

EXHIBIT C

Declaration concerning Tennessee Congressional redistricting

Moon Duchin

June 8, 2026

1 Background and qualifications

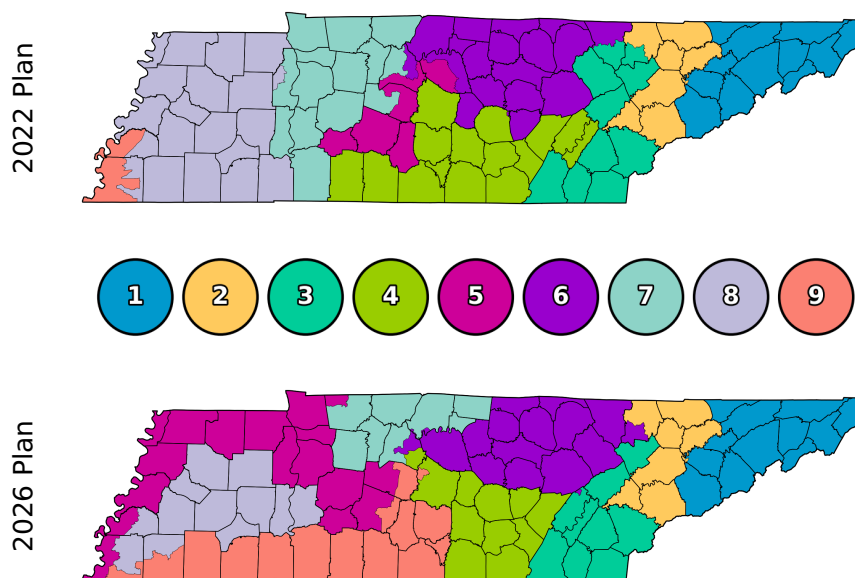
I am a Professor of Data Science and Computer Science at the University of Chicago. I hold a Ph.D. from Chicago and an A.B. from Harvard University. I have provided reports and/or testimony in numerous redistricting matters.

My general research areas are discrete geometry and the applications of mathematics and computing to the study of democratic systems. My research has had major grant support from the National Science Foundation, including a CAREER grant from 2013–2018 and a Convergence Accelerator grant from 2019–2021 entitled "Network Science of Census Data." I was elected a Fellow of the American Mathematical Society in 2017 and was named both a Radcliffe Fellow and a Guggenheim Fellow in 2018. Case citations and further professional details are available on the CV that is included with this report.

Tennessee's new Congressional districts

This report contains brief analysis of the 2026 Congressional redistricting in Tennessee.

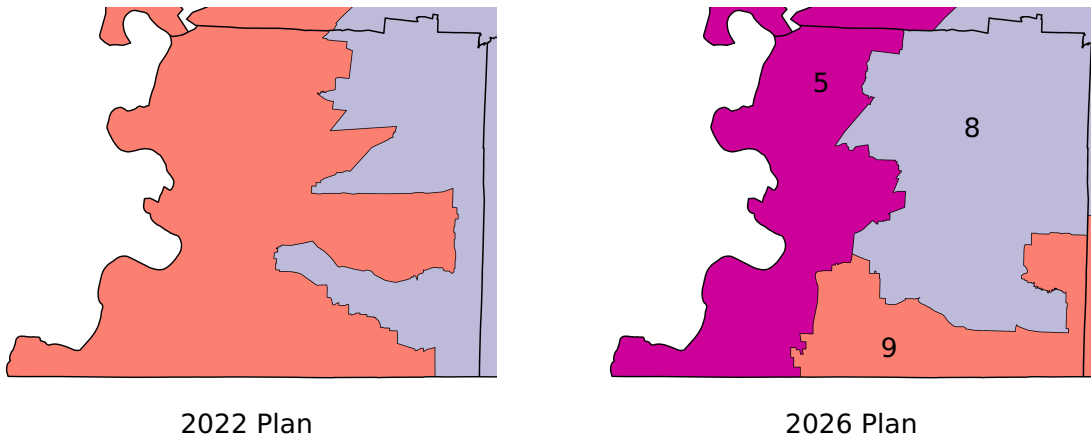
Figure 1: TN Congressional plans, before and after the 2026 redistricting.



