

Technical Appendix to
*Prison Gerrymandering Distorts Representation*¹

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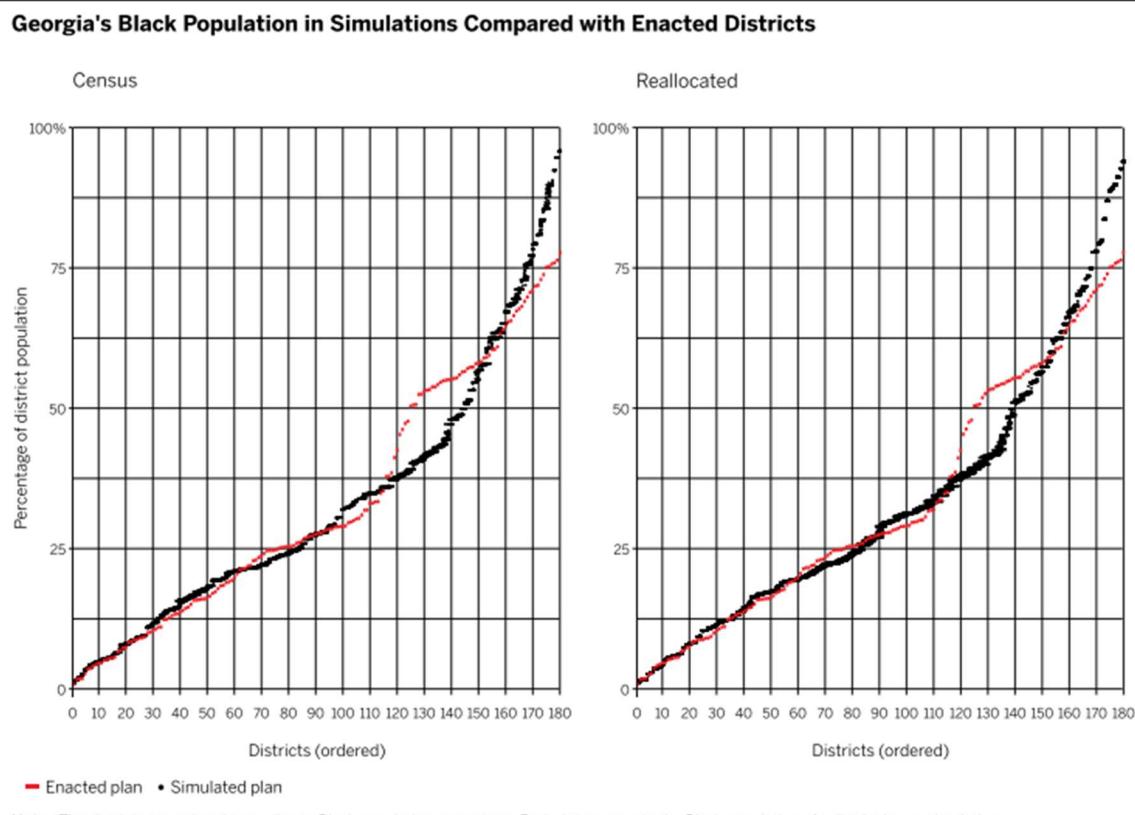
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A.1 Simulations Comparison with Enacted Districts

In some states we see one or both sets of simulations drawing noticeably fewer majority districts of a certain demographic (Latino, Black, or Democrat) than there are in the current enacted plan. This discrepancy is apparent for a couple of reasons, one being that these simulations are done using precincts as the building block, as opposed to actual census blocks. Also, the simulations are constrained in a way that human map drawers are not, so we end up with fewer districts that are substantially more densely populated with the demographic of interest. As discussed in the Insight report that this appendix accompanies, a 2009 study showed that “when partisan preferences are spatially dependent and partisanship is highly correlated with population density, any districting scheme that generates relatively compact, contiguous districts will tend to produce bias against the urban party.”² This phenomenon may be applied to other demographics that follow similar patterns of spatial dependence.

Human map drawers can be more intentional in splitting up areas that are densely populated with a particular demographic to create more majority districts of that characteristic. Using Georgia as an example, the plots below show how, compared with enacted districts, the 30 most Black districts are much more Black in both sets of simulations than in the enacted plan; the enacted plan has a more diffuse Black population and therefore is able to have a greater number of Black-majority districts, while the simulations pack the districts. These condensed Black areas are primarily in metro Atlanta as well as around Valdosta University.

Figure A1



Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Of important note, these simulations show the potential of incarcerated population reallocation to increase representation across specific populations. Even if map drawers were to pack districts, they would still end up with more packed districts of the demographic of interest (Black districts in the example above) using reallocated data than they would if using traditional census data. However, as we do have people drawing more realistic and representative maps, such as the current state legislative ones, we can expect to see an increase in representation when counting incarcerated populations at their homes.

