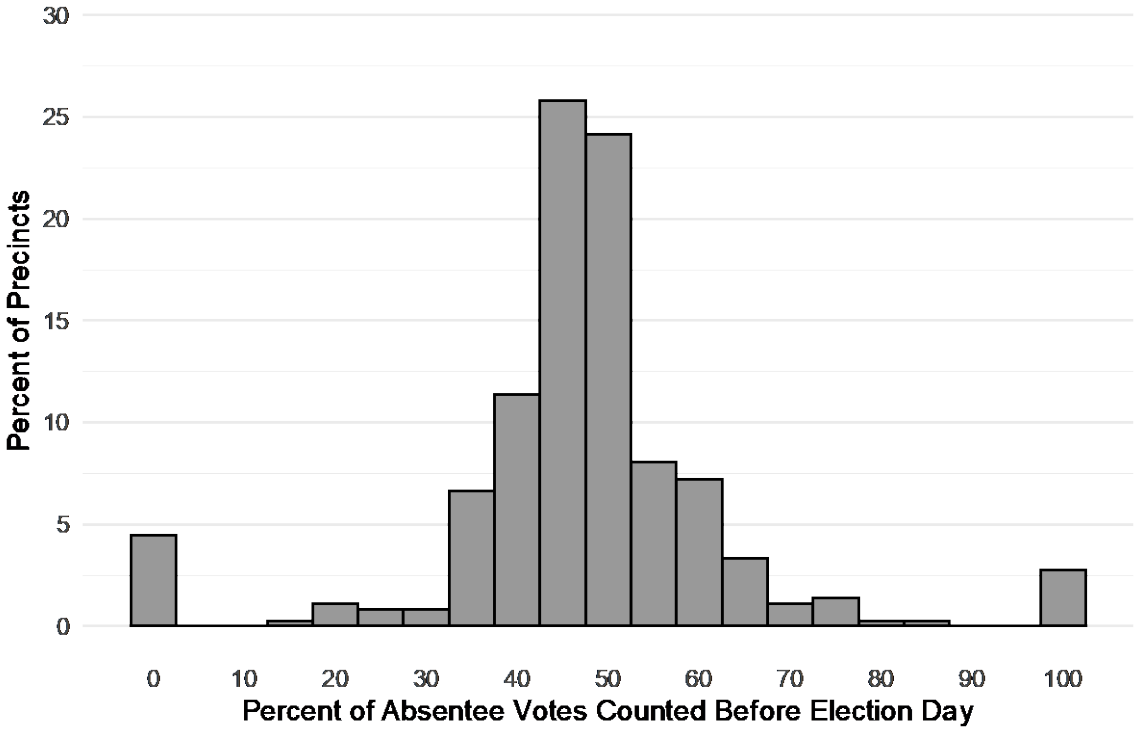
To further probe the ability of this argument to explain the pattern of results in QY's report, we conduct a simple numerical simulation that extends the coin-flip analogy used above. This simulation retains the same intuition but is designed to closely mirror the actual precinct-level data in Fulton County. For the reasons explained above, although we are skeptical about it, in this exercise we adopt QY's assumption that there is no geographic lumpiness to the vote counting. That is to say, we assume that all of the ballots have been shuffled like a deck of cards, and a Chattahoochee Hills voter is mixed in a pile of ballots such that he or she is no more likely to be counted right after another neighboring voter from Southern Fulton County than right after a Buckhead voter.

We start with the total number of absentee votes for Trump in each precinct, derived from official Fulton County vote return data. Then, we assume each Trump absentee voter flips a coin to decide whether or not to cast their ballot early enough for it to be counted before Election Day.[11] We then calculate the proportion of total simulated absentee votes within each precinct that arrive before Election Day.

Figure 3 shows a histogram, using the simulated dataset, of the percent of Trump's absentee votes within a precinct that are counted before Election Day. This graph looks strikingly similar to the one presented as evidence of "statistical anomalies" in QY's report (para. 30). There are spikes in the histogram around 0% and 100%, just as in QY's report. Far from being anomalous, the general pattern presented in QY's report is just what we would expect to observe in a fair election.

