An Initial Evaluation of the Partisan Bias in Indiana's Proposed Districting Plan for Congress and the State Legislature

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September 21, 2021

Abstract

Summary: This memo provides a brief, initial evaluation of Indiana's proposed state house, state senate, and congressional maps. It finds that the proposed plans are likely to lead to a substantial bias in favor of Republicans at all levels of government. This would enable Republican voters in Indiana to have more political voice than Democratic voters.

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1 Introduction

I have been asked by the nonprofit group Women4Change to examine the partisan fairness of Indiana's proposed congressional and state legislative districting plans. The relationship between the distribution of partisan support in the electorate and the partisan composition of the government—what Powell (2004) calls "vote–seat representation"—is a critical link in the longer representational chain between citizens' preferences and governments' policies. If the relationship between votes and seats systematically advantages one party over another, then some citizens will enjoy more influence—more "voice"—over political outcomes than others.

Indiana's previous 2012-2020 redistricting plan was proposed by Republican leaders and passed on party lines, with nearly all Republicans voting in favor and nearly all Democrats opposed.[1] This map led to a substantial bias in favor of Republicans in both congressional and state legislative elections. For example, in congressional elections, Democrats only won 2 out of 9 districts in every election from 2012-2020. In a previous report, I found that these maps had a historically extreme level of partisan bias. Indiana's congressional districts had a larger pro-Republican bias after its 2011 redistricting plan took effect in 2012 than 98% of the congressional election maps over the past 50 years. Indiana's new state house districts were also more pro-Republican in 2012 than 99% of previous plans and its state senate districts were more pro-Republican in 2014 than 99% of previous plans over the past five decades.[2]

Indiana's Republican House caucus recently proposed new congressional, state house, and state senate plans (Figure 1).[3] The new maps have roughly the same amount of partisan bias as the previous maps. In the 2020 presidential election, Democrat Joe Biden received about 42% of the two-party vote. However, he would have only won 22% of the congressional districts, 30% of the state house districts, and 22% of the state senate districts in the proposed plans.

The new plans would lead to substantially more wasted Democratic votes in Indiana elections than wasted Republican votes. Based on the predictive model on PlanScore.org, the proposed congressional plan would be more skewed in favor of Republicans than 97% of previous plans. The proposed state house plan would be more skewed in favor of Republicans than 91% of previous plans over the past fifty years, and the proposed state

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1. See https://ballotpedia.org/Redistricting_in_Indiana_after_the_2010_census.

2. I focus on the state senate after the 2014 elections since it took two election cycles for elections for all the districts under its new map to be held. Also, this analysis is based on the Efficiency Gap metric, which I will discuss in more depth below.

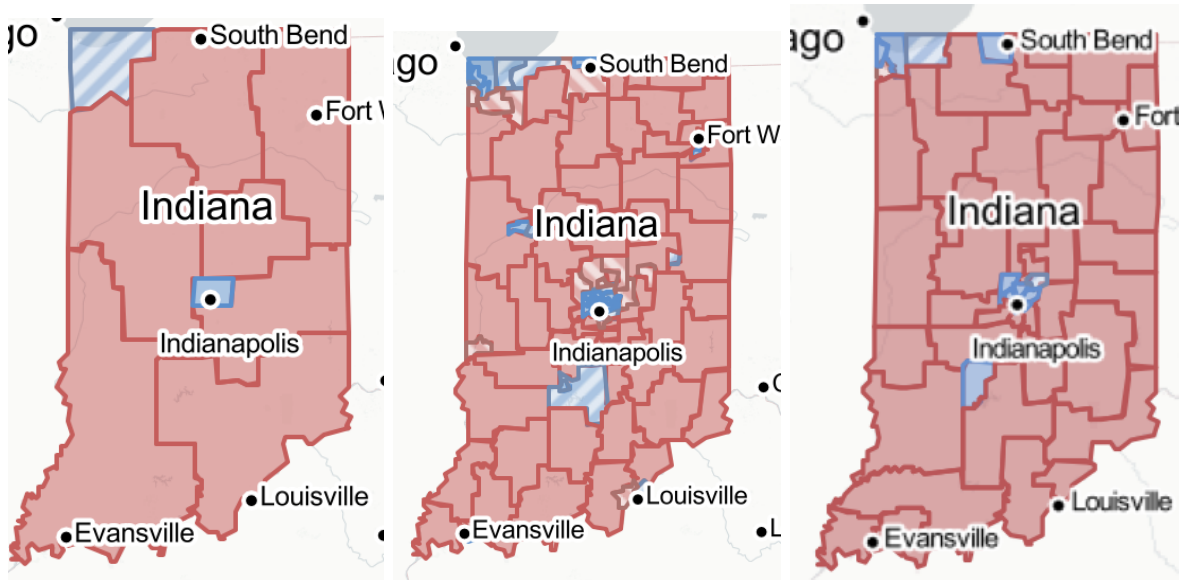3. See https://www.indianahouserepublicans.com.

