EXHIBIT A

SUPREME COURT OF THE STATE OF NEW YORK

COUNTY OF STEUBEN

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TIM HARKENRIDER, GUY C. BROUGHT, LAWRENCE CANNING, PATRICIA CLARINO, GEORGE DOOHER, JR., STEPHEN EVANS, LINDA FANTON, JERRY FISHMAN, JAY FRANTZ, LAWRENCE GARVEY, ALAN NEPHEW, SUSAN ROWLEY, JOSEPHINE THOMAS, and MARIANNE VOLANTE,

Index No. E2022-0116CV

Petitioners,

-against-

GOVERNOR KATHY HOCHUL, LIEUTENANT GOVERNOR AND PRESIDENT OF THE SENATE BRIAN A. BENJAMIN, SENATE MAJORITY LEADER AND PRESIDENT PRO TEMPORE OF THE SENATE ANDREA STEWART-COUSINS, SPEAKER OF THE ASSEMBLY CARL HEASTIE, NEW YORK STATE BOARD OF ELECTIONS, and THE NEW YORK STATE LEGISLATIVE TASK FORCE ON DEMOGRAPHIC RESEARCH AND REAPPORTIONMENT,

Respondents.

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REPLY OF SEAN P. TRENDE

MARCH 1, 2022

Reply of Sean P. Trende

I. Scope Of Engagement

I have been asked by counsel to respond to the Affidavit of Dr. Michael Barber, Ph.D. ("Barber Report"), the Affidavit of Dr. Kristopher R. Tapp, Ph.D. ("Tapp Report"), and the Expert Report of Dr. Stephen Ansolabehere ("Ansolabehere Report") (collectively "Respondents' Expert Reports"). I have been further asked to render such opinions relating to the 2022 state Senate and Congressional maps, 2021–2022 N.Y. Reg. Sess. Leg. Bills S.8196, A.9039-A, A.9040-A, and A.9168, enacted by the New York State Legislature and signed by Governor Kathy Hochul (respectively, "Enacted Senate Map" and "Enacted Congressional Map," or collectively, "Enacted Maps"), as needed to evaluate these three reports. I have also been asked to re-evaluate, if necessary, the conclusions found in the Expert Report of Sean P. Trende (hereinafter "Trende Report").

II. Introduction And Executive Summary

- Respondents' Expert Reports all miss the mark, badly. In fact, taking their objections seriously only provides stronger evidence that the Enacted Maps were drawn with the purpose of disfavoring the Republican Party and reducing the number of competitive districts.

- The Respondents' Experts' claim that the Enacted Maps actually reveal that the Enacted Maps have a pro-*Republican* bias fails to understand the Trende Report, which does not rest on classifying districts as "Republican" or "Democratic." Had it done so, it would not have used the selection of races in the naïve way that Respondents' Experts use it.

- Proper classification of districts as "Republican" or "Democratic" yields even stronger evidence that the Enacted Maps were drawn with the purpose of disfavoring the Republican Party and reducing the number of competitive districts.

- Nor does Respondents' Experts' complaint that the ensemble does not respect municipal boundaries or ensure proper protection of minority voting rights help Respondents' case. In fact, *even after essentially conceding* arguendo *to Respondents that 35% of the districts in the Enacted Plan must be drawn exactly as the legislature drew them, that municipalities should be split or consolidated*

according to the legislature's determinations, and that district cores should be considered, the map still presents as an outlier compared to the ensembles.

- The additional critiques found in the Tapp Report are baseless.
- In short, the Respondents' Expert Reports actually strengthen the conclusions of the Trende Report. These conclusions do not need to be altered or revisited.

III. The Enacted Map Was Plainly Enacted To Favor Democrats And Reduce Competition

Respondents' Expert Reports ultimately rest their analysis on a faulty interpretation of the data. To understand this, it is helpful to revisit the method and conclusions offered in the Trende Report. After producing an ensemble of 5,000 simulated maps, I calculated a Gerrymandering Index, which shows how far each district deviates from the average partisanship for a particular district across the maps (for a fuller explanation, see Trende Report at 12–13).

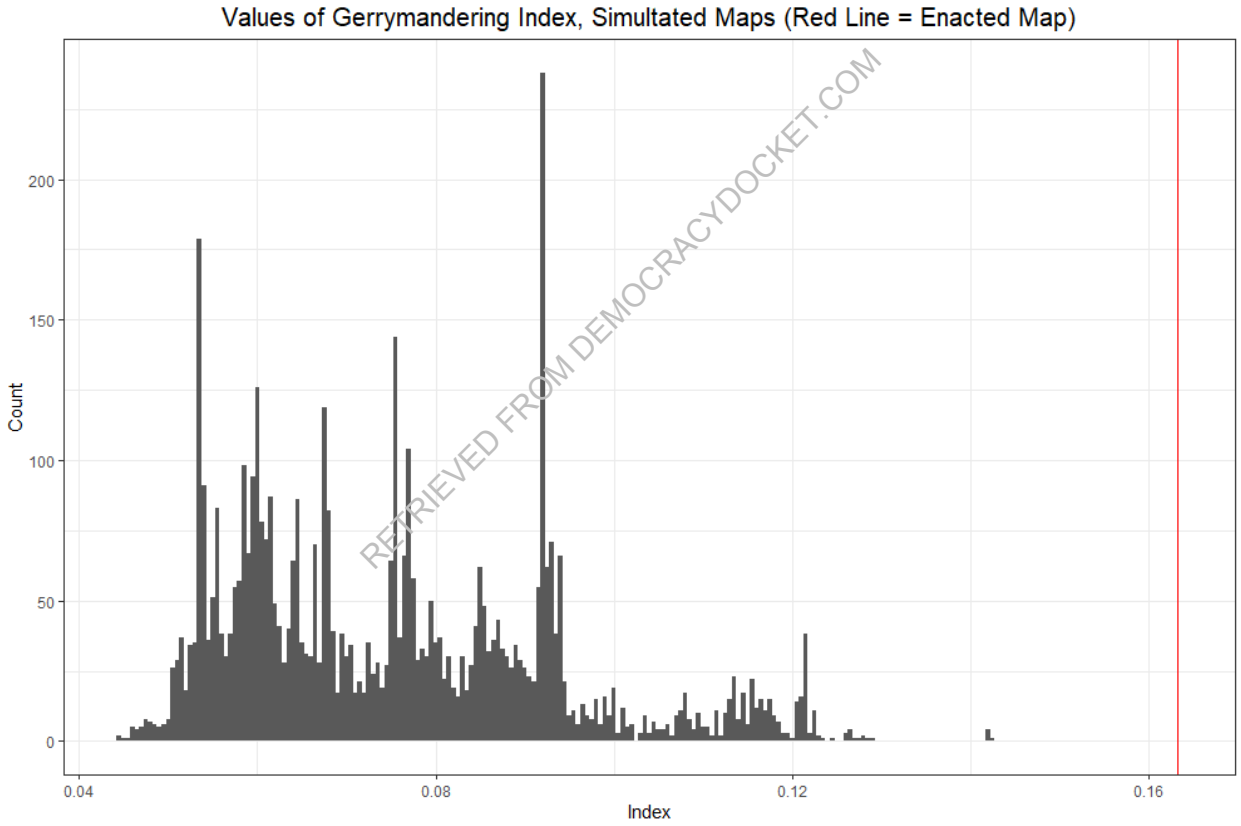
Partisanship is measured by averaging all races included in a widely available dataset. Those races are the 2016 presidential election in New York, the 2016 New York senate election, the 2018 New York gubernatorial election, the 2018 New York attorney general election, and the 2020 presidential election in New York. *See* Trende Report at 12 n.2. Crucially, however, the Trende Report makes clear that there are any number of ways to calculate district partisanship. Thus, the Trende Report employed these races *not* because they will precisely predict the outcome of congressional elections at a threshold of 50%. As shown below, interpreting them this way is a reasonably poor way to accomplish that task.

Rather, the Trende Report is express that it averages in every race in this dataset: (a) to foreclose an attack that that the races had been somehow cherry-picked in order to achieve a pre-ordained outcome, and (b) because "[t]he simulation approach tends not to be as sensitive to the choice of elections as other metrics, unless political coalitions in a state vary radically from election-to-election." *Id.* The key to this analysis is not who wins or loses in a particular district. It is instead whether the map deviates from expected district partisanship in a way that is inexplicable except by heavy reliance on partisan data.

To begin an analogy to be revisited later, one would never want to use Massachusetts Governor Charlie Baker's performance in congressional districts in 2018 as a direct proxy for how a district would perform in congressional elections, given that his 2018 performance in Massachusetts is atypical for a Republican in that State (to say the least). At the same time, even

given his strong overall performance, we would expect districts drawn without respect to partisanship to still resemble those that an ensemble approach would create, and to exhibit no clear pattern of packing and cracking of his vote. In other words, while you cannot predict congressional elections based on Baker's vote share, you could still usefully examine the distribution of Baker's vote shares in districts in an ensemble and compare them to those in an enacted map to determine whether political data were used to draw the map.[1]

After calculating the Gerrymandering Index for all 5,000 plans in the ensemble, which were all drawn blind to partisanship, I calculated the Gerrymandering Index for the Enacted Map. The Enacted Map appeared to be six standard deviations from the average Index produced by the ensemble, an enormously improbable outcome for a partisan-blind map drawing.