2 Changes in Shelby County and Memphis

The May 2026 redistricting makes a significant change to the districts in Shelby County, home to Memphis. Shelby, in the far southwest corner of Tennessee, is now split across three districts; the city of Memphis is nearly evenly divided between districts 5, 8, and 9. Previously, CD 5 was about 150 miles from Memphis.

Figure 2: Shelby County used to be split across two districts, CD 8 and CD 9. In the new configuration, CD 5 reaches 150 miles across the state to extend a finger into Memphis.



The 2020 Census gave total population counts as follows. The City of Memphis had a total population of 633,104 people, within Shelby County (total population 929,744). The target population for a Congressional district is 767,871 people. This means that it is possible for Memphis to make up the greatest part of a district, and for that district to be wholly contained within Shelby County.

Indeed, something close to that was the case in Tennessee Congressional plans for decades. For instance, in the 2022 Plan, two districts touched Shelby, and their population was divided as follows.

2022 Plan.

- CD 8: 192,467 people (25% of CD 8) in Shelby, 34,375 (4% of CD 8) in Memphis.
- CD 9: 737,277 people (96% of CD 9) in Shelby, 598,729 (78% of CD 9) in Memphis.

The 9th district was represented by Steve Cohen, widely recognized as the candidate of choice for Memphis voters overall, since his initial election to Congress in 2006.

2026 Plan.

- CD 5: 221,035 people (29%) in Shelby, 212,105 (28%) in Memphis
- CD 8: 440,132 people (57%) in Shelby, 222,303 (29%) in Memphis
- CD 9: 268,577 people (35%) in Shelby, 198,696 (26%) in Memphis

After these changes to the lines, no district will have even 30% of its population in Memphis. This was done by cutting right through communities of interest and flouting traditional districting principles like compactness and county integrity.

3 Traditional districting principles

One of the major traditional principles for redistricting is to favor compact districts: those whose shape is simple rather than erratic. This is frequently measured with scores called the Polsby-Popper and Reock scores, which are "contour-based" scores of compactness for each district. **Polsby-Popper** is computed by comparing the district's area to its perimeter using the formula $4\pi A/P^2$. This can be interpreted as the ratio of the district's area to a circle with the same perimeter. **Reock** divides the district's area by the area of its smallest circumscribing circle. Both scores give a ratio of 1 for circles and fall below that for every other shape. A different kind of metric is the **cut edges** score, which is based on the geographical units rather than the map projection: it measures the "scissors complexity" of the plan by counting the number of pairs of neighboring census blocks that receive *different* district assignments. A simpler plan has a lower cut edges count.¹

Table 1: Compactness scores: all three districts touching Shelby in the 2026 Plan got far less compact than their earlier counterparts. Higher scores are better for both of these scores.

		CD 5	CD 8	CD 9
Reock	2022 Plan	.284	.585	.289
	2026 Plan	.206	.352	.171
Polsby-Popper	2022 Plan	.131	.293	.121
	2026 Plan	.090	.203	.140

The cut edges score got worse as well, for the plan as a whole, rising from 3588 to 4306. (Lower is better for cut edges.)

Finally, respect for political boundaries is universally recognized as a traditional districting principle. This can be measured by just counting how many of Tennessee's 95 counties touch more than one district, but a finer measurement would also take into account how many pieces the counties are cut into by district lines. Overall, the 2022 Plan had 10 counties split, and they were split into 21 pieces, with only Davidson split three ways. The 2026 Plan splits 12 counties, and they are split into 26 pieces—Shelby joins Davidson with a three-way split.