[11] The table after para. 27 in QY's report indicates that about 47% of Trump's total absentee votes were counted in the first batch of Edison data. Therefore, instead of flipping a fair coin, we assume Trump voters flip a weighted coin that comes up head 47% of the time.

Figure 3: Simulated share of precincts' absentee votes for Trump that are counted before Election Day.



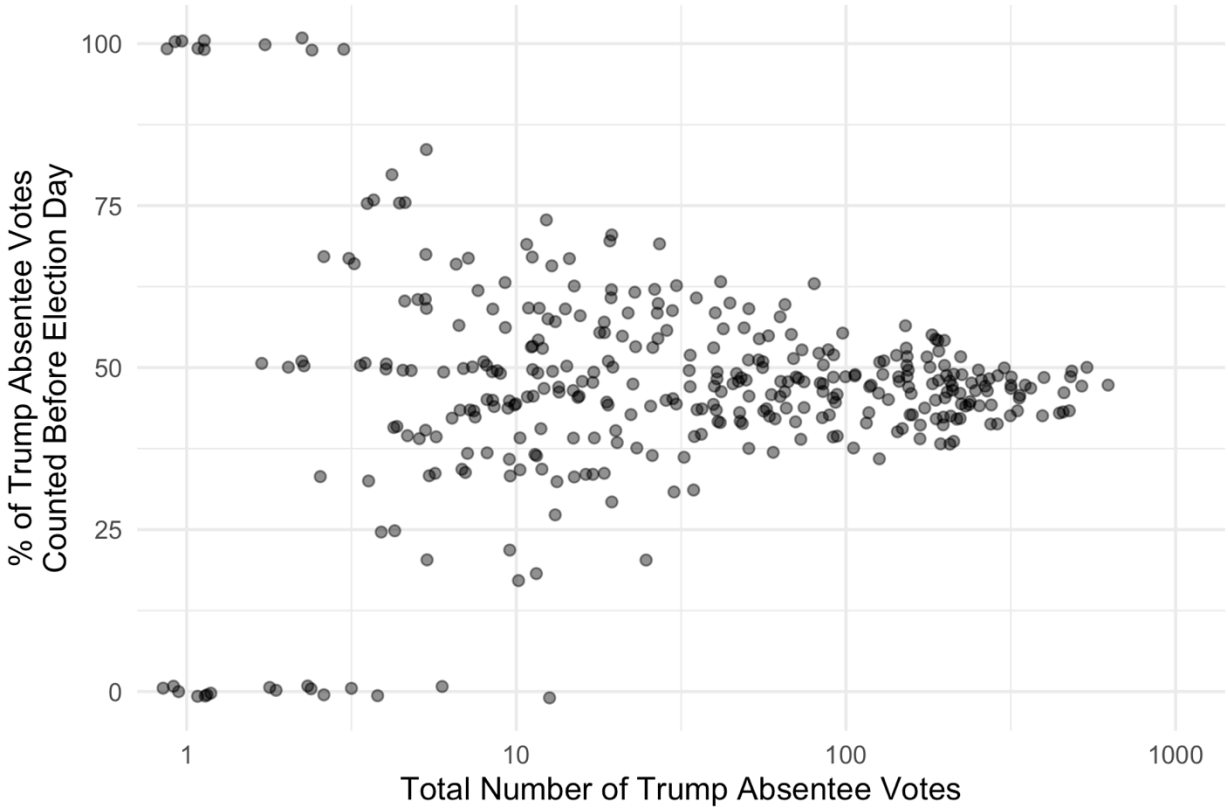
As expected from our discussion, the precincts with very high or very low share of absentee ballots counted before Election Day are precincts where there are very few Trump absentee voters. To see this, consider Figure 4 below. In this scatterplot, each point represents a precinct. On the horizontal axis is the actual number of absentee votes for Trump in that precinct.[12] On the vertical axis is the simulated percentage of Trump votes that are counted before Election Day. The points are moved slightly from their true *x*-*y* values to make it easier to see points that overlap.