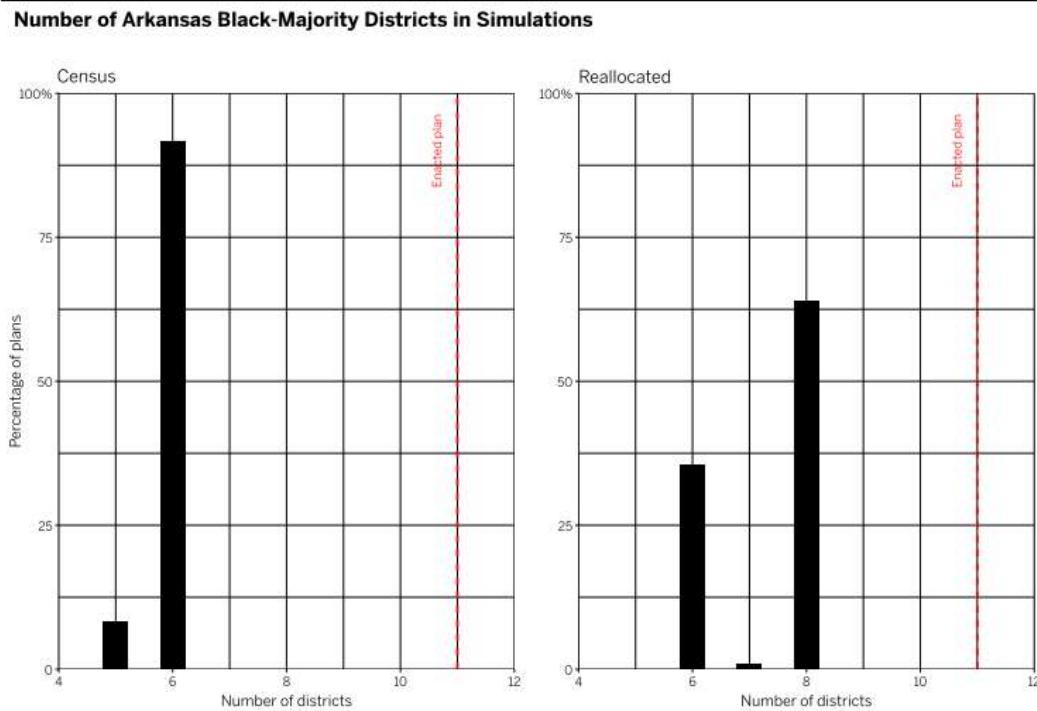
A.2 Arkansas

Black Districts

The bar graphs in figure A2 show a comparison of the number of majority districts of the specific demographic, in this case Black-majority districts, in the simulations using traditional census data (left) and reallocated data (right). The graphs have the number of majority districts on the x-axis and the percentage of simulations that have that many majority districts on the y-axis. The red dotted line shows how many majority districts of the demographic, in this case how many Black-majority districts, are in the currently enacted plan in the state. See above for a discussion of discrepancies between simulations and enacted plans.

So, in the example below, 92% of Arkansas simulations using census data have six Black-majority districts, and 8% have five Black-majority districts; 64% of Arkansas simulations using reallocated data have eight Black-majority districts, 1% have seven Black-majority districts, and around 35% have six Black-majority districts. The enacted plan has eleven Black-majority districts.

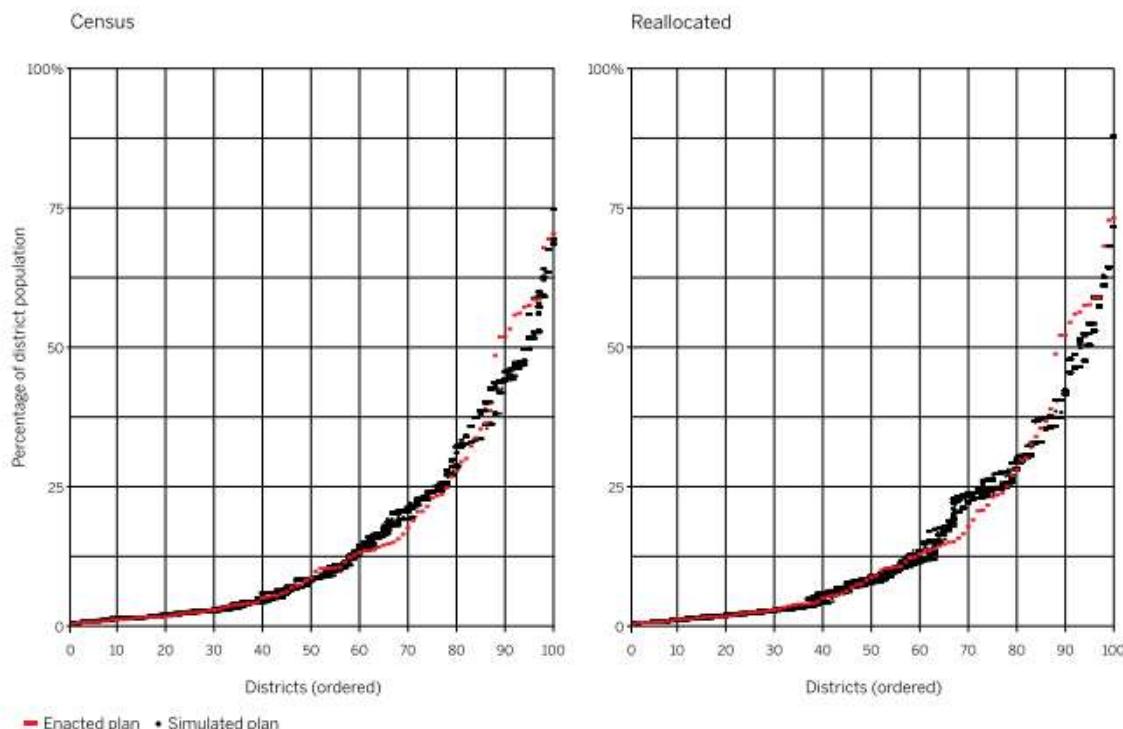
Figure A2



In figure A3, the jitterplots compare the percentage of the demographic of interest in each district in the simulations — both traditional census (left) and reallocated (right) — with the demographic of interest in the enacted plan according to the respective data. The x-axis orders the districts from those containing the lowest percentage of the demographic, in this case the least Black district, to those with the highest percentage of the demographic, in this case the most Black district, within each simulation. The y-axis represents the percentage of the district population that is of the studied demographic. Each black dot represents one district within one simulation. The red lines represent the district composition under the enacted plan, using the respective data for calculation (i.e., the census data graph shows the percentage of the district population that is Black using traditional census data, and the reallocated graph shows the percentage of the district population that is Black using reallocated data).