4 Matching plan features with randomized algorithms

4.1 Methods

Computational methods are now widely available for building random samples of districting plans that follow specified rules and priorities. I executed numerous different algorithmic runs that proposed alternative plans in a sequence of ten million steps while targeting different objectives.²

¹For a comparison of compactness scores, see Duchin and Tenner, "Discrete Geometry for Electoral Geography," *Political Geography* **109**, March 2024. doi.org/10.1016/j.polgeo.2023.103040.

²The algorithmic runs use a method called *recombination* that my research group developed for the study of redistricting. See DeFord, Duchin, and Solomon, "Recombination: A Family of Markov Chains for Redistricting," *Harvard Data Science Review* **3**(1), Winter 2021. doi.org/10.1162/99608f92.eb30390f

The three major variants are as follows:

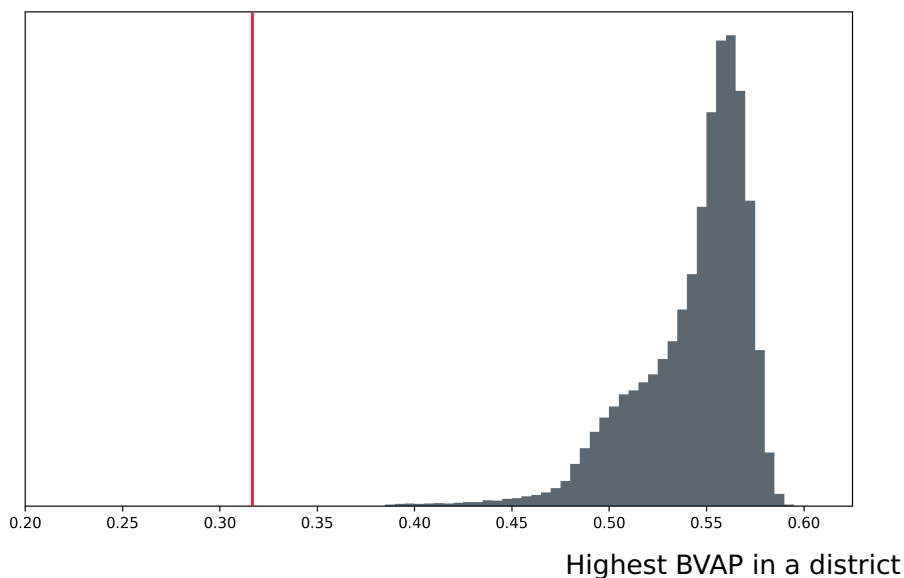
■	Neutral run:	Require contiguity and population balance; prefer compact districts. No use of race or party.
■	Partisan-targeted run:	Aim for 60% Trump share of the two-party vote in every district.
■	Race-targeted run:	Aim for an even split of Black VAP across three districts that intersect Shelby County.

I have been informed by counsel that the Tennessee legislators charged with creating the 2026 Plan have represented that only U.S. Census data was used in its construction. I note that a neutral objective (seeking only to balance population), a race-targeted objective, and a Memphis-splitting objective are all possible using Census data alone: the Decennial Census contains a Redistricting Data File (PL 94-171) that has very few data fields, essentially just counts by census block of total population and voting age population, broken down by race and ethnicity. Census data does not contain any partisan data, or any electoral data at all, so a partisan-targeted run would not be possible from this information alone.

4.2 Results of neutral runs

Tennessee is one of the few American states in which majority-Black districts are the norm under "race-blind" redistricting. In our runs, at least 88.8% of neutral plans have a majority-Black district by voting age population (i.e., majority-BVAP); by contrast, the new plan has no district exceeding 32% BVAP.

Figure 3: Over 88.8% of maps found in a ten-million step "race-blind" run have a majority-Black district.