The Trende Report concludes that "[t]he probability that the Enacted Congressional Map would be drawn by map drawers who cared only about the constitutional mandates for compactness and avoiding undue partisan influence is vanishingly small. Put simply, it is

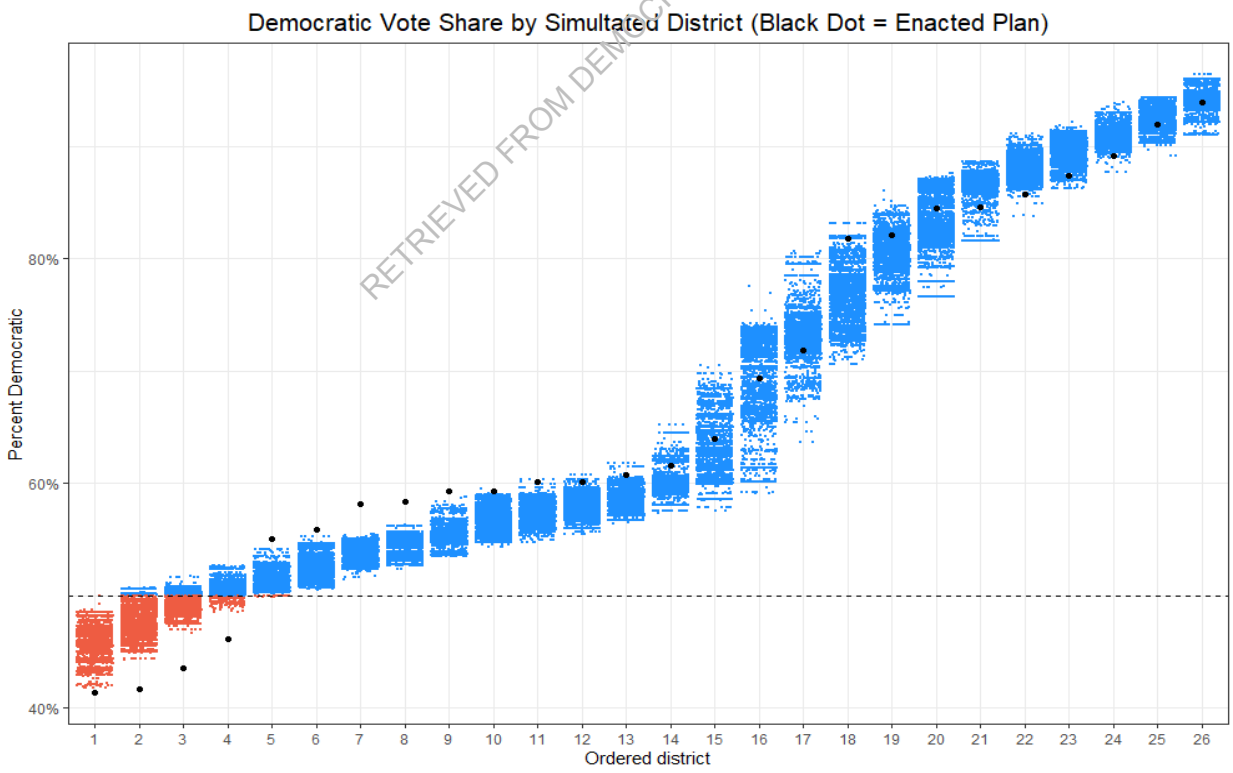
[1] To be clear, it would probably be *better* to use a more representative race or set of races. The point is simply that if Republicans are purposefully clustered in a few overwhelmingly Republican districts and improperly spread out over other districts, it should also show up in the Baker data.

implausible, if not impossible, that this map was drawn without a heavy reliance upon political data and was likely drawn to favor or disfavor a political party." Trende Report at 14.

Respondents' only rejoinder is to claim that the Gerrymandering Index, by itself, tells you nothing about the direction of the bias. The Gerrymandering Index can indeed detect gerrymanders for either party, but the idea that the overwhelmingly Democratic legislature set aside the map drawn by its redistricting commission and produced a map whose partisanship is an extreme outlier in order to favor of Republicans should be implausible on its face.

It is also belied by other evidence provided in the Trende Report. Contrary to the claims in the Respondents' Expert Reports, *see, e.g.*, Tapp Report ¶ 26, the Trende Report does did not stop its analysis with the Gerrymandering Index, although it probably could have. Instead, the Trende Report is clear that establishing whether and which party is being disadvantaged is *best* accomplished by also "[i]nterrogating the maps from a different angle." Trende Report at 14.

It does so by following McCartan and Imai and taking the ensemble maps, ordering each map's districts from most-to-least Republican, and then examining how Republican or Democratic the district is, using the index of statewide races described above.



As the Trende Report notes, in the closest it comes to classifying districts directly, "[t]he only place where the Enacted Congressional Map falls within expectations is in safely Democratic

districts—those where Democrats would win over 60% of the vote. This 60% threshold, however, is significant, as political scientists and elections analysts will begin to classify elections as competitive below that threshold." Trende Report at 15–16. Yet, "around district number 13, the simulation expects to see multiple districts that fall into the potentially competitive range. This is also the exact point at which the values of the Enacted Maps begin to fall outside of the expected ranges." *Id.*at 16. We also see that the most Republican districts are made far more Republican than we would expect and note that, although the Democratic vote share in the ensemble maps rises gradually from the most Republican district to the 14th-most Republican district, Democratic vote share in the Enacted Map jumps suddenly around District 5. In other words, the map packs Republicans into a few overwhelmingly Republican districts, and then it cracks the remainder to create fewer competitive districts, which is prohibited by the New York Constitution. This is the "DNA of a gerrymander." *Id.*; *see also* Gregory Herschlag *et al.*, "Quantifying Gerrymandering in North Carolina" 7 *Statistics & Pub. Pol'y* 2 (2018) (referring to this pattern as the "signature of gerrymandering").[2]

IV. The Respondents' Expert Reports Incorrectly And Needlessly (Mis)classify Districts As "Republican" Or "Democratic." But A Proper Classification Scheme Leads To The Same Conclusions Found In The Trende Report

The Respondents' experts' main response to the conclusions found in the Trende Report appears to be that the Enacted Maps are actually biased against Democrats. The conclusion that independent analysts on the left, right, and center are all incorrect about the fairness of a map that would appear to limit Republicans to 15% of the seats (in a State where they routinely win around a third of the vote), is one that can only be reached through a misapplication of methods and a naïve interpretation of data.

Respondents' experts embark upon an entirely different line of analysis, classifying all districts whose average Democratic performance is in excess of 50% as "likely to be won by Democrats," *e.g.*, Tapp Report ¶¶ 28-34, and vice-versa. Tellingly, they cite nothing, either in the academic literature or from practitioners, suggesting that a simple average of statewide races is an accurate way to predict whether a district is "likely" to elect Republicans or Democrats to Congress. Nor do they conduct their own analysis, nor do they even *consider* actual congressional election results.

[2] https://www.researchgate.net/publication/322419073_Quantifying_Gerrymandering_in_North_Carolina.

The Tapp Report expends just two sentences analyzing what would constitute a Democratic district, concluding, erroneously, that any district that falls above the 50% Democratic *average* vote share in the provided index of elections would "likely" elect a Democrat. *Id.* ¶ 24. Respondents' experts then count up the number of "Republican" districts predicted by the ensemble plans, note that the Enacted Plan creates four "Republican" districts (which is something of a best-case scenario under the ensembles), and conclude that this plan actually has a Republican bias to it. Dr. Ansolabehere employs a similar classification scheme throughout his report, both in response to my analyses and those of the other Petitioners' experts.

This is a flawed way to classify these districts, for two reasons.

A. Classifying Districts As Simply "Republican" Or "Democratic" Is Misleading And Unwarranted.

First, such an approach converts what is, in truth, a probabilistic measure into a dichotomous one. Simply put, while methodologists and mathematicians sometimes use this as a heuristic to illustrate the functionality of redistricting algorithms, no elections analyst or elections scholar would look at a district where statewide Republicans would be expected, on average, to win 50.1% of the statewide vote and conclude it would elect Republicans to Congress, without further inquiry. Indeed, as illustrated by my first report, political scientists would, as a general matter, classify districts where parties win as much as 60% of the vote as "competitive." Three examples help illustrate why this is the case.

First, there is no practical difference between a district where statewide Democratic candidates average 49.99% of the vote and a district that where statewide Democratic candidates average 50.01% of the vote. Both are, for all intents and purposes, equally likely to elect a Republican to Congress. But Respondents' Expert Reports urge this Court to label the former district "Republican" and the latter district "Democratic."