At the left-hand side of the plot, we have precincts that have very few Trump absentee voters. These precincts are highly variable in the proportion of Trump absentee votes that are counted before Election Day in our simulation: some precincts have 0% counted and some have

[12] Because there is a large asymmetry in precinct sizes in Fulton County, the horizontal axis is plotted on a logarithmic scale.

100%. As we move to the right — as the precincts have more Trump absentee voters — the dispersion of the points decreases substantially. This pattern exactly mimics the coin flip analogy above: when we flip a coin only a few times, it's fairly likely that we'll end up with close to all heads or all tails. But if we increase the number of flips, we increase the odds of getting close to a 50-50 distribution of heads and tails.

Figure 4: Simulated percentage of a precinct's Trump absentee votes that are counted before Election Day versus the total number of Trump absentee votes. Points are moved from their true values slightly to make it easier to see overlapping points.



This simple simulation surely leaves out many details about the way that voters decide when to cast a ballot and when election officials count those ballots. It also ignores the likely geographic "lumpiness" in the timing of ballot counting. Nonetheless, it demonstrates that the

patterns presented in QY's report are entirely expected and provide no evidence of fraud or manipulation whatsoever.

VIII. Skewness and Kurtosis Are Uninformative About Statistical Anomalies

QY make additional claims about the cross-precinct distributions of the share of a candidate's absentee votes that were reported in the first Edison update. Specifically, they calculate the skewness and kurtosis of these distribution. Skewness and kurtosis are statistics that indicate, respectively, how symmetric a distribution is around its average value and how "fat" its tails are — i.e., how common it is for observations to fall very far from the average value of the distribution.

QY refer to the skewness statistic for the Biden distribution as a "meaningless nonsense calculation." On this point, we agree: this statistic is meaningless for the purpose of detecting statistical anomalies. QY provide no explanation of why we should expect any particular skewness or kurtosis values in the data they present. Absent such an explanation of what statistical regularities we should expect in datasets like the one they present, there is no reason to think that any skewness or kurtosis value is indicative of statistical irregularities.

Perhaps QY expect that this dataset should follow a normal, bell-shaped distribution. Normal distributions have a skewness value of 0 and a kurtosis value of 3. However, as we show above through our probability argument and numerical simulation, there is absolutely no reason to expect that this dataset should follow a normal distribution, and in fact it would be surprising if it did. The fact that the skewness statistic was not 0 and the kurtosis statistic was not 3 is totally uninformative about the integrity of Fulton County's vote counting.

QY also misinterpret their own statistics. They write that an observed skewness of -153.5% implies that most outcomes lie below 0. This is incorrect. A negative skewness indicates that the

left-hand tail of the distribution is longer than the right-hand tail — informally, that there are more observations to the right of the average value than there are to the left. A negative skewness statistic does not imply that most observations are below 0. In fact, the data they present — which, by their nature, cannot be below 0 — shows quite clearly that a distribution can have negative skewness without any observations below 0.

In sum, QY's discussion of skewness and kurtosis is totally meaningless for the determination of statistical anomalies in Fulton County's vote counting. They present no argument for why any particular values would be anomalous and they misinterpret their own data analysis.

IX. Over-Time Correlations in Vote Counting Are Inevitable

QY make additional claims about the correlations between vote total for each candidate across precincts over time. For example, in para. 25 they point to graphs that plot the cumulative share of each candidate's eventual absentee votes that had been counted at different points in time within a set of precincts. They write that "all gains track nearly perfectly," implying that this "synchronous result" is evidence that "absentee votes of all precincts [are] centralized and coordinated." QY appear to insinuate that such coordination would be nefarious. No data analysis is required to reach the conclusion that vote counting is likely coordinated across precincts. While absentee vote totals in Fulton County are eventually apportioned into voters' precincts, our understanding is that actual counting is done in a centralized manner by election administrators. Centralization in processing and counting of absentee ballots by county election administrators is a common practice. It would seem most impractical to send absentee ballots out to individual precincts for counting. Some level of centralization in ballot-counting is not evidence of anything nefarious, but rather a run-of-the-mill feature of election administration. In any case, their data

analysis tells us nothing about whether counting is centralized or not. As time goes on, a higher proportion of the total absentee ballots are counted. It is impossible for these time series *not* to be highly correlated across precincts.