Furthermore, districting plans constructed under neutral conditions tend to respect Memphis boundaries and minimize Shelby cuts—even without being programmed to do so—just by virtue of their location in the corner of the state. Over 99.5% of neutral plans have one or two districts touching Shelby, while the state has three (see Figure 2). An even greater number—over 99.8% of neutral plans—have one or two districts touching Memphis. As we have seen, the State’s 2026 plan cuts both the city and the county three ways, with districts extending halfway across the state.

4.3 Targeting party, targeting race

It is often said that race can be used as a proxy for party in modern American voting, and the next set of experimental trials shows that this is true in Tennessee.³

The two targeted methods (using race or using election results) produce ensembles of plans that are roughly equal in their resemblance of the partisanship in the 2026 Plan (Figure 4). That is, both aiming for partisan advantage directly and simply seeking to split up the Black population are equally effective at driving up the Republican advantage to levels similar to the 2026 Plan.

However, a large difference emerges when we compare the *demographics* in the partisan-targeted run to those in the race-targeted run (Figure 5). The 2026 Plan has all three Shelby districts between 26.5% and 32% BVAP. Partisan targeting does not produce race statistics anything like this; in fact, having three Shelby districts above 23.3% BVAP is a one percent tail occurrence when the run has a partisan aim, and the typical BVAP in the third-highest district hovers around 18%. By contrast, the median for the race-targeted run is 26.2% in that district, a near-perfect match for the 26.5% in the State’s plan.⁴

Notably, these algorithmic runs that narrowly sought partisan advantage often produced two districts over 37% BVAP, both containing significant parts of Shelby County. The 2026 Plan depresses BVAP by ten additional percentage points, significantly reducing the influence of Black voters with no measurable benefit to the partisan bottom line.

5 Conclusion

I conclude that race targeting explains the key features of the 2026 Plan to a much greater extent than partisan targeting. Despite many attempts, I could not find a way to approximate the statistics of the 2026 Plan without setting race targets in my algorithmic searches.

Whether using Census data alone, as reported by legislators, or even if incorporating election results in the mapping process, I was unable to replicate the "cracking" of the Black vote across three districts in Memphis and Shelby County. Only the use of racial targets came close to matching the features of the 2026 Plan. I very clearly find from these trials that this level of cracking is not necessary to match the partisanship of the State’s plan, but can be expected to dilute the influence of Black voters.

³In the illustrations below, I conduct three independent runs of ten million proposal steps for each type of search, then winnow the resulting plans to those with all districts favoring Trump in the 2024 election.

⁴Given the legislators’ claim of only using Census data, I also executed runs designed to split the Memphis population into three equal parts. These also failed to approximate the racial statistics of the 2026 Plan.

Figure 4: Matching the State plan's partisanship. Targeting partisanship directly or targeting race are roughly equally good ways to match the observed partisanship in the 2026 Plan. *In these box-and-whiskers plots, the districts are lettered A-I rather than numbered, emphasizing that they are ordered from lowest to highest Trump share, rather than geographically. In each column, the box extends from the 25th to the 75th percentile, the median is marked, and the whiskers extend from the 1st to 99th percentile.*