Second, this approach characterizes a district where statewide Democrats win, on average, 50.1% of the vote in the same way as it does a district where statewide Democrats win, on average, 90% of the vote: they are both simply "Democratic." It would therefore have the Court refrain from distinguishing between a map that pairs one district where statewide Republicans average 100% of the vote with two districts where statewide Democratic candidates average 75% of the vote, on the one hand, and one that draws one district where statewide Republicans average 52% of the vote and two districts where statewide Democrats average 51% of the vote, on the other hand.

Third, the Respondents' Expert Reports would treat a map with nine districts where statewide Democratic candidates average 50.1% of the vote and one district where statewide Republican candidates average 49.9% of the vote as being fundamentally dissimilar from a map with three 50.3% Democratic districts, two 50.2% Democratic districts, and five 49.9% Democratic districts. They would call the first map a 9-1 Democratic map and the second map a 5-5 Democratic map. Assuming *arguendo* that 50% was, in fact, the threshold defining the boundary between races where Republicans were favored to win and Democrats were favored to win, any analysis should view both maps as simply containing ten tossup districts; they might further estimate that both maps would tend to elect five Republicans and five Democrats to Congress.

A final example ties this in directly with these maps: The ensembles expect a congressional plan's seventh-most Democratic district to be one where statewide Democrats win, on average, between 51% and 55% of the vote. The Enacted Plan creates a district where Democrats win, on average, 58% of the vote. It is obvious that there is a world of difference between a district where (statewide) Democrats win 51% of the vote on average and districts where those Democrats win 58% of the vote, on average. But Respondents' Experts urge this Court to be indifferent between those two districts and classify them both as simply "Democratic." That is an inaccurate way to approach election classification.

B. Using 50% Of A Party's *Average* Statewide Vote Share As A Threshold Misclassifies Elections

Second, even if Respondents' experts were correct that we should look at races through the dichotomous lens of "Republican" and "Democrat," the 50% threshold that they employ as their classification boundary is the wrong threshold to use. Remember, the index provided is not based on congressional elections, but rather is an average of statewide elections conducted over a span of election cycles.[3] People who study elections for a living know that a district where Andrew Cuomo, or Hillary Clinton, or Joe Biden wins 51% of the vote is not *necessarily* likely to elect a Democrat to Congress. In fact, given that Biden won nationally by four points, we would probably conclude that a district where Biden won 51% of the vote has a slight Republican tilt to it overall.

[3] We use statewide races because it helps to control for things like candidate quality, fundraising, and incumbency in a uniform way across the State.

Candidates can have unique appeal in a State, face an unusually weak opponent, or run in a particularly good year for Democrats (such as 2018) or a particularly bad year for Democrats (such as 2010). To revisit our example of Charlie Baker, while it would be useful to know whether a legislature draws an unusually large number of districts where he performed poorly, it would be a terrible error to classify the districts that he won as "Republican." Baker carried all but one of the State's districts, often by overwhelming margins, but Massachusetts has not elected a Republican to Congress since 1996.[4] In other words, classifying districts he won as "Republican" would grossly overstate the likely Republican performance in those districts.

A careful examination of the data confirms that this is exactly what happens when using these data to try to classify districts as "Republican" or "Democratic" in New York by using 50% as our classification boundary. The following table provides the Democratic vote share in districts in every congressional election in New York over the past three election cycles, sorted by that district's score in our index.[5] Notably, Republican candidates have won every congressional election in seats where statewide Democratic candidates have averaged less than 50% of the vote, excepting a narrow loss in one district in the unusually good Democratic year of 2018. They have won more than half of the elections in districts where statewide Democratic candidates have averaged between 50% and 55% of the vote. While they do not win either of the seats in the mid-to-high 50s, they are occasionally competitive in them. Democrats run behind the average of their statewide candidates in 2/3 of all races where they faced opposition; most of the races where they ran ahead of that average fall in the very good Democratic year of 2018.

[4] *See* https://docs.google.com/spreadsheets/d/17yr9mcAtuUdNjI9NEPYKxXsEldzzQ2ZaDwEAbnPRyS4/edit#gid=46011824.

[5] We examine the last three cycles because those are the years that have statewide races included in our index. But the trend continues back to the beginning of the decade: Republicans almost always win in districts up to roughly a 53% threshold in our index, and are competitive/capable of winning in districts up to roughly a 55.5% threshold.

Table 1: Democratic Vote Share in Districts, By Index
2012-2020 Lines

District	Index	Democratic Share 2020	Democratic Share 2018	Democratic Share 2016
27	42.89%	39.50%	49.81%	32.80%
23	46.63%	41.61%	45.76%	42.40%
21	46.85%	41.16%	43.06%	31.55%
22	47.15%	50.00%	50.89%	46.86%
1	50.39%	45.14%	47.93%	41.04%
19	51.44%	55.91%	52.68%	45.75%
2	51.76%	46.51%	46.89%	37.54%
11	52.05%	46.86%	53.23%	37.37%
18	53.60%	56.36%	55.47%	55.60%
24	55.66%	44.72%	47.37%	39.44%
3	57.68%	56.30%	58.98%	52.80%
4	59.34%	56.63%	61.33%	55.76%
20	59.95%	61.17%	66.50%	67.90%
25	61.21%	60.24%	58.98%	56.16%
17	63.50%	62.72%	100.00%	100.00%
26	64.89%	70.90%	73.34%	74.60%
6	69.63%	67.98%	100.00%	72.98%
16	78.06%	100.00%	100.00%	100.00%
14	81.01%	72.32%	85.17%	82.88%
10	81.60%	75.52%	82.15%	78.08%
12	85.69%	83.32%	87.72%	83.18%
9	87.21%	93.97%	89.67%	100.00%
5	88.04%	100.00%	100.00%	86.79%
8	88.27%	84.83%	100.00%	100.00%
7	89.29%	85.45%	100.00%	90.79%
13	93.73%	92.12%	94.60%	92.77%
15	93.88%	88.88%	95.99%	96.45%

If we are somehow not yet convinced that classifying any seat where statewide Democratic candidates have averaged more than 50% of the vote as "Democratic" for purposes of congressional elections is mistaken, we can be more rigorous. A simple regression analysis of Democratic vote share in a district election on the index yields the following result, which suggests Republican vote share would be expected to remain above 50% up to the point where statewide Democratic candidates begin to average around 53% of the vote. Of course, this is simply a "break-even point," as Republicans would remain competitive in districts with even higher indices.

Table 2: Regression of Partisan Index on Democratic Vote Share[1]

Characteristic	Beta	95% CI[2]	p-value
(Intercept)	-0.06	-0.11, -0.01	0.030
index	1.1	1.0, 1.1	<0.001

[1] R^2 = 0.9139

[2] CI = Confidence Interval

We can, of course, build more complex models; given the near-perfect separation in the data, use of logistic regression analysis to classify districts directly as "Republican" or "Democratic" is unreliable, but perhaps utilization of a support vector machine would give slightly different answer. We could also incorporate variables such as incumbency to potentially improve the (already high) fit. There is a veritable rabbit hole of analysis we could go down classifying a district as "Republican" or "Democratic," before even engaging in the question of what would constitute a "competitive" district in a quantitative sense. This subjectivity is part of why I avoid this approach. Regardless, there is no reason to believe any technique would reveal an answer other than what we can intuit from our naked eye: "Republican District" does not line up with a 50% cutpoint in our index.

Overall, a correct interpretation of the ensemble data—***if*** we were to go down the "classification route"—would be to take 53% as the threshold at which Democratic wins become more likely than Republican wins, and 55.6% as the point at which Republicans have no chance at winning whatsoever. Using those points, the ensemble predicts that, overall, maps drawn without partisan intent would produce *on average* six districts where Republicans would be favorites to win and nine districts where they would at least be competitive. It predicts that, overall, maps drawn without partisan intent would produce *as many* as eight seats where Republicans would be favorites to win, and twelve where they would be competitive (although such results would be outliers).

This stands in stark contrast to the reality of the Enacted Plan, which creates just four districts where Republicans would be favored and five where they would have a chance at winning (the index in the fifth-most Republican district in the Enacted Plan is 54.9%, barely in the range of races where Republicans would have a chance). In other words, a proper system of classifying "Republican" and "Democratic" districts would actually confirm what our common sense should

tell us: That the outlying Gerrymandering Index score for the Enacted Plan is a result of the legislature aggressively targeting competitive and Republican-leaning seats.[6]

To drive home the point that these maps were clearly not drawn to favor Republicans, consider the following table. It shows the partisan index under the old lines, the partisan index under the new lines, and is sorted by the amount that index shifted to either the left or right. I have also included a metric for the Cook Partisan Voting Index (PVI), which elections analysts actually do employ to measure whether a district will send Republicans or Democrats to Congress, under both the new and the old lines.[7] Finally, the table lists the 2020 congressional winner in each district and the amount of the old district core retained.

[6] Again, these averages and maxima are estimated from a set of elections where, overall, Republicans fared quite poorly.