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Publications

Books

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Political Geography and Representation: A Case Study of Districting in Pennsylvania (with Thomas Weighill), forthcoming 2021.

Decentralized Rule and Revenue, 2019, in Jonathan Rodden and Erik Wibbels, eds., *Decentralized Governance and Accountability*, Cambridge University Press.

Geography and Gridlock in the United States, 2014, in Nathaniel Persily, ed. *Solutions to Political Polarization in America*, Cambridge University Press.

Can Market Discipline Survive in the U.S. Federation?, 2013, in Daniel Nadler and Paul Peterson, eds, *The Global Debt Crisis: Haunting U.S. and European Federalism*, Brookings Press.

Market Discipline and U.S. Federalism, 2012, in Peter Conti-Brown and David A. Skeel, Jr., eds, *When States Go Broke: The Origins, Context, and Solutions for the American States in Fiscal Crisis*, Cambridge University Press.

Federalism and Inter-Regional Redistribution, 2010, in Nuria Bosch, Marta Espasa, and Albert Sole Olle, eds., *The Political Economy of Inter-Regional Fiscal Flows*, Edward Elgar.

Back to the Future: Endogenous Institutions and Comparative Politics, 2009, in Mark Lichbach and Alan Zuckerman, eds., *Comparative Politics: Rationality, Culture, and Structure* (Second Edition), Cambridge University Press.

The Political Economy of Federalism, 2006, in Barry Weingast and Donald Wittman, eds., *Oxford Handbook of Political Economy*, Oxford University Press.

Fiscal Discipline in Federations: Germany and the EMU, 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

The Political Economy of Pro-cyclical Decentralised Finance (with Erik Wibbels), 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

Globalization and Fiscal Decentralization, (with Geoffrey Garrett), 2003, in Miles Kahler and David Lake, eds., *Governance in a Global Economy: Political Authority in Transition*, Princeton University Press: 87-109. (Updated version, 2007, in David Cameron, Gustav Ranis, and Annalisa Zinn, eds., *Globalization and Self-Determination: Is the Nation-State under Siege?* Routledge.)

Introduction and Overview (Chapter 1), 2003, in Rodden et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Soft Budget Constraints and German Federalism (Chapter 5), 2003, in Rodden, et al, *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Federalism and Bailouts in Brazil (Chapter 7), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Lessons and Conclusions (Chapter 13), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Online Interactive Visualization

Stanford Election Atlas, 2012 (collaboration with Stephen Ansolabehere at Harvard and Jim Herries at ESRI)

Other Publications

How America's Urban-Rural Divide has Shaped the Pandemic, 2020, *Foreign Affairs*, April 20, 2020.

An Evolutionary Path for the European Monetary Fund? A Comparative Perspective, 2017, Briefing paper for the Economic and Financial Affairs Committee of the European Parliament.

Representation and Regional Redistribution in Federations: A Research Report, 2009, in *World Report on Fiscal Federalism*, Institut d'Economia de Barcelona.

On the Migration of Fiscal Sovereignty, 2004, *PS: Political Science and Politics* July, 2004: 427–431.

Decentralization and the Challenge of Hard Budget Constraints, *PREM Note* 41, Poverty Reduction and Economic Management Unit, World Bank, Washington, D.C. (July).

Decentralization and Hard Budget Constraints, *APSA-CP* (Newsletter of the Organized Section in Comparative Politics, American Political Science Association) 11:1 (with Jennie Litvack).