Figure A3

Arkansas's Black Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Latino Districts

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Figure A4

Number of Arkansas Latino-Majority Districts in Simulations

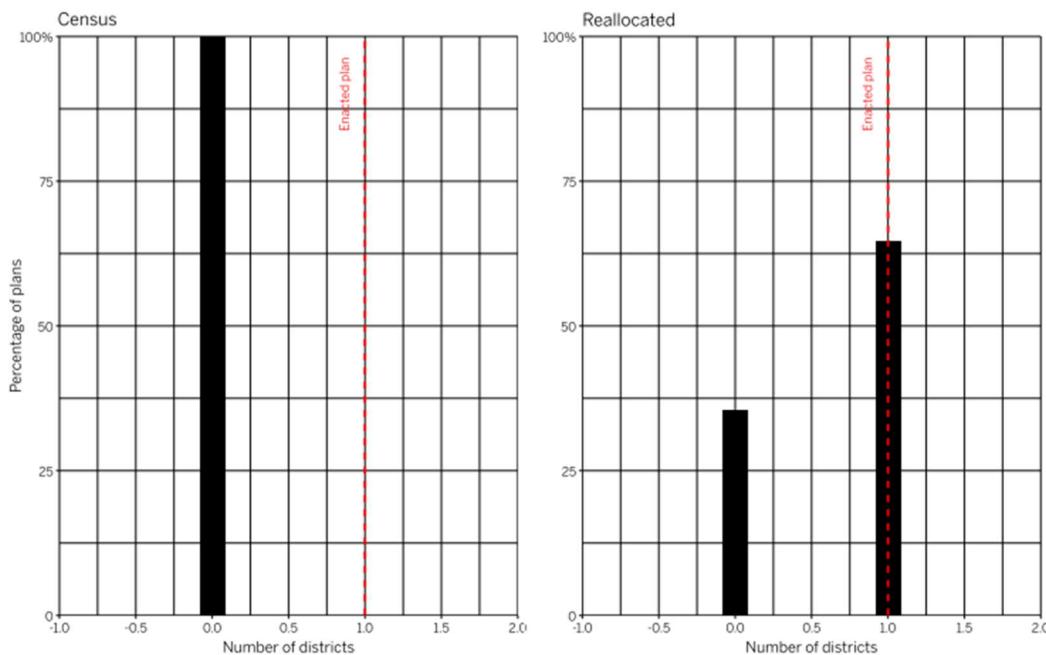
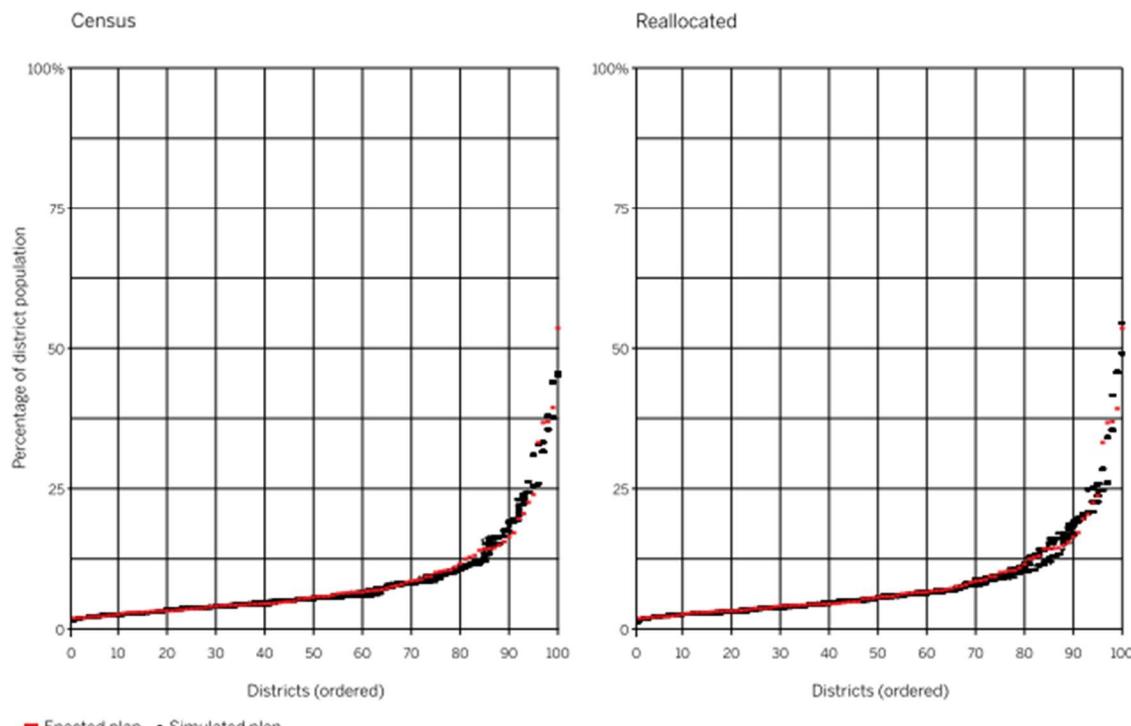


Figure A5

Arkansas's Latino Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Latino population percentage. Each dot represents the Latino population of a district in one simulation.