[7] Cook PVI looks at how much more Republican or Democratic a district was than the country as a whole in the last two presidential elections. Donald Trump received 49% the popular vote (excluding third parties) in 2016 and 48% in 2020. Assume Donald Trump tied with the Democratic candidate in both years. PVI helps to correct for national forces by noting that the district was a point to the right of the country in 2016 and two points to the right in 2020, for a PVI of R+1.5. PVI is a reasonably strong classifier: Democrats currently hold every district with a Democratic-leaning PVI but six; Democrats hold 20 of the Republican-leaning PVIs (this Democratic bias reflects the fact that Democrats have had two good election cycles in a row). This is available on Cook's subscription-only website.

Table 3: Summary of New and Old Districts

District	Old District Index	New District Index	Change	Old District Cook PVI	New District Cook PVI	2020 Winner	Core Retention
11	52.05%	61.50%	9.45%	R+7	D+4	Nicole Malliotakis (R)	74.78%
1	50.39%	58.10%	7.71%	R+6	D+2	Lee Zeldin (R)	53.22%
24	55.66%	60.15%	4.48%	D+2	D+6	John Katko (R)	69.10%
19	51.44%	55.90%	4.46%	R+3	D+2	Antonio Delgado (D)	47.52%
3	57.68%	59.30%	1.62%	D+3	D+5	Thomas Suozzi (D)	72.23%
18	53.60%	55.00%	1.40%	R+1	D+1	Sean Patrick Maloney (D)	70.84%
14	81.01%	82.05%	1.04%	D+25	D+27	AOC (D)	83.01%
10	81.60%	81.76%	0.17%	D+27	D+27	Jerrold Nadler (D)	69.77%
13	93.73%	93.88%	0.15%	D+40	D+40	Adriano Espaillat (D)	82.89%
12	85.69%	85.72%	0.02%	D+34	D+34	Carolyn Maloney (D)	83.24%
4	59.34%	59.30%	−0.04%	D+4	D+4	Kathleen Rice (D)	96.68%
7	89.29%	89.11%	−0.18%	D+34	D+34	Nydia Velazquez (D)	66.68%
6	69.63%	69.37%	−0.26%	D+13	D+13	Grace Meng (D)	95.54%
25	61.21%	60.77%	−0.44%	D+8	D+8	Joe Morelle (D)	92.76%
5	88.04%	87.34%	−0.71%	D+34	D+32	Gregory Meeks (D)	95.60%
26	64.89%	63.96%	−0.93%	D+10	D+9	Brian Higgins (D)	95.56%
27	42.89%	41.31%	−1.57%	R+12	R+13	Chris Jacobs (R)	55.02%
20	59.95%	58.35%	−1.60%	D+7	D+6	Paul Tonko (D)	84.60%
15	93.88%	91.94%	−1.94%	D+39	D+38	Ritchie Torres (D)	77.36%
9	87.21%	84.57%	−2.64%	D+32	D+29	Yvette Clark (D)	78.34%
21	46.85%	43.52%	−3.33%	R+8	R+12	Elise Stefanik (R)	62.51%
17	63.50%	60.14%	−3.36%	D+9	D+5	Mondaire Jones (D)	73.63%
8	88.27%	84.47%	−3.80%	D+33	D+28	Hakeem Jeffries (D)	82.51%
23	46.63%	41.65%	−4.98%	R+9	R+13	Tom Reed (R)	64.64%
2	51.76%	46.10%	−5.66%	R+5	R+10	Andrew Garbarino (R)	57.11%
16	78.06%	71.86%	−6.20%	D+25	D+18	Jamaal Bowman (D)	77.52%
22	47.15%	—	—	R+9	—	Claudia Tenney (R)	—

To accept the theory of the Respondents' Expert Reports, one must accept that it is merely a coincidence that all districts that shift leftward by more than a point are either held by Republicans or potentially vulnerable Democrats. One must accept that it is merely a coincidence that almost every district that shifts rightward is either very likely to elect a Republican already or is overwhelmingly Democratic. Respondents' Expert Reports require a conclusion that it is just a coincidence that every district whose PVI shifts its basic underlying orientation flips from Republican to Democrat (this occurs in Districts 1, 11, 18 and 19).

One must also accept that close to every district with less than 70% core retention is a district where Democrats pack Republicans (Districts 2, 23, 21, 27) or a previously competitive district that they move sharply leftward (Districts 19, 24, 1). The only exception is Rep. Nydia Velazquez's district, which gives up a substantial number of Democratic voters to the Republican-held Eleventh District, while remaining heavily Democratic. Simply put: An independent fact-finder would have to struggle mightily to miss what is hiding in plain sight here.

V. Addressing The "Missing Constitutional Requirements" Does Not Change The Analysis

All three of Respondents' Expert Reports observe that the ensemble maps are not explicitly constrained by every constitutional requirement in New York. This all misses the mark.

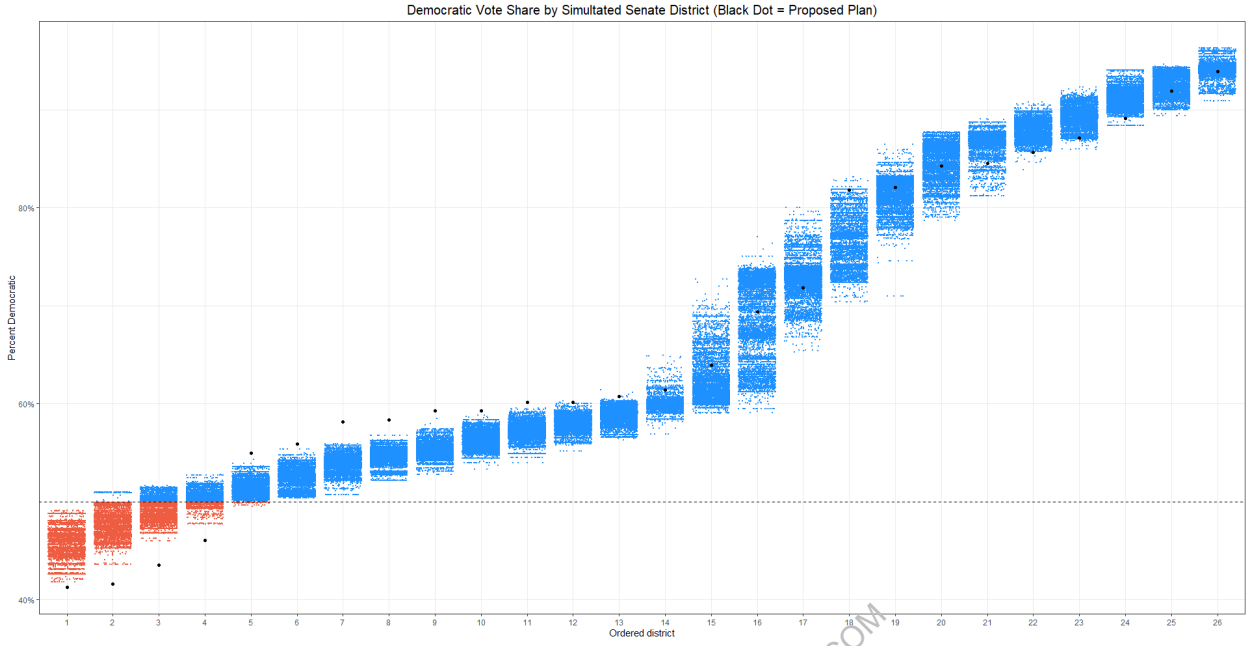
A. Respondents' Expert Reports Offer No Counter-Maps

Every one of Respondents' experts is more than capable of either re-running the relevant simulation algorithm that I employed or executing a competing algorithm; one of the authors does just that. Thus, while every one of Respondents' experts could readily demonstrate that changing these assumptions or fixing the purported omissions might lead this Court to arrive at different conclusions about the gross partisan bias animating the Enacted Maps, none does so. The silence is deafening. As it turns out, if you include the constraints about which Respondents complain to the simulations, it makes no difference.

B. Controlling For Municipal And Town Lines Makes No Difference

The New York Constitution demands that maps "consider" municipalities and town lines, although, unlike other constitutional provisions such as compactness or contiguity, it does not make respect for them mandatory. N.Y. Const. art. III §4(c)(5). It is also unclear whether the simulations really need to give deference to this as the Enacted Plan does not seem to either, splitting, as it does, six of the ten towns in Suffolk County and all three towns in Nassau County (it does keep the two cities intact). Regardless, any of Respondents' experts could have run simulations to see what impact respecting municipalities or town lines might have had.

As it turns out, that answer is "none." It is possible to "freeze" portions of the map together so that they cannot be split. To enable this, an additional set of 10,000 simulations were run that favors keeping intact every municipality that the Enacted Map keeps intact. As you can see, the results do not change appreciably.