Book Review of *The Government of Money* by Peter Johnson, *Comparative Political Studies 32,7: 897-900.*

Fellowships and Honors

Fund for a Safer Future, Longitudinal Study of Handgun Ownership and Transfer (LongSHOT), GA004696, 2017-2018.

Stanford Institute for Innovation in Developing Economies, Innovation and Entrepreneurship research grant, 2015.

Michael Wallerstein Award for best paper in political economy, American Political Science Association, 2016.

Common Cause Gerrymandering Standard Writing Competition, 2015.

General support grant from the Hewlett Foundation for Spatial Social Science Lab, 2014.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2012.

Sloan Foundation, grant for assembly of geo-referenced precinct-level electoral data set (with Stephen Ansolabehere and James Snyder), 2009-2011.

Hoagland Award Fund for Innovations in Undergraduate Teaching, Stanford University, 2009.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, beginning Fall 2010.

Research Grant on Fiscal Federalism, Institut d'Economia de Barcelona, 2009.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2008.

United Postal Service Foundation grant for study of the spatial distribution of income in cities, 2008.

Gregory Luebbert Award for Best Book in Comparative Politics, 2007.

Fellow, Center for Advanced Study in the Behavioral Sciences, 2006-2007.

National Science Foundation grant for assembly of cross-national provincial-level dataset on elections, public finance, and government composition, 2003-2004 (with Erik Wibbels).

MIT Dean's Fund and School of Humanities, Arts, and Social Sciences Research Funds.

Funding from DAAD (German Academic Exchange Service), MIT, and Harvard EU Center to organize the conference, "European Fiscal Federalism in Comparative Perspective," held at Harvard University, November 4, 2000.

Canadian Studies Fellowship (Canadian Federal Government), 1996-1997.

Prize Teaching Fellowship, Yale University, 1998-1999.

Fulbright Grant, University of Leipzig, Germany, 1993-1994.

Michigan Association of Governing Boards Award, one of two top graduating students at the University of Michigan, 1993.

W. J. Bryan Prize, top graduating senior in political science department at the University of Michigan, 1993.

Other Professional Activities

International Advisory Committee, Center for Metropolitan Studies, Sao Paulo, Brazil, 2006–2010.

Selection committee, Mancur Olson Prize awarded by the American Political Science Association Political Economy Section for the best dissertation in the field of political economy.

Selection committee, Gregory Luebbert Best Book Award.

Selection committee, William Anderson Prize, awarded by the American Political Science Association for the best dissertation in the field of federalism and intergovernmental relations.

Courses

Undergraduate

Politics, Economics, and Democracy

Introduction to Comparative Politics

Introduction to Political Science

Political Science Scope and Methods

Institutional Economics

Spatial Approaches to Social Science

Graduate

Political Economy of Institutions

Federalism and Fiscal Decentralization

Politics and Geography

Consulting

2017. Economic and Financial Affairs Committee of the European Parliament.

2016. Briefing paper for the World Bank on fiscal federalism in Brazil.

2013-2018: Principal Investigator, SMS for Better Governance (a collaborative project involving USAID, Social Impact, and UNICEF in Arua, Uganda).

2019: Written expert testimony in *McLemore, Holmes, Robinson, and Woullard v. Hosemann*, United States District Court, Mississippi.

2019: Expert witness in *Nancy Corola Jacobson v. Detzner*, United States District Court, Florida.

2018: Written expert testimony in *League of Women Voters of Florida v. Detzner* No. 4:18-cv-002510, United States District Court, Florida.

2018: Written expert testimony in *College Democrats of the University of Michigan, et al. v. Johnson, et al.*, United States District Court for the Eastern District of Michigan.

2017: Expert witness in *Bethune-Hill v. Virginia Board of Elections*, No. 3:14-CV-00852, United States District Court for the Eastern District of Virginia.

2017: Expert witness in *Arizona Democratic Party, et al. v. Reagan, et al.*, No. 2:16-CV-01065, United States District Court for Arizona.