Democratic Districts

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Figure A6

Number of Arkansas Democratic-Majority Districts in Simulations

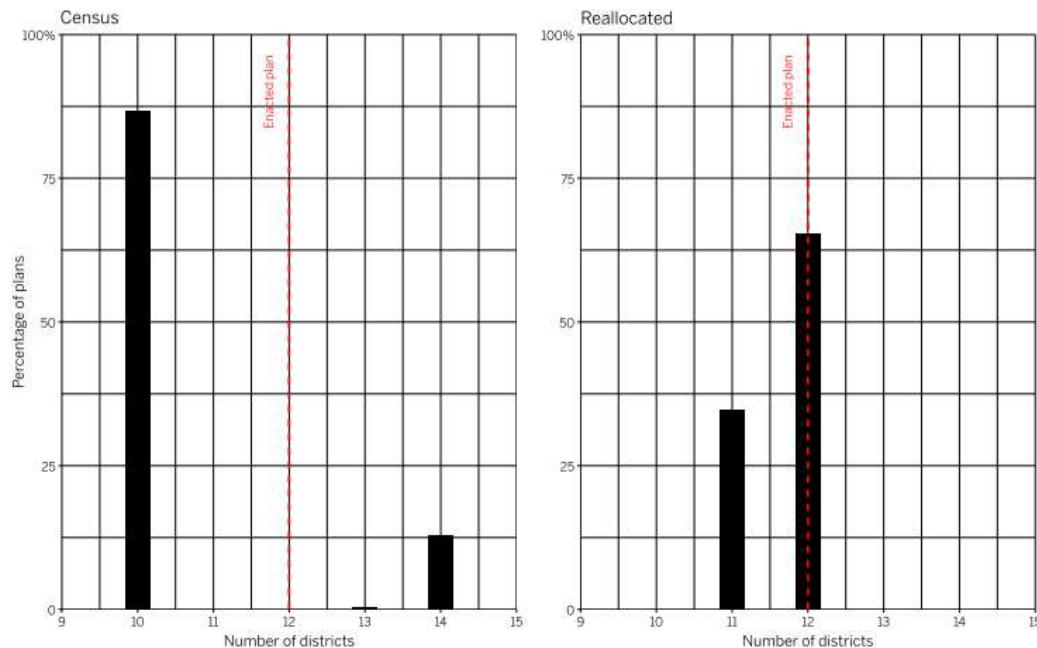
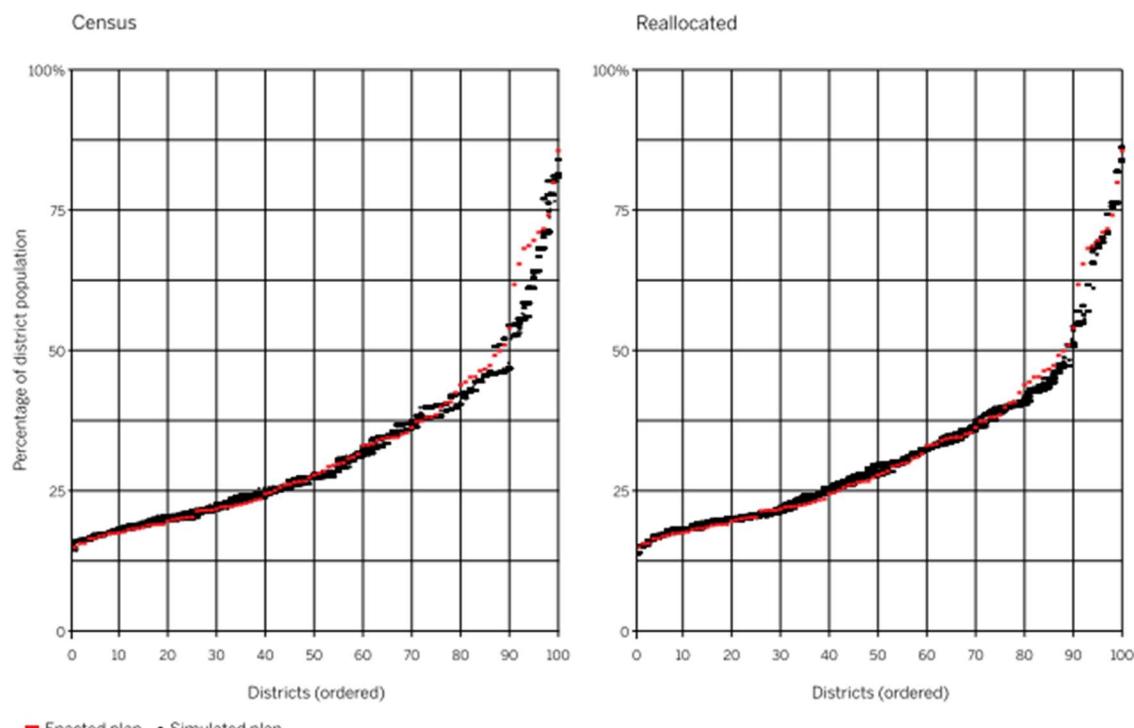