C. The Simulation Ensemble Sufficiently Protects Minority Voting Rights

Dr. Ansolabehere offers additional criticisms of the ensembles with respect to the protection of "ability-to-elect" districts, though they too fall short.[8] It is worth stepping back to take a simplified view of the confusing and seemingly ever-changing rules of what is required by the Voting Rights Act ("VRA"). The VRA requires the creation of districts that can elect the candidates of choice of a minority group when such a group: (a) is "sufficiently large and geographically compact to form a majority in a single-member district;" (b) is "politically cohesive" (that is, its members tend to vote the same way); and (c) the majority votes as a bloc to defeat the group's candidate of choice. *Thornburg v. Gingles*, 478 U.S. 30 (1986). It is unclear (a) whether the VRA requires the creation of districts where multiple minority groups can form a cohesive majority (though the majority rule among circuits is that it does); (b) what precisely a "geographically compact" minority group means; and (c) whether the remedial district must comply with the first *Gingles* prong, *but see Cooper v. Harris*, 137 S. Ct. 1455 (2017) (suggesting that it possibly does not). Layered on top of that are two additional considerations: The New York Constitution requires that maps not abridge minority groups' voting rights, which may or may not

[8] Dr. Tapp muses that it is his "understanding that counting minority-majority districts is a crude and incomplete proxy for the ability of minority voters to elect their candidates of choice," Tapp Report ¶ 46, even though Dr. Tapp outright concedes that he is "not an expert on the Voting Rights Act," (which likely should have ended his analysis). Indeed, it is unclear to me how Dr. Tapp, who is a math professor and not a social scientist, would have expertise to opine on any of these "missing requirements."

be evaluated under a different test than *Gingles*, while the Fourteenth Amendment to the U.S. Constitution prohibits States from drawing districts with race as a predominate factor, unless they satisfy strict scrutiny (compliance with the VRA presumably does so). *Shaw v. Reno*, 560 U.S. 630 (1993).

Against this backdrop, Dr. Ansolabehere's criticism that I offer no evidence that the majority-minority districts drawn by the maps are required by the VRA, Ansolabehere Report ¶¶ 17, 63, fails to connect. Since these maps are, by definition, drawn without respect to race, there are no Fourteenth Amendment concerns raised here, as there is, to my understanding, no prohibition against creating majority-minority districts where the VRA does not require them if it is done without using race as the predominate factor (or, in this case, without using race at all).

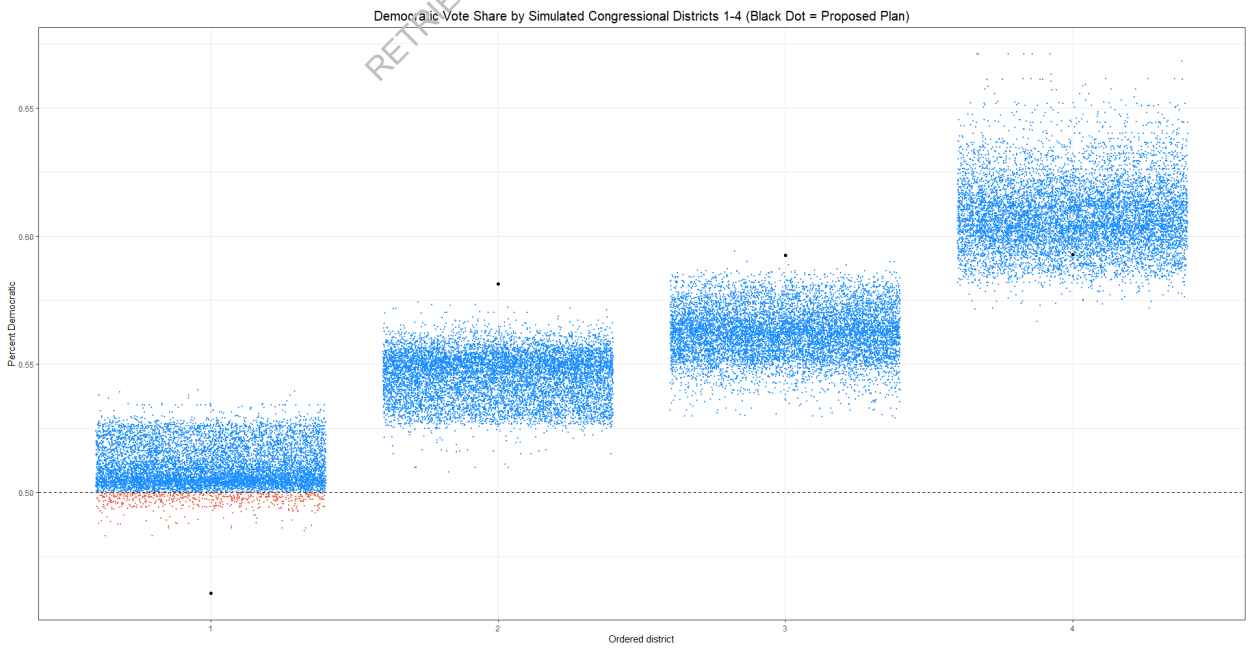
Dr. Ansolabehere's suggestion in paragraph 64 of his report that there is no analysis of whether districts in the simulation will, in fact, perform must be viewed in the context of the record here: there is no evidence proffered by any party of racially polarized voting in New York City or in particularized boroughs, nor is there evidence that any single minority group can form a reasonably compact majority in a district. In other words, on this record, we likely could have simply ignored the VRA altogether. Instead, I utilized majority-minority status as a stand-in for ability-to-elect, since only two districts under the 2012–2020 lines where white New Yorkers are a majority—one of which is the 82% non-Hispanic white New Yorkers Nineteenth District—send a Person of Color to Congress. Of course, if Respondents or their experts believed that there were districts or groups that needed to be protected, they could have identified them or, better yet, identified them and run the simulations to see what would happen if ability-to-elect districts were preserved.

To that end, I have produced additional simulations that, following the lead of Dr. Imai (see reports linked below), freeze certain districts in place in the same manner as the current map, thus removing them from the discussion. At the instruction of counsel, these simulations freeze the districts in the Enacted Plan that are plausible candidates for protection under the VRA or the State Constitution. To be more direct, they remove all of the census blocks from the maps that are contained in Districts 5, 6, 7, 8, 9, 13, 14, 15 and 16. These nine districts are the plausible ability-to-elect districts, where non-Hispanic white New Yorkers are a minority; where a single minority group is either a majority, plurality, or near-plurality of the Voting Age Population (the Sixteenth District is the only one in the former category); and where a Person of Color is currently elected

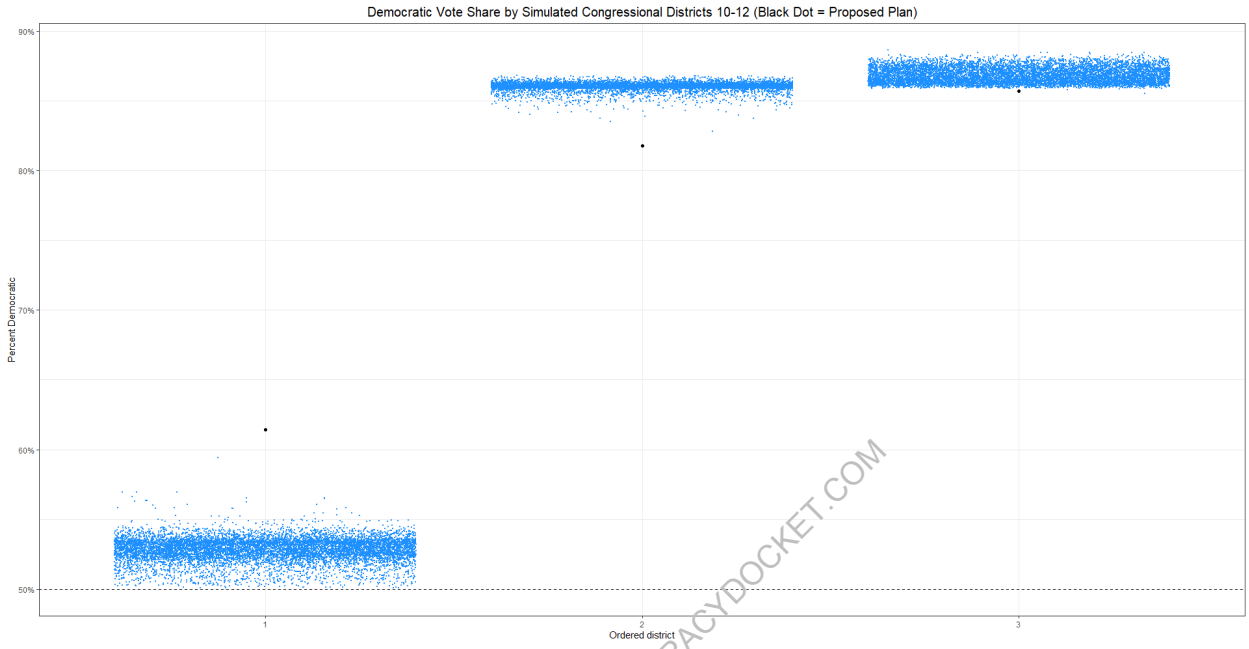
to Congress. If they are not VRA-protected, no harm is done by freezing them, except for possibly making Petitioners' case more difficult. All of the remaining non-frozen districts are non-Hispanic White Voting Age Population majority districts, and in all but one (the Tenth District), a single minority group never constitutes even a quarter of the Voting Age Population.