2016: Expert witness in *Lee v. Virginia Board of Elections*, 3:15-cv-357, United States District Court for the Eastern District of Virginia, Richmond Division.

2016: Expert witness in *Missouri NAACP v. Ferguson-Florissant School District*, United States District Court for the Eastern District of Missouri, Eastern Division.

2014-2015: Written expert testimony in *League of Women Voters of Florida et al. v. Detzner, et al.*, 2012-CA-002842 in Florida Circuit Court, Leon County (Florida Senate redistricting case).

2013-2014: Expert witness in *Romo v Detzner*, 2012-CA-000412 in Florida Curcuit Court, Leon County (Florida Congressional redistricting case).

2011-2014: Consultation with investment groups and hedge funds on European debt crisis.

2011-2014: Lead Outcome Expert, Democracy and Governance, USAID and Social Impact.

2010: USAID, Review of USAID analysis of decentralization in Africa.

2006–2009: World Bank, Independent Evaluations Group. Undertook evaluations of World Bank decentralization and safety net programs.

2008–2011: International Monetary Fund Institute. Designed and taught course on fiscal federalism.

1998–2003: World Bank, Poverty Reduction and Economic Management Unit. Consultant for *World Development Report*, lecturer for training courses, participant in working group for assembly of decentralization data, director of multi-country study of fiscal discipline in decentralized countries, collaborator on review of subnational adjustment lending.

Last updated: October 19, 2020

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Education

Stanford University *2015-Present*
Ph.D. Candidate in Political Science

Fields: American Politics, Political Methodology, Comparative Politics (minor)
Dissertation: "Political Responses to Economic Decline"
Committee: Kenneth Scheve, Jonathan Rodden, Justin Grimmer, Clayton Nall

University of Pennsylvania *2011-2015*
B.A. in Political Science and Economics, minor in Mathematics

Publications

William Marble and Clayton Nall. "Where Interests Trump Ideology: Liberal Homeowners and Local Opposition to Housing Development." *Journal of Politics* (Forthcoming). [link]

Amalie Jensen, William Marble, Kenneth Scheve, and Matthew J. Slaughter. "City Limits to Partisan Polarization in the American Public." Forthcoming, *Political Science Research and Methods*. [link]

William Marble and Matthew Tyler. "The Structure of Political Choices: Distinguishing Between Constraint and Multidimensionality." Conditionally accepted, *Political Analysis*. [link]

Working Papers

Ala' Alrababa'h, William Marble, Salma Mousa, and Alexandra Siegel. "Can Exposure to Celebrities Reduce Prejudice? The Effect of Mohamed Salah on Islamophobic Behaviors and Attitudes." Revised and resubmitted, *American Political Science Review*. [link]

William Marble. "Responsiveness in a Polarized Era: How Local Economic Conditions Structure Campaign Rhetoric." (Job Market Paper) [link]

Justin Grimmer and William Marble. "Who Put Trump in the White House? Explaining the Contribution of Voting Blocs to Trump's Victory." [link]

William Marble and Nathan Lee. "Why Not Run? How The Demands of Fundraising Undermine Ambition for Higher Office." [link]

Kaiping Chen, Nathan Lee, and William Marble. "How Policymakers Evaluate Online versus Offline Constituent Messages." [link]

William Marble. "All-Mail Voting Can Decrease Ballot Roll-Off." [link]

In Progress

"Estimating Issue Weights in American Federal Elections, 1980-2018"

"Social Ties, Labor Mobility, and Support for the Welfare State"

"Attitude Activation and the Study of Political Campaigns" (with Cole Tanigawa-Lau and Justin Grimmer)

"How Much Do Social Connections Matter for Political Success?" (with Ari Ray)

"Creating the American Gentry: Political Consequences of Property Tax Reform in California" (with Clayton Nall)

"Where's the Party in Foreign Policy?" (with Rachel Myrick and Carl Gustafson)