Figure 1: Map of proposed U.S. House, state house, and state senate districts in Indiana from PlanScore.org

senate plan would be more skewed in favor of Republicans than 98% of previous plans.

Partisan gerrymandering degrades our democracy. As Americans, we should aspire to legislative plans that give everyone the same political voice. In my view, Indiana's proposed plans fail this test.

2   Background on Partisan Gerrymandering

The goal of partisan gerrymandering is to create legislative districts that are as "efficient" as possible in translating a party's vote share into seat share (McGhee 2014, 2017; Caughey, Tausanovitch, and Warshaw 2017). In practice, this entails drawing districts in which the supporters of the advantaged party constitute either a slim majority (e.g., 55% of the two-party vote) or a small minority (e.g., 20%). The former is achieved by "cracking" local opposing-party majorities across multiple districts and the latter by "packing" them into a few overwhelming strongholds. In a "cracked" district, the disadvantaged party narrowly loses, while in a "packed" district, the disadvantaged party wins overwhelmingly. The resulting *asymmetry* or *advantage* in the efficiency of the vote–seat relationships of the two parties lies at the core of normative critiques of partisan gerrymandering. Asymmetries in the translation of votes to seats "offer a party a means of increasing its margin of control over policy without winning more votes from the public" (McGhee 2014).

There are a number of approaches that have been proposed to measure partisan ad-

vantage in a districting plan. These approaches focus on asymmetries in the efficiency of the vote–seat relationships of the two parties. In recent years, at least 10 different approaches have been proposed (McGhee 2017). While no measure is perfect, much of the recent literature has focused on a handful of related approaches. The results of these metrics sometimes diverge in states where one party dominates elections. But they all yield similar substantive results in most states (see Stephanopoulos and McGhee 2018, 556).

In the analysis that follows, I focus on a metric called the Efficiency Gap to measure the partisan bias in Indiana's plan. Both cracked and packed districts "waste" more votes of the disadvantaged party than of the advantaged one (McGhee 2014; Stephanopoulos and McGhee 2015).[4] This suggests that gerrymandering can be measured based on asymmetries in the number of wasted votes for each party. The *efficiency gap* (EG) focuses squarely on the number of each party's wasted votes in each election. It is defined as "the difference between the parties' respective wasted votes, divided by the total number of votes cast in the election" (Stephanopoulos and McGhee 2015, 831; see also McGhee 2014, 2017).[5] All of the losing party's votes are wasted if they lose the election. When a party wins an election, the wasted votes are those above the 50%+1 needed to win.

If we adopt the convention that positive values of the efficiency gap imply a Democratic advantage in the districting process and negative ones imply a Republican advantage, the efficiency gap can be written mathematically as:

$$EG = \frac{W_R}{n} - \frac{W_D}{n} \tag{1}$$

where W_R are wasted votes for Republicans, W_D are wasted votes for Democrats, and n is the total number of votes in each state.

Table 1 provides a simple example about how to calculate the efficiency gap with

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4. The authors of the efficiency gap use the term "waste" or "waste" to describe votes for the losing party and votes for the winning party in excess of what is needed to win an election. Since the term is used by the efficiency gap authors, I use it here when discussing the efficiency gap.

5. The efficiency gap calculations here focus on wasted votes in *legislative elections* since these results directly capture voters' preferences in these elections. However, we might also calculate the efficiency gap using district-level results from presidential elections or other statewide races. These have the "advantage of being (mostly) unaffected by district-level candidate characteristics" (Stephanopoulos and McGhee 2015, 868). This feature is particularly useful for simulating efficiency gaps from randomly generated districting plans since candidate characteristics are clearly influenced by the final districting plan. Presidential elections or other statewide races are less closely tied, however, to voters' preferences in legislative races given the district lines that actually exist. In practice, though, both legislative races and other statewide races produce similar efficiency gap results for modern elections where voters are well sorted by party and ideology. Indeed, the data indicate that the correlation between efficiency gap estimates based on congressional elections and presidential elections is approximately 0.8 for elections held after 2000 and about 0.9 for elections held after the 2011 redistricting cycle.

three districts where the same number of people vote in each district. In this example, Democrats win a majority of the statewide vote, but they only win 1/3 seats. In the first district, they win the district with 75/100 votes. This means that they only wasted the 24 votes that were unnecessary to win a majority of the vote in this district. But they lose the other two districts and thus waste all 40 of their votes in those districts. In all, they waste 104 votes. Republicans, on the other hand, waste all 25 of their votes in the first district. But they only waste the 9 votes unnecessary to win a majority in the two districts they win. In all, they only waste 43 votes. This implies a pro-Republican efficiency gap of $\frac{43}{300}$ - $\frac{104}{300}$ = -20%.