In short, the following simulations protect minority voting rights at least as well as do the current maps. Notably, they also concede a fair amount of ground to the Legislature, as each map in the following simulations accepts the Legislature's decision to pair Yorktown with Yonkers in the Sixteenth District, and to crack Republican-leaning areas in Midwood and Sheepshead Bay between the Ninth and Eighth Districts. If anything, this is a "worst-case" scenario for Petitioners.

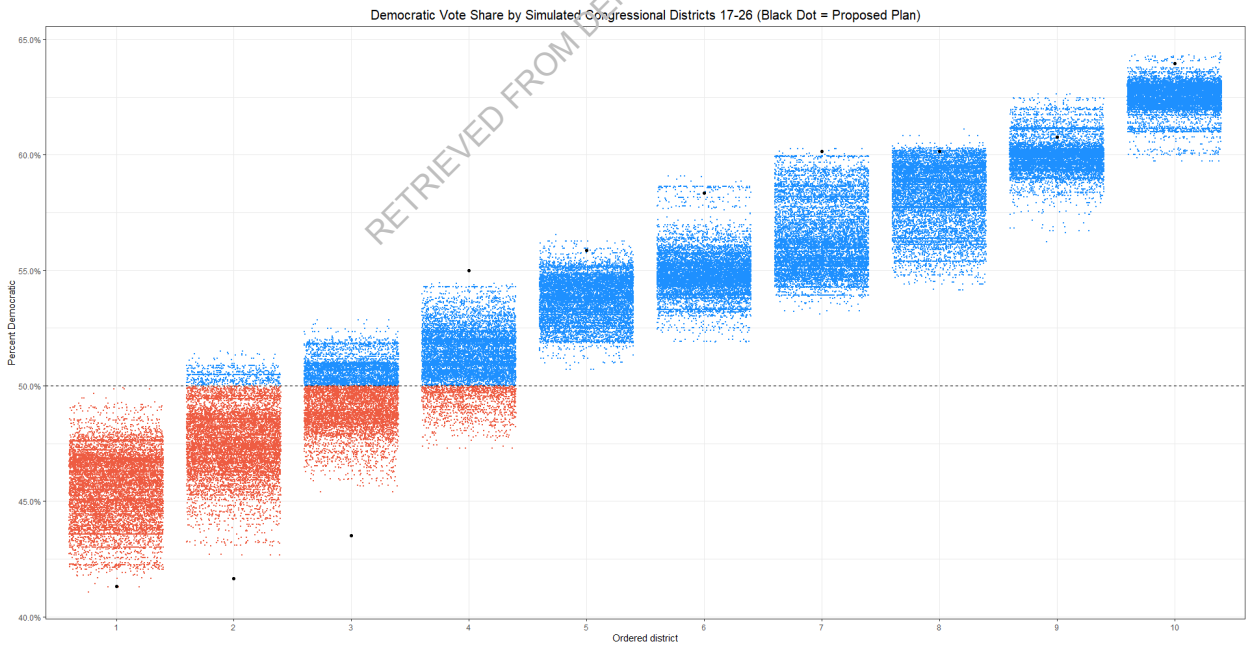
Because the remaining precincts are non-contiguous, the simulations were run in three batches (this follows the approach of Dr. Imai in his recent South Carolina report, and Dr. Barber's approach in his North Carolina report). All other constraints are the same as in the original simulations, except that we now run 10,000 simulations, and municipalities are protected at least as well as in the Enacted Plan (*i.e.*, intact municipalities in the Enacted Plan are "frozen" together in the ensemble). The first batch simulates four districts in the precincts that currently make up the First, Second, Third., and Fourth Districts. As one can easily see, there is strong evidence of gerrymandering within this grouping, with the most Republican district made significantly more Republican than we would expect, allowing the two remaining districts to be pushed substantially to the left of our expectations, and eliminating two competitive districts in the process:



Likewise, in the grouping of Districts 10, 11 and 12 we can see how the two safely Democratic districts are made more Republican than expected (but are still safely Democratic) while the remaining district is pushed well out of expectations into safe Democratic territory.



Upstate New York (Districts 17 through 26) shows the same pattern described in the initial report:



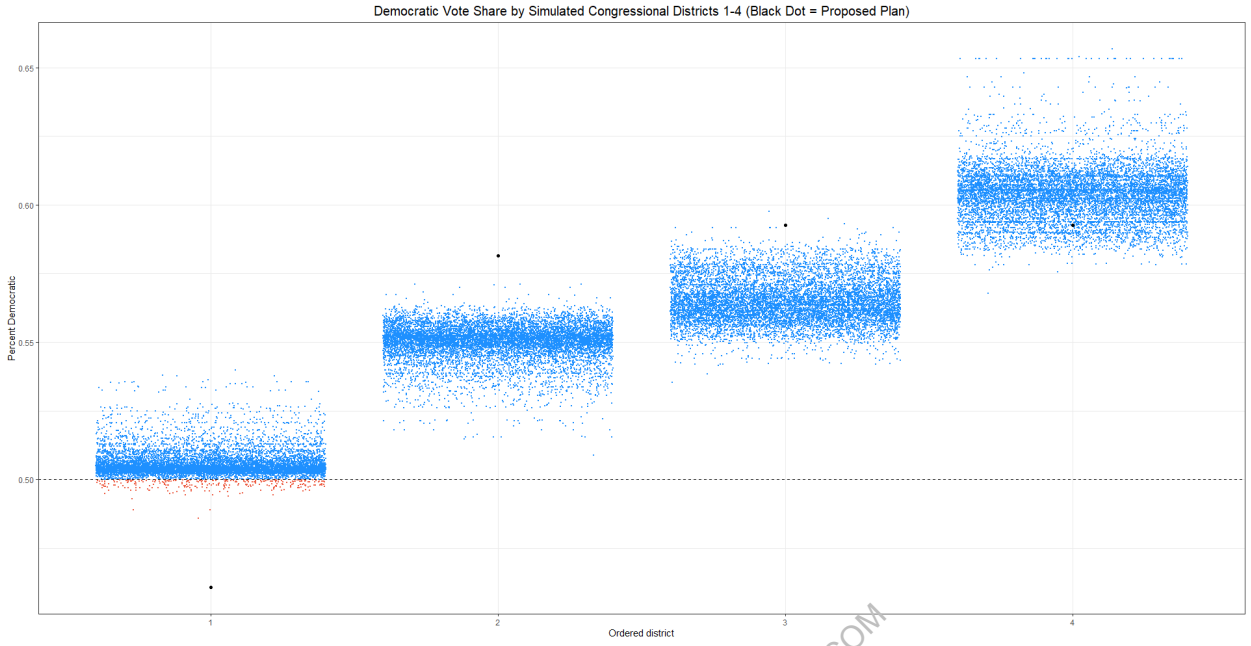
D. Respondents' Experts Offer No Evidence That "Considering" Communities Of Interest Or Core Retention Would Alter The Partisan Balance In The Simulations

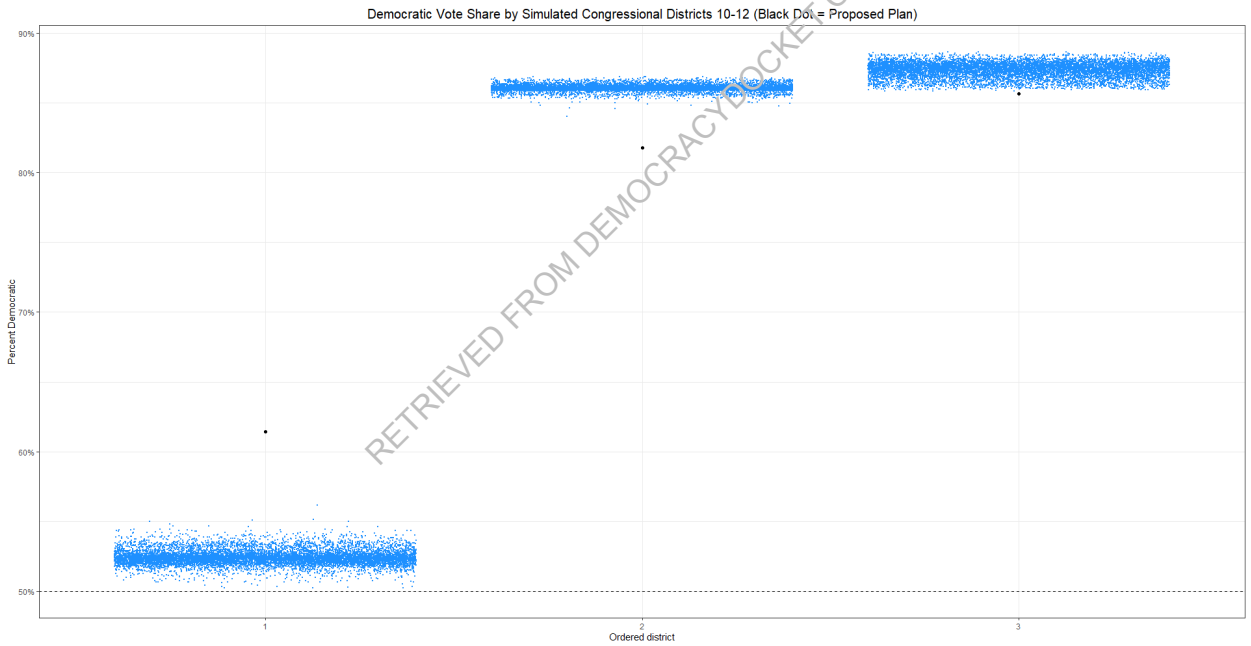
Communities of interest are a notoriously difficult concept to nail down, as they typically have a vague definition such as "[s]ocial, cultural, racial, ethnic, and economic interests common to the population of the area, which are probable subjects of legislation." *See, e.g.*, Kan. Office of Revisor of Statutes, *Proposed Guidelines and Criteria for 2022 Kansas Congressional and State Legislative Redistricting* (May 20, 2021).[9] That makes them vulnerable to *ad hoc* reasoning ("this is the district we want, find a community of interest to justify it") and difficult to encode, since they lack formal definition.