Figure A7

Arkansas's Democratic Population in Simulations Compared with Enacted Districts

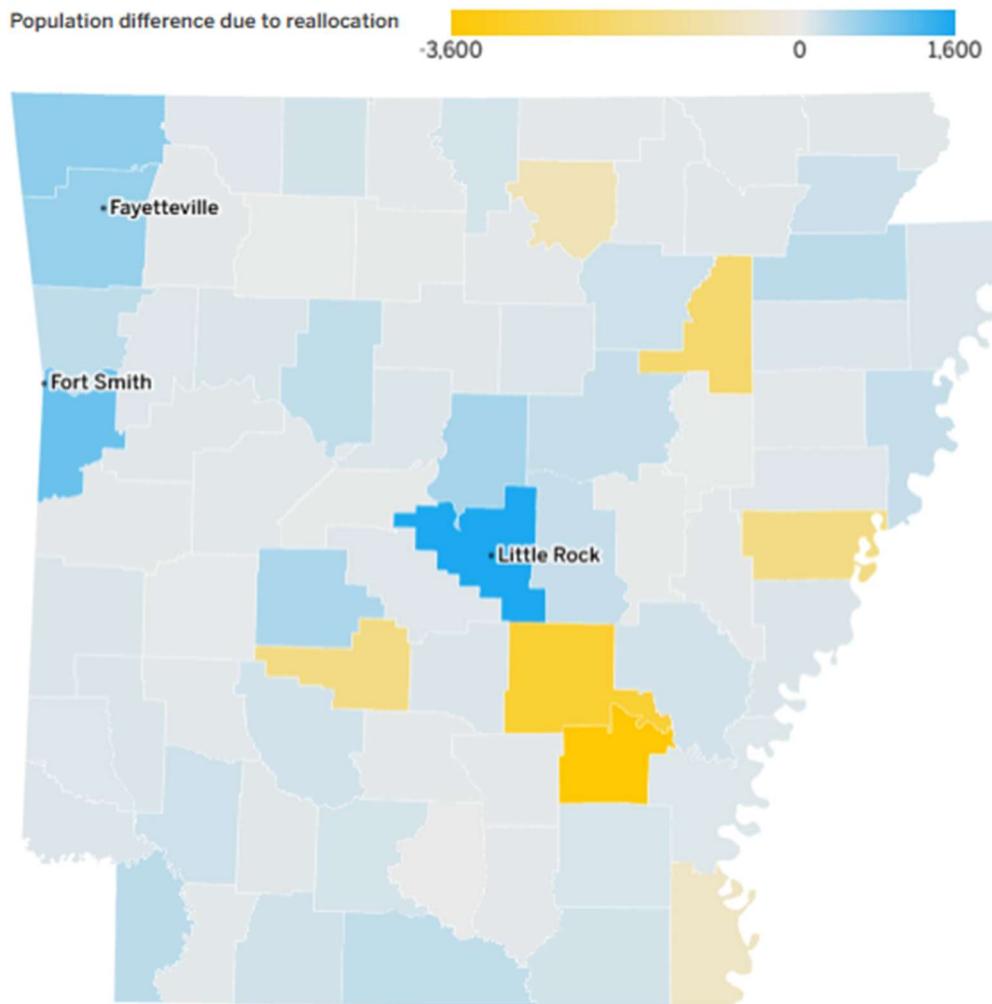


Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

Figure A8

Arkansas County Population Changes Due to Reallocation of Incarcerated Populations



A.3 Arizona

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Black Districts

Figure A9

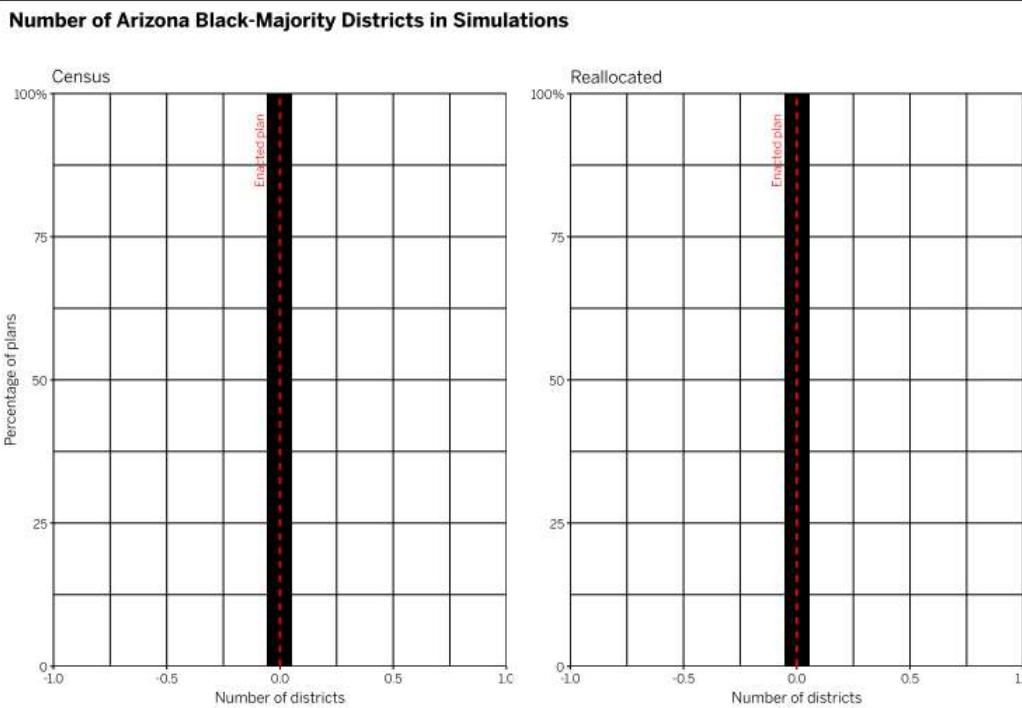
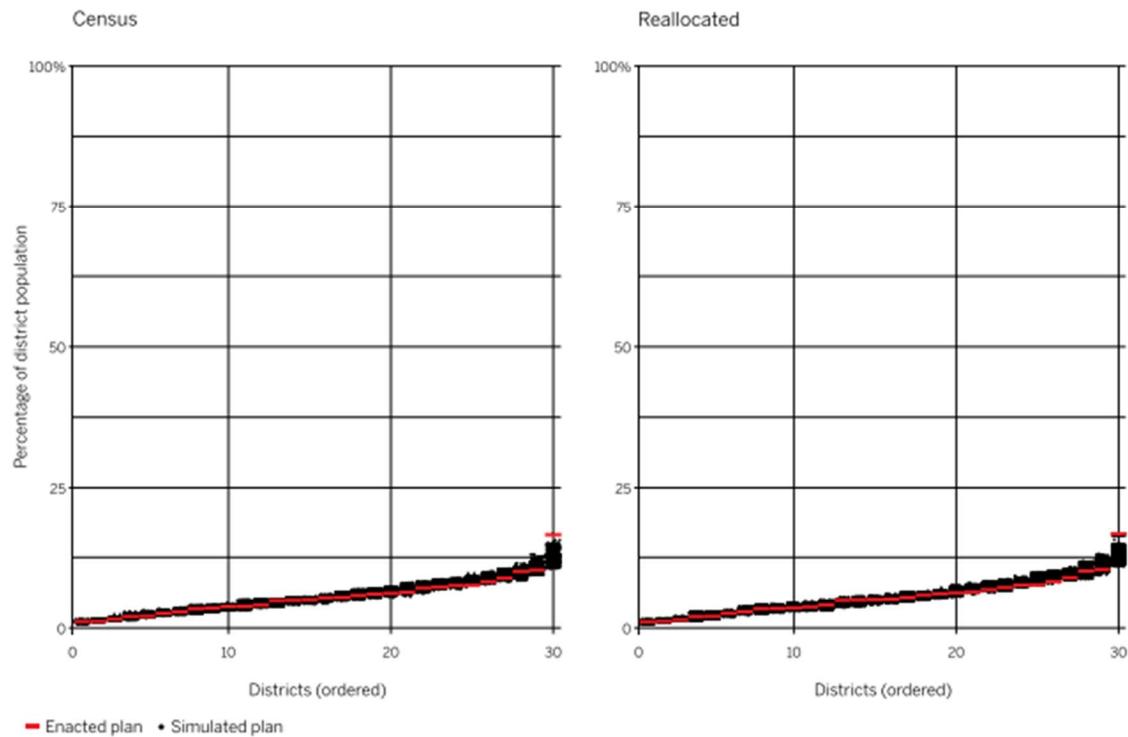


Figure A10

Arizona's Black Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Latino Districts

Figure A11

Number of Arizona Latino-Majority Districts in Simulations

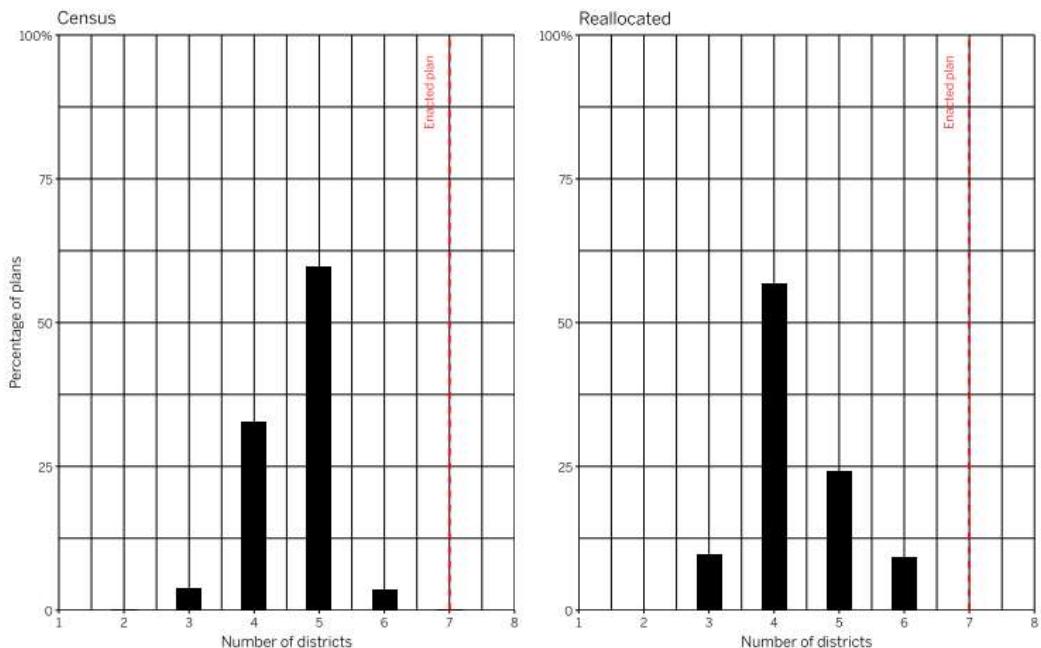
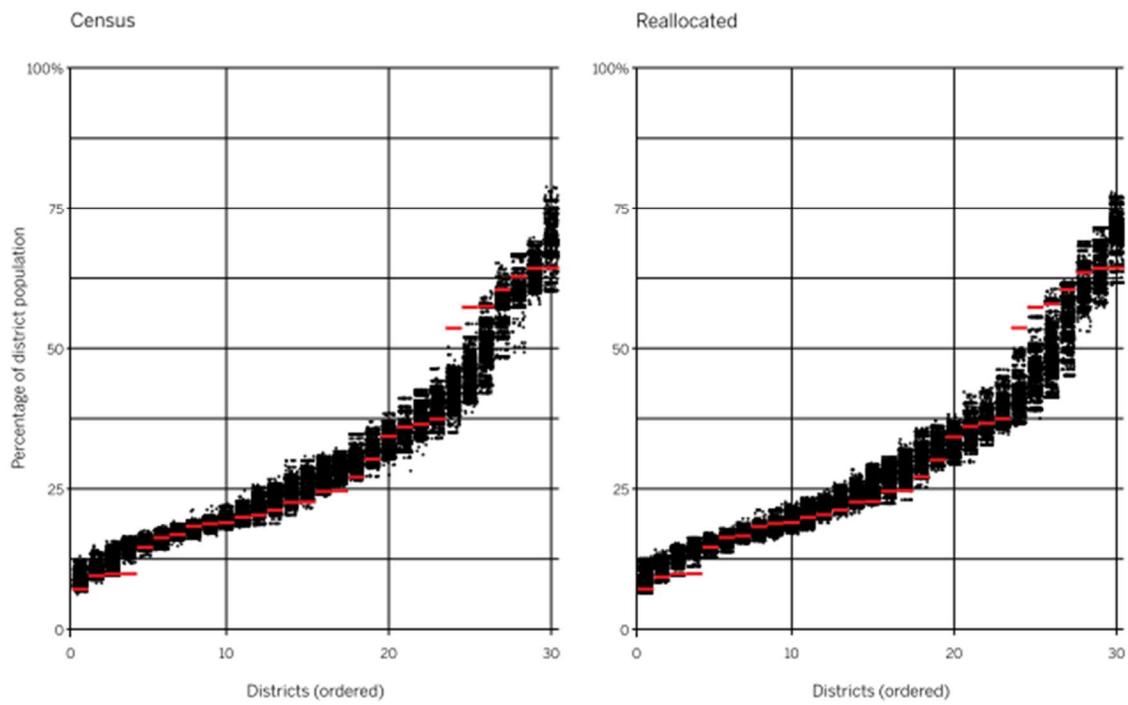