Grants and Awards

Dissertation Fellowship, Stanford Institute for Research in the Social Sciences, 2020-2021 ($5,500)

Collaborative Research Fellowship, Stanford Impact Labs, 2020 ($7,000)

Schultz Graduate Student Fellowship in Economic Policy, Stanford Institute for Economic Policy Research, 2019 ($9,000)

Computational Social Science Grant, Russell Sage Foundation, 2019 (with Ari Ray, $9,835)

Ric Weiland Graduate Fellowship in the Humanities and Sciences, 2018-2020

Stanford Centennial Teaching Assistant Award, 2018

Small Grants for Survey Experiments in Political Science, Stanford Institute for Research in the Social Sciences, 2018 (with Ala' Alrababa'h and Salma Mousa, $1,000)

Conference travel grant, Penn College of Arts and Sciences, 2015

Undergrad research grant, Penn Democracy, Citizenship, and Constitutionalism Program, 2014

Research fellow, Penn Program on Opinion Research and Election Studies, 2013 and 2014

Invited Presentations

2019: UC Santa Barbara

Conferences

American Political Science Association (2017, 2019)

Midwest Political Science Association (2015, 2018)

Stanford-Berkeley Political Economy Working Group (2018)

American Association for Public Opinion Research (2016)

Teaching

Teaching Assistant

Graduate Political Methodology I, 2016 and 2017 (Stanford)

Graduate Political Methodology II, 2017 and 2018 (Stanford)

Math Camp for incoming Ph.D. students, 2016 and 2017 (Stanford)

Undergraduate Political Methodology, 2015 (Penn)

Thinking Strategically: Introduction to Game Theory, 2017 (Stanford)

What's Wrong with American Politics? An Institutional Approach, 2019 and 2020 (Stanford)

International Negotiation and Decision-Making, 2018 (Stanford, short course)

Instructional Workshops

Introduction to Data Science, workshop for high school students visiting Stanford, 2018

Introduction to Webscraping, Stanford Summer Research College, 2016. Links to materials: slides, tutorial (pdf), GitHub.

Data Visualization Using `ggplot2`, presentation to Stanford political science graduate students, 2016. Links to materials: slides, GitHub.

Introduction to Stata, workshop for summer fellows at the Penn Program for Opinion Research and Election Studies, 2015

Service

Reviewer for *American Political Science Review*, *American Journal of Political Science*, *Journal of Politics*

TA Mentor for the Stanford Political Science Department, 2017-2020

Co-Chair, Stanford Political Science Graduate Student Association, 2018

Co-Organizer, Stanford Political Science Very Applied Methods Workshop, 2017-2018

Social Chair, Stanford Political Science Graduate Student Association, 2016

Policy Writing

"The Evidence and Tradeoffs for a Stay-at-Home Pandemic Response: A Multidisciplinary Review of Stay-at-Home Implementation in America." Policy brief reviewing early research on covid-19, April 2020. (with Alexis A. Doyle, Mollie S.H. Friedlander, Grace D. Li, Courtney J. Smith, et al.) [link]

Non-testifying expert witness research in *League of Women Voters of Florida v. Detzner*, United States District Court, Northern District of Florida, 2018. (with Jonathan Rodden)

Co-author of expert report on the 2015 vote-by-mail election in San Mateo County, California. Commissioned by the San Mateo County Election Office. (with Melissa Michelson)

Other Experience

Co-founder, CivicPulse

Election analyst, NBC News Decision Desk, New York, 2014 midterm elections

Debate coach, La Salle College High School, Wyndmoor, PA, 2011-2015

References

Kenneth Scheve
Professor of Political Science and Global Affairs
Yale University
Email: `kenneth.scheve@yale.edu`

Jonathan Rodden
Professor of Political Science
Stanford University
Email: `jrodden@stanford.edu`

Clayton Nall
Assistant Professor of Political Science
UC Santa Barbara
Email: `nall@ucsb.edu`

Justin Grimmer
Professor of Political Science
Stanford University
Email: `jgrimmer@stanford.edu`