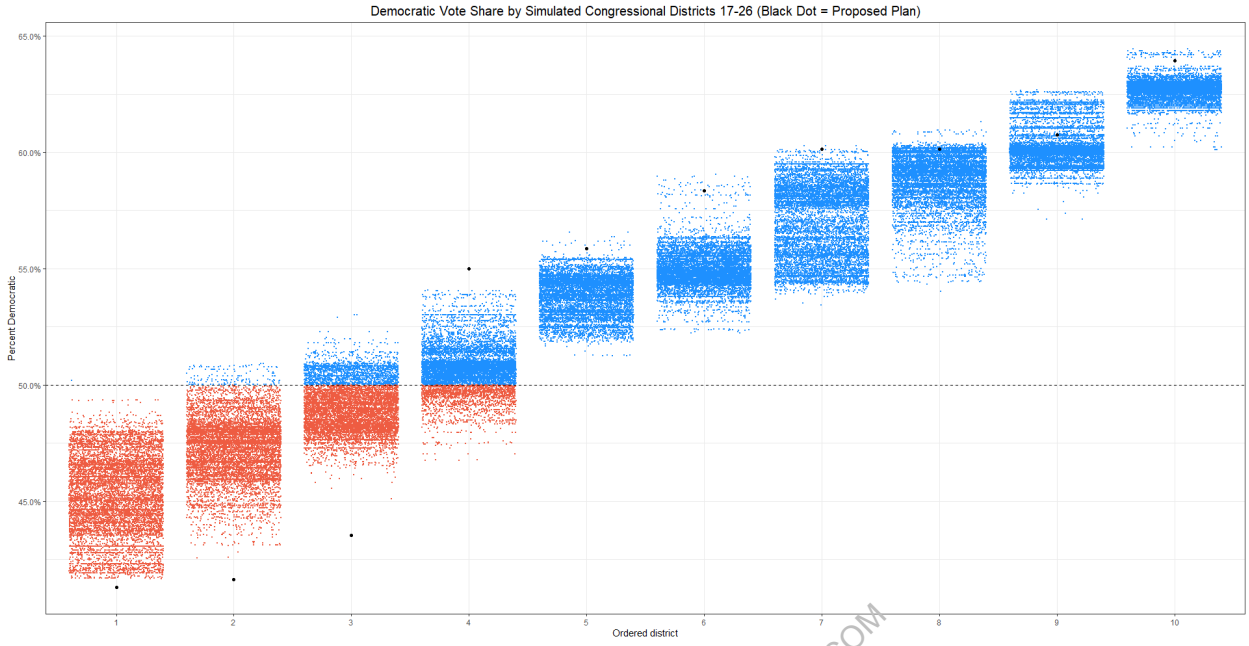
In any event, I was not asked to look at communities of interest by counsel. I presume this is because there are disputes about the degree to which the Enacted Maps consider communities of interest and other constitutional requirements. If there are indeed important communities of interest to be protected, however, any of Respondents' experts could program a simulation that respected those communities of interest and potentially harm Petitioners' case. At the very least, they have not provided any analysis suggesting a different result would be reached.

While Dr. Ansolabehere may be correct that the Enacted Congressional Map overall exhibits a high degree of core retention, Ansolabehere Report ¶ 38, a more accurate statement, as shown above, would be that the map offers a high degree of core retention in heavily Democratic districts, but pulls apart Republican districts, when possible, Trende Report at 12. That is not something we would wish to replicate. In any event, the redistricting simulation that I used does allow researchers to direct the ensemble to prefer maps with stronger core retention. In addition to the constraints above, I have instructed the simulations to draw maps that consider district core retention. The analysis once again does not change.

[9] https://redistricting.lls.edu/wp-content/uploads/KS-Proposed-redistricting-guidelines.pdf.







A map drawn without respect to partisanship would tend to draw between six and twelve districts in our competitive-to-Republican range of less than 55% in the index. The Enacted Plans draw four. This is because they are obvious and aggressive partisan gerrymanders that target Republicans and competitive districts.

E. Conclusion

Contrary to the suggestion of Respondents' Expert Reports, the initial ensemble was not biased because it failed to expressly consider race, city or municipal boundaries, or other factors. Even after conceding, for sake of argument, that 35% of the districts in the map must be drawn exactly as they were drawn by the Legislature to protect minority voting rights, and after conceding that municipalities should be split or kept intact in the same way as the Legislature suggests, and after conceding that previous district cores should be strongly considered, the map still appears to be a gross outlier whose boundaries are inexplicable save through a desire to disadvantage the Republican Party and reduce the number of competitive districts.

VI. Further Response To The Tapp Report

The Barber and Ansolabehere Reports restrict their analyses to the two issues raised above. The Tapp Report continues with a number of similarly meritless attacks.

The Tapp Report's Critique Of My Credentials Misunderstands The Role Of The Expert

It is ironic that Dr. Tapp embarks upon an attack on my expert credentials, given that such analysis is typically reserved for lawyers and the Court, and given that he is not a lawyer (unlike

myself).[10] I believe my c.v. and previous expert work speaks for itself but will, of course, leave that determination to the Court and the attorneys.

The only criticism that Dr. Tapp levies that is relevant to his actual area of expertise is his suggestion that I do not display a sufficiently deep understanding of the underlying algorithm, because the Trende Report suggests that spanning trees are constructed by breaking adjacencies, that more than two precincts will always have multiple spanning trees, and that algorithms are "potentially subject to a variety of parameters." Tapp Report ¶ 38 (quoting Trende Report at 7). In general, Dr. Tapp seems to think that the Trende Report simplifies things because its author does not understand the material.

Had Dr. Tapp read the Trende Report with sufficient care, he would have noticed the phrase "[t]o simplify greatly" and the admonishment that "the math is quite complicated." Trende Report at 9. He should have noticed the use of scare quotations around the term "break" before talking about adjacencies, which typically alert a reader that a word is not being used in an exact way. *Id.* at 8.

There is a reason for these simplifications. The role of the expert in New York is to "help to clarify an issue calling for professional or technical knowledge, possessed by the expert and beyond the ken of the typical [finder of fact]." *De Long v. County of Erie*, 60 N.Y.2d 296, 307 (1983). Reasonable minds can disagree on how to approach this, but my view—shared by at least some of Respondents' experts—is that detailed discussions of methodologies, using the precise jargon typical of an academic conference, is neither helpful nor clarifying of any issue. There is nothing wrong with including an exposition on McCartan & Imai's utilization of Wilson's Algorithm in a report, but I am unsure what that would accomplish. Nor is there anything wrong with explaining the gerrymandering index in terms of vector math, as the Tapp Report does, Tapp Report ¶¶ 19–22. But, in my experience, discussion of vectors, three-dimensional space, and

[10] It is also ironic that Tapp criticizes my lack of a Ph.D. and peer-reviewed articles, Tapp Report ¶¶ 36–37, given that he is a math professor whose c.v. suggests that he, unlike me, lacks a graduate degree in political science (or any related field); has never taught a course on participation and turnout, or any course involving elections; has never advised, directly or indirectly, a redistricting commission or Court; has never studied or advised a body about the Voting Rights Act; has never drawn an actual enacted map; has never analyzed a district's competitiveness to determine whether it is likely to elect a Republican or Democrat; has never testified as an expert; and has a c.v. that fails to display any professional or even hobbyist-level interest in political outcomes or gerrymandering until two years ago. He does appear to have participated as a plaintiff for a Democratic-aligned plaintiffs' group in a case where I served as an expert for *amici*. *See, e.g.*, https://www.pacourts.us/Storage/media/pdfs/20220125/200409-jan.24,2022-amicusvotersofthecommonwealth.pdf.

Euclidean distance—while precise—tends to be less illuminating for most observers than my simplified description. Trende Report at 12–13.