Figure A12

Arizona's Latino Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Latino population percentage. Each dot represents the Latino population of a district in one simulation.

Democratic Districts

Figure A13

Number of Arizona Democratic-Majority Districts in Simulations

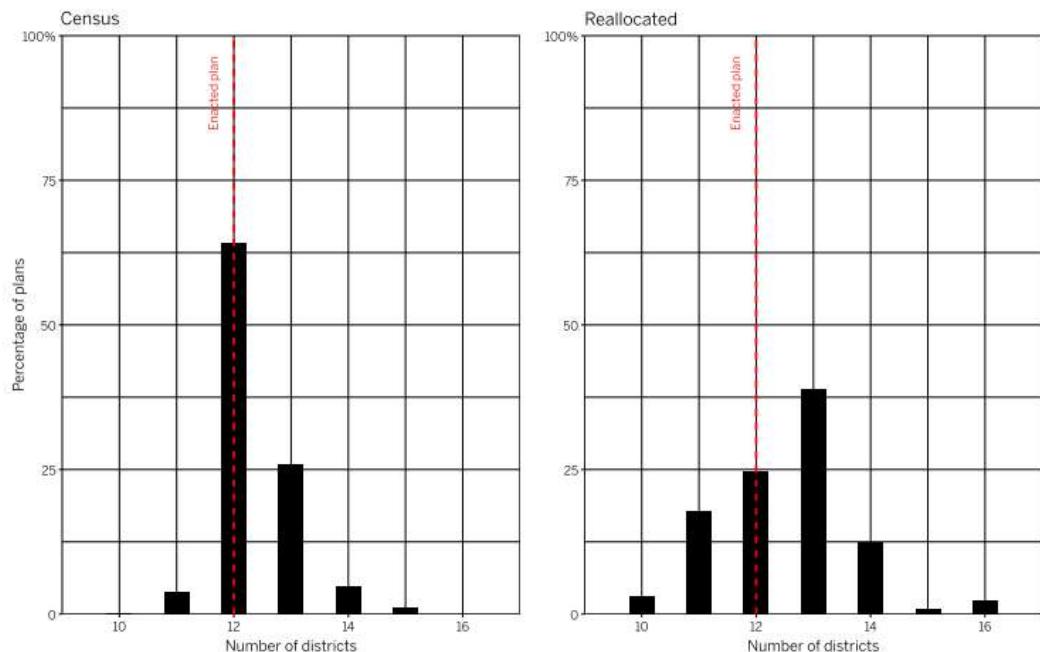
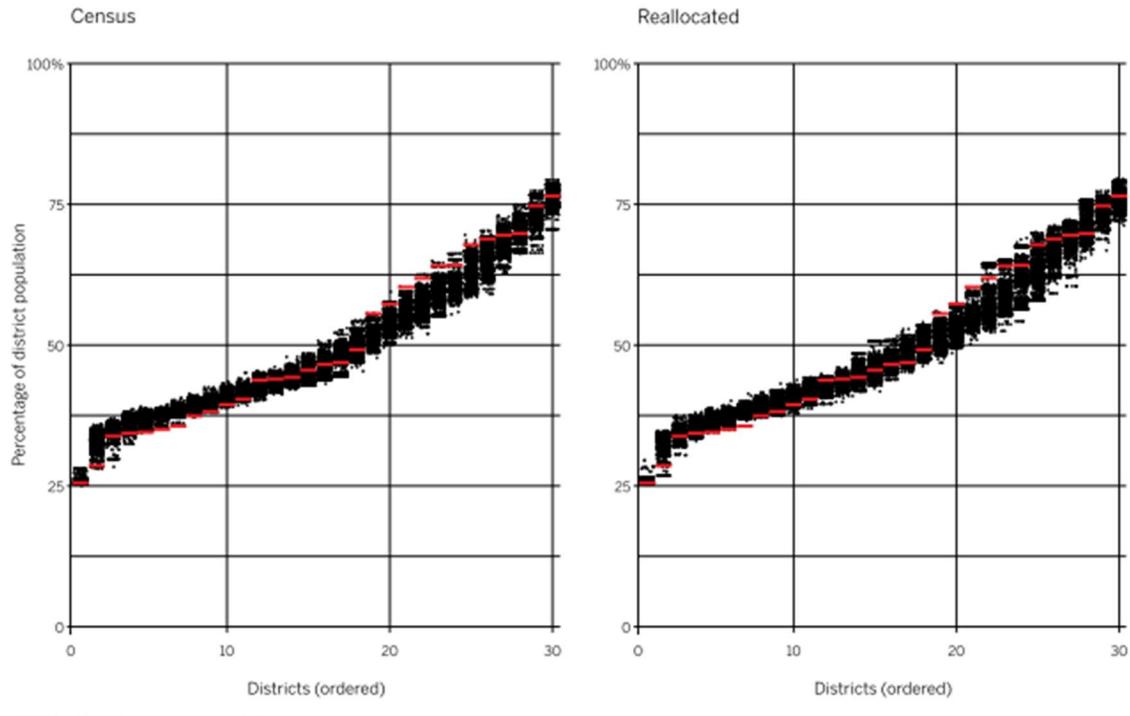