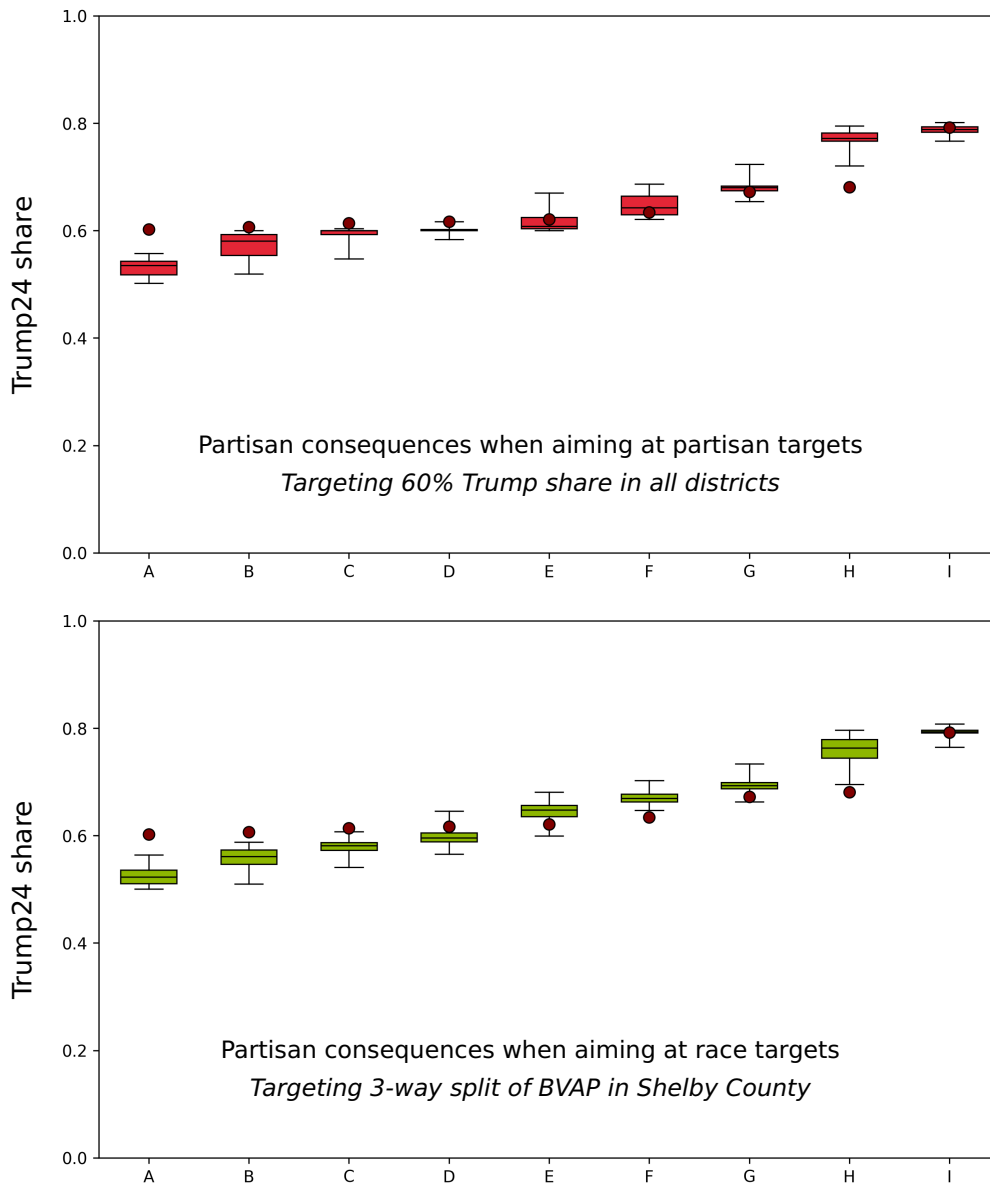
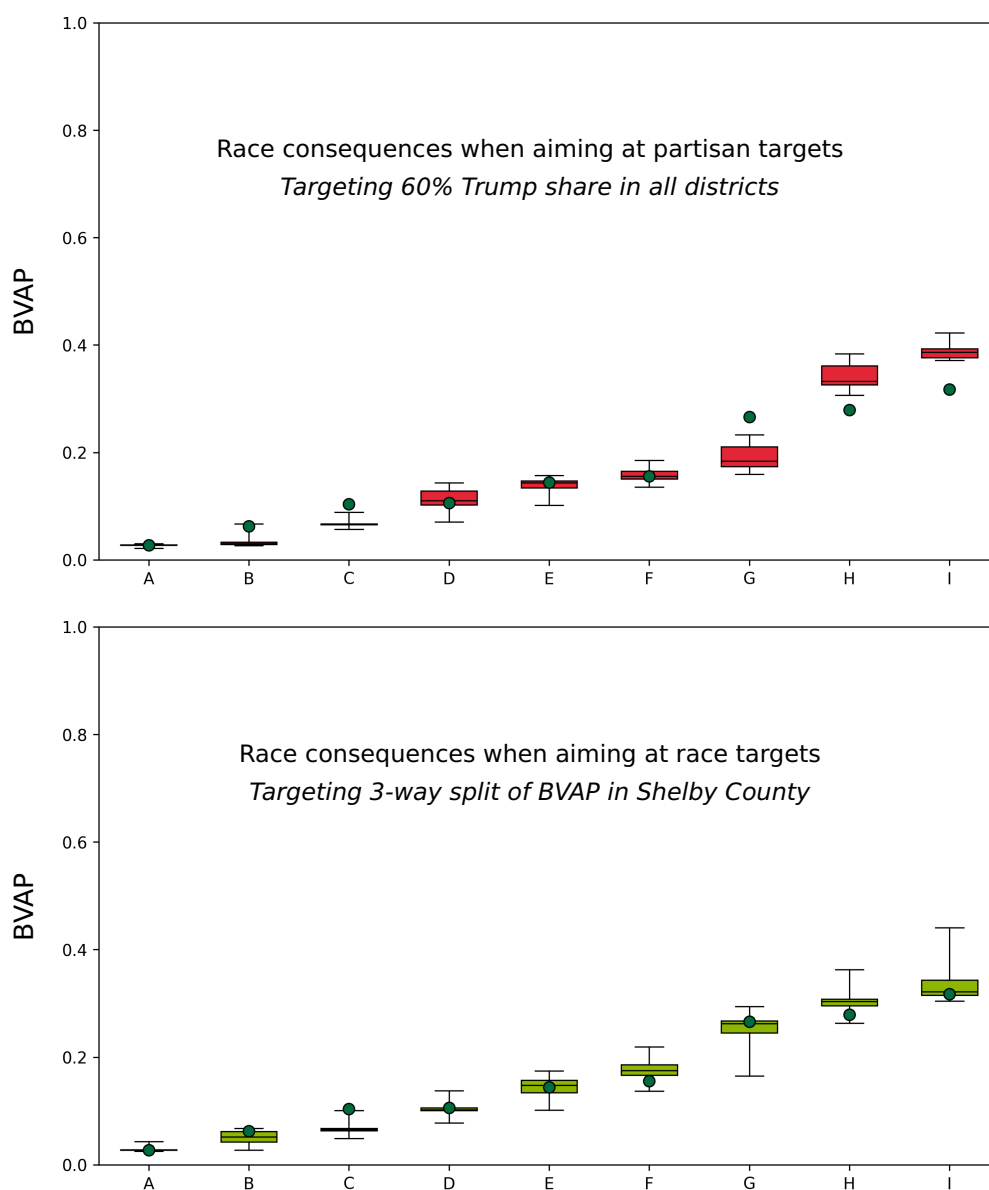


Figure 5: Comparing demographics. The race-targeted run is a close match to the State's 2026 Plan in Black voting age population (BVAP). The partisan-targeted run is far from a match in the three districts with the highest BVAP shares. *In these box-and-whiskers plots, the districts are lettered A-I rather than numbered, emphasizing that they are ordered from lowest to highest BVAP share, rather than geographically. In each column, the box extends from the 25th to the 75th percentile, the median is marked, and the whiskers extend from the 1st to 99th percentile.*



I reserve the right to modify, update, or supplement my analyses, findings, and any conclusions as additional information is made available to me or as I perform further analysis.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge and belief.

Executed on June 8, 2026 in Stamford, CT.

A handwritten signature in black ink, appearing to read 'Moon Duchin', written over a horizontal line.

Dr. Moon Duchin