Moreover, other experts—including one of the authors of Respondents' Expert Reports—have taken similar approaches in court-accepted reports. Dr. Imai frequently only mentions spanning trees in passing in an appendix, without attempting to explain what they are. Affidavit of Dr. Kosuke Imai, Ex. A at 30–31, *League of Women Voters of Ohio v. Ohio Redistricting Comm'n*, No. 2021-1193 (Oct. 22, 2021);[11] Expert Report of Kosuke Imai, Ph.D., at 26–27, *NAACP v. McMaster*, No. 3-21-cv-03302 (D.S.C. Jan. 24, 2022). Respondents' expert, Dr. Barber, foregoes any discussion of spanning trees; indeed, his reports often opt to avoid discussion of the mechanics of Sequential Monte Carlo ("SMC") altogether. Affidavit of Michael Barber at 20–24, *North Carolina League of Conservation Voters, et al.*, Nos. 21 CVS 015426, 21 CVS 500085, (Dec. 22, 2021).[12] This does not mean that they are ignorant of these mechanics. It means that they understand the role of the expert in litigation.

In any event, the Tapp Report is correct that spanning trees are not created by removing adjacencies; I could have more precisely used the language of graph theory and discussed removing edges, McCartan & Imai, *Sequential Monte Carlo for Sampling Balanced and Compact Redistricting Plans* at 6 (Aug. 17, 2021), though using the term "edges" to refer to the lines connecting the precincts (or, to be more precise, vertices) rather than the edges of the precincts themselves is confusing for most observers. Of course, that's also not how spanning trees are constructed directly, and the Trende Report never claims as such. It seemed a useful way to help the Court conceptualize what a "spanning tree" is, in the event that it had not previously encountered the term. The Tapp Report is also technically correct that not all groups of more than two precincts would have more than one spanning tree. A sequence of precincts arranged in a line would only have one tree, although I doubt if such a situation exists in the "real world." Finally, the Tapp Report is probably correct that the Trende Report uses the term "parameters" to refer to the values set in the algorithm imprecisely. I do not understand why this is a problem, however, given that the Tapp Report also refers to the algorithm's parameters. *See* Tapp Report ¶ 52

[11] https://vhdshf2oms2wcnsvk7sdv3so.blob.core.windows.net/thearp-media/documents/Affidavit_of_Dr._Kosuke_Imai_10.22.21_2TeveP4.pdf.

[12] https://vhdshf2oms2wcnsvk7sdv3so.blob.core.windows.net/thearp-media/ documents/Expert_Report_of_Michael_Barber_12.22.21.pdf.

("Depending on how its parameters are set, the McCartan-Imai algorithm is capable of sampling from the uniform distribution.").

The Amount Of Specificity About The Algorithmic Choices Employed In The Trende Report Is Typical Of Expert Reports, Including Reports Offered By Respondents' Experts

The Tapp Report complains about the lack of reproducibility of the Trende Report, based on the description of choices made. This is odd, given that Dr. Barber manages to adequately replicate the findings of the Trende Report. Regardless, in constructing the report, I considered the level of detail typical of other reports that I have encountered in my experience as an expert in redistricting cases. Upon further review, the choices that I describe are provided at a level of detail similar to those provided in Dr. Barber's previous reports (linked above).

The Tapp Report's Methodological Complaints are Unfounded

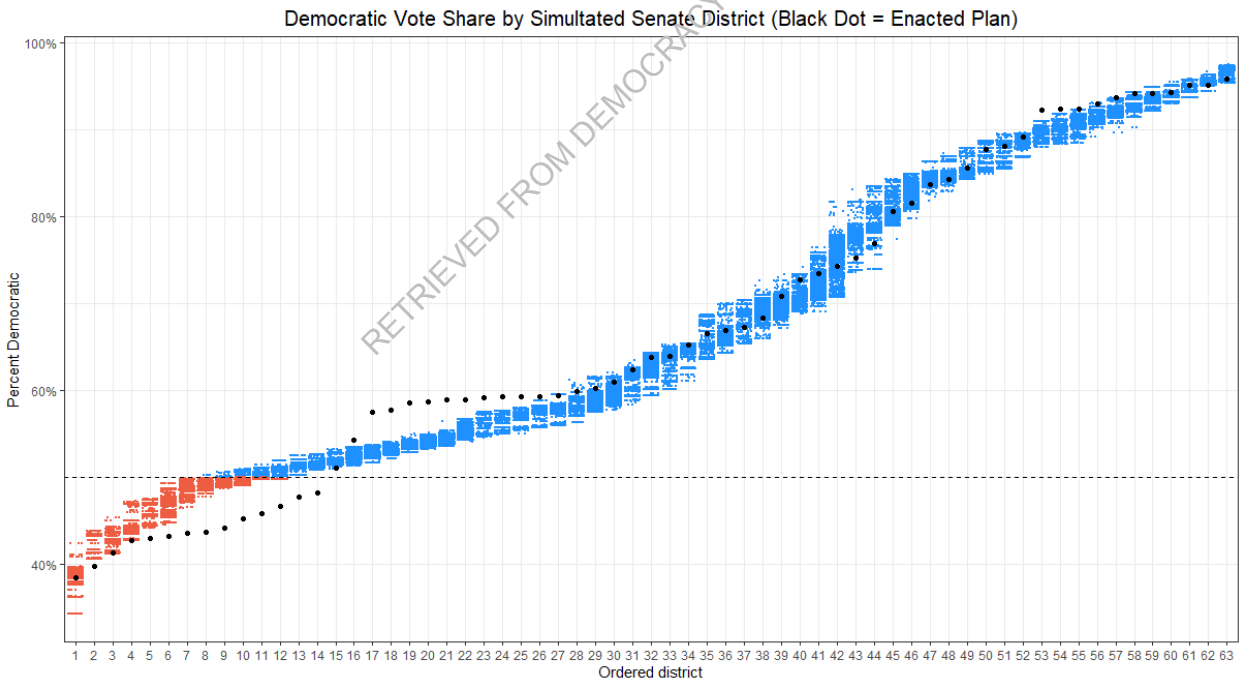
The Tapp Report complains that the Trende Report does not expressly state its target distribution. This is hand-waving. As with most of his other complaints, it misunderstands the nature of the endeavor. Dr. Imai's reports (cited above) relegate any mention of target distributions to the appendices, and never spell out his target distribution; Dr. Barber's reports don't mention the idea of a target distribution whatsoever. Regardless, Dr. Tapp never suggests what difference, if any, utilizing a different target distribution might make. He of course would not have to reproduce my analysis exactly, or at all, to do so. He could simply have explored different sets of constraints and distributions and demonstrated that some reasonable set of constraints/distributional assumptions would result in an ensemble of maps that resemble the partisan distribution of the Enacted Maps. Again, all three of Respondents' experts are more than capable of doing this. None has produced the results of any such analysis.

The Tapp Report concludes by suggesting that traditional Markov Chain Monte Carlo ("MCMC") simulations are better established, that SMC is new, and that a larger sample size might be preferable. This is another hand-waving exercise. If Dr. Tapp truly believed that MCMC simulations would yield a different result, he could easily have performed them himself and potentially helped Respondents' case considerably. He does not. While he might believe that 5,000 simulations are possibly insufficient (he does not go so far as to say that running 5,000 simulations is disqualifying), Dr. Imai clearly believes that number is sufficient, as that is the standard number of simulations that he has run and that courts have accepted when considering his analyses (see citations above). Regardless, in this report, all follow-up simulations are

performed with 10,000 simulations, rather than 5,000 simulations. Unsurprisingly, the results are unchanged.

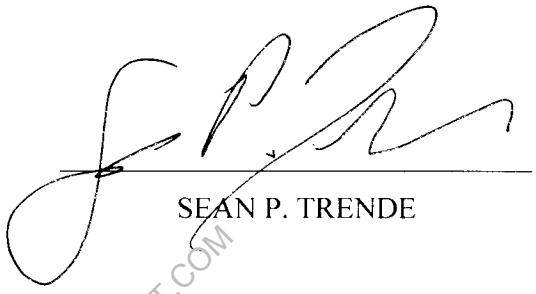
VII. The Same Analysis Holds True For The Senate Map

Respondents' Experts ignore the Senate map, but the same analysis holds true there. The Enacted Senate map conforms closely to the expected distribution of vote shares in districts except where it matters most: in the 40% to 60% range, where the maps once again produce an unusually large number of districts where statewide Democrats have averaged around 60% of the vote. Remember, it would be a mistake to use a 50% threshold to classify the districts in the ensembles as either Republican or Democratic. Using our thresholds of 53% and 55.6%, we would expect there to be around 17 districts where Republicans would be favored to win and 21 districts where they would be competitive. Instead, the Enacted Senate Map packs Republicans into seats where they would be overwhelming favorites to win, providing just 15 seats where they would be favored overall and 16 where they would be competitive. This is consequential, as it effectively locks in a veto-proof Democratic majority in the Senate.



VIII. Conclusion

This is the rare instance where a respondent's expert work actually strengthens a petitioners' case. Even using Respondents' Experts' preferred set of constraints and preferred methodologies, the maps still clearly were primarily drawn to reduce the number of Republican and competitive districts. None of the conclusions in the Trende Report need to be adjusted or changed.



SEAN P. TRENDE

Dated: March 1, 2022