Figure A14

Arizona's Democratic Population in Simulations Compared with Enacted Districts

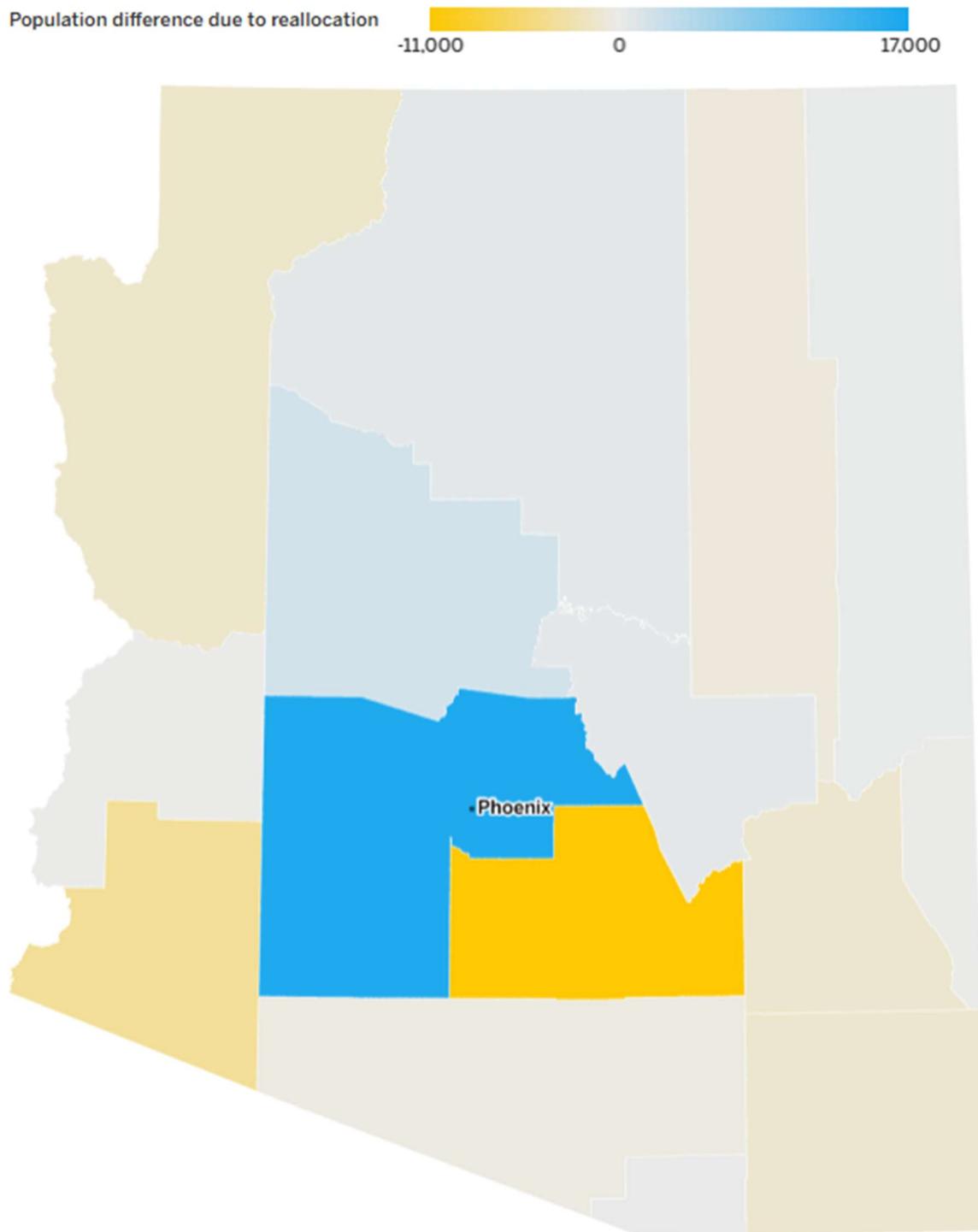


Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

Figure A15

Arizona County Population Changes Due to Reallocation of Incarcerated Populations



A.4 Georgia

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Black Districts

Figure A16