Table 1: Illustrative Example of Efficiency Gap

District	Democratic Votes	Republican Votes
1	75	25
2	40	60
3	40	60
Total	155 (52%)	145 (48%)
Wasted	104	43

In order to account for unequal population or turnout across districts, the efficiency gap formula in equation 1 can be rewritten as:

$$EG = S_D^{margin} - 2 * V_D^{margin} \qquad (2)$$

where S_D^{margin} is the Democratic Party's seat margin (the seat share minus 0.5) and V_D^{margin} is is the Democratic Party's vote margin. V_D^{margin} is calculated by aggregating the raw votes for Democratic candidates across all districts, dividing by the total raw vote cast across all districts, and subtracting 0.5 (McGhee 2017, 11-12). In the example above, this equation also provides an efficiency gap of -20% in favor of Republicans. But it could lead to a slightly different estimate of the efficiency gap if districts are malapportioned or there is unequal turnout across districts.[6] In the case of Indiana's congressional districts, equation 2 implies there was an efficiency gap of approximately 19% in 2012 and 9% in 2020.

The efficiency gap mathematically captures the packing and cracking that are at the heart of partisan gerrymanders. It measures the extra seats one party wins over and above what would be expected if neither party were advantaged in the translation of votes to

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6. In general, the two formulations of the efficiency gap formula yield very similar results. Because Democrats tend to win lower-turnout districts, however, the turnout adjusted version of the efficiency gap in equation 2 tends to produce results that suggest about a 2% smaller disadvantage for Democrats than the version in Equation 1 (see McGhee 2018).

seats (i.e., if they had the same number of wasted votes). A key advantage of the efficiency gap over other measures of partisan bias is that it can be calculated directly from observed election returns even when the parties' statewide vote shares are not equal.

3 Partisan Fairness of Proposed Plans

In order to evaluate the proposed plan, it is necessary to create a model to predict future election outcomes. This enables us to estimate district-level vote shares for a new map and evaluate its partisan fairness. I predict future elections using the sophisticated statistical model on the PlanScore.org website, which is a project of the Campaign Legal Center.[7] PlanScore uses a statistical model of the relationship between districts' latent partisanship and election outcomes. This enables it to estimate district-level vote shares for a new map and the corresponding partisan gerrymandering metrics.[8] PlanScore also places the bias in Indiana's plan into historical perspective.

3.1 Congressional Plan

PlanScore indicates that Republicans are likely to win 7 out of the 9 seats in the proposed congressional plan (see Table 2).[9] In the average election, they would win 77% of the seats despite only winning 56% of the vote. According to the Efficiency Gap metric, Indiana's proposed congressional plan is more pro-Republican than 97% of the congressional plans over the past 50 years. Moreover, it would favor Republicans in 97% of potential electoral scenarios.

The new plan is actually slightly more biased than the previous 2012-2020 plan. In the previous plan, the 5th congressional district was a competitive district that leaned Republican. The new plan makes this a solid Republican district. This increases the expected Republican seat share from 73% to 77%.

Table 2: Partisan Fairness of Congressional Plan based on the predictive model on PlanScore.org

	Exp. Republican Vote Share	Exp. Rep. Seat Share	Efficiency Gap	Favors Rep's in this % of Scenarios	More Skewed than this % of Plans	More Pro-Rep. than this % of Plans
2012-2020 Plan	0.56	0.73	10.0% Pro-Rep.	91%	81%	93%
Rep's Proposed Plan	0.56	0.77	14.4% Pro-Rep.	97%	96%	97%

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7. I am on the social science advisory board of Plan Score, but I am not compensated by Campaign Legal Center nor do I have any role in PlanScore's evaluation of individual maps.

8. See https://planscore.campaignlegal.org/models/data/2021B/ for more details.

9. See https://planscore.campaignlegal.org/plan.html?20210915T133251.530364274Z

3.2 State House Plan

PlanScore indicates that Republicans are likely to win 69 out of the 100 seats in the proposed state house plan (see Table 3).[10] In the average election, they would win 69% of the seats despite only winning 56% of the vote. According to the Efficiency Gap metric, Indiana's proposed state house plan is more pro-Republican than 91% of the state legislative plans over the past 50 years. Moreover, it would favor Republicans in 96% of potential electoral scenarios. The proposed plan is nearly exactly as biased as the previous state house plan in Indiana, which my earlier report showed was one of the most pro-Republican plans in history.

Table 3: Partisan Fairness of State House Plan based on the predictive model on PlanScore.org

	Exp. Republican Vote Share	Exp. Rep. Seat Share	Efficiency Gap	Favors Rep's in this % of Scenarios	More Skewed than this % of Plans	More Pro-Rep. than this % of Plans
2012-2020 Plan	0.56	0.69	7.5% Pro-Rep.	97%	76%	92%
Rep's Proposed Plan	0.56	0.69	6.9% Pro-Rep.	96%	73%	91%

3.3 State Senate Plan

PlanScore indicates that Republicans are likely to win 37 or 38 out of the 50 seats in the proposed state senate plan (see Table 4).[11] In the average election, they would win 75% of the seats despite only winning 56% of the vote. According to the Efficiency Gap metric, Indiana's proposed state senate plan is more pro-Republican than 98% of the state legislative plans over the past 50 years. Moreover, it would favor Republicans in 98% of potential electoral scenarios. The proposed plan is even more biased than the previous state senate plan in Indiana, which my earlier report showed was one of the most pro-Republican plans in history.

Table 4: Partisan Fairness of State Senate Plan based on the predictive model on PlanScore.org

	Exp. Republican Vote Share	Exp. Rep. Seat Share	Efficiency Gap	Favors Rep's in this % of Scenarios	More Skewed than this % of Plans	More Pro-Rep. than this % of Plans
2012-2020 Plan	0.56	0.69	8.8% Pro-Rep.	97%	78%	90%
Rep's Proposed Plan	0.56	0.75	12.2% Pro-Rep.	98%	91%	98%

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10. See https://planscore.campaignlegal.org/plan.html?20210915T133303.588089382Z
11. See https://planscore.campaignlegal.org/plan.html?20210921T204026.189750690Z

3.4   Summary of Partisan Fairness Analysis

Overall, my initial analysis indicates that Indiana's proposed congressional and state legislative plans have historically extreme levels of partisan bias. These extreme levels of partisan bias are very unlikely to be explainable by geography or other politically neutral factors. As a result, the partisan bias in these maps is likely largely due to intentional partisan gerrymandering designed to deprive some Indiana voters of their political voice.

4   Do proposed plans satisfy requirement equipopulous districts?

I was also asked by Women4Change to evaluate whether the proposed plan satisfies the requirements of one-person, one-vote. I find that the proposed Congressional plan has nearly exactly equipopulous districts, while the maximum population deviation in the state house plan is only 1% and the maximum deviation in the state senate plan is 2%. So the proposed plans appear to satisfy the requirements of one-person, one vote.

5   Compactness

Finally, I was asked to evaluate the compactness of the districts in the proposed plans. My analysis indicates that the districts in the proposed plans are approximately as compact as in the previous 2012-2020 plan based on two commonly used criteria (see Tables 5, 6, and 7). Higher values of these metrics indicate more compact districts.

Table 5: Compactness Metrics for Congressional Plans

	Reock	Polsby-Popper
2012-2020 Plan	0.47	0.43
Rep's Proposed Plan	0.48	0.48

Table 6: Compactness Metrics for State House Plans

	Reock	Polsby-Popper
2012-2020 Plan	0.44	0.37
Rep's Proposed Plan	0.44	0.39

Table 7: Compactness Metrics for State Senate Plans

	Reock	Polsby-Popper
2012-2020 Plan	0.44	0.39
Rep's Proposed Plan	0.46	0.43

6 Background on the Author

Christopher Warshaw is an Associate Professor of Political Science at George Washington University. Prior to that, he was an Associate Professor at the Massachusetts Institute of Technology from July 2016 - July 2017, and an Assistant Professor at MIT from July 2012 - July 2016.

His Ph.D. is in Political Science, from Stanford University, where his graduate training included courses in political science and statistics. He also has a J.D. from Stanford Law School. His academic research focuses on public opinion, representation, elections, and polarization in American Politics. His work is published in peer-reviewed journals such as: the *American Political Science Review*, the *American Journal of Political Science*, the *Journal of Politics*, *Political Analysis*, the *Annual Review of Political Science*, *Political Science Research and Methods*, the *British Journal of Political Science*, *Political Behavior*, the *Election Law Journal*, *Nature Energy*, *Public Choice*, and edited volumes from Cambridge University Press and Oxford University Press. His book *Dynamic Democracy in the American States* is forthcoming from the University of Chicago Press. He has also served as an expert witness in a number of legal cases on partisan gerrymandering and on the U.S. Census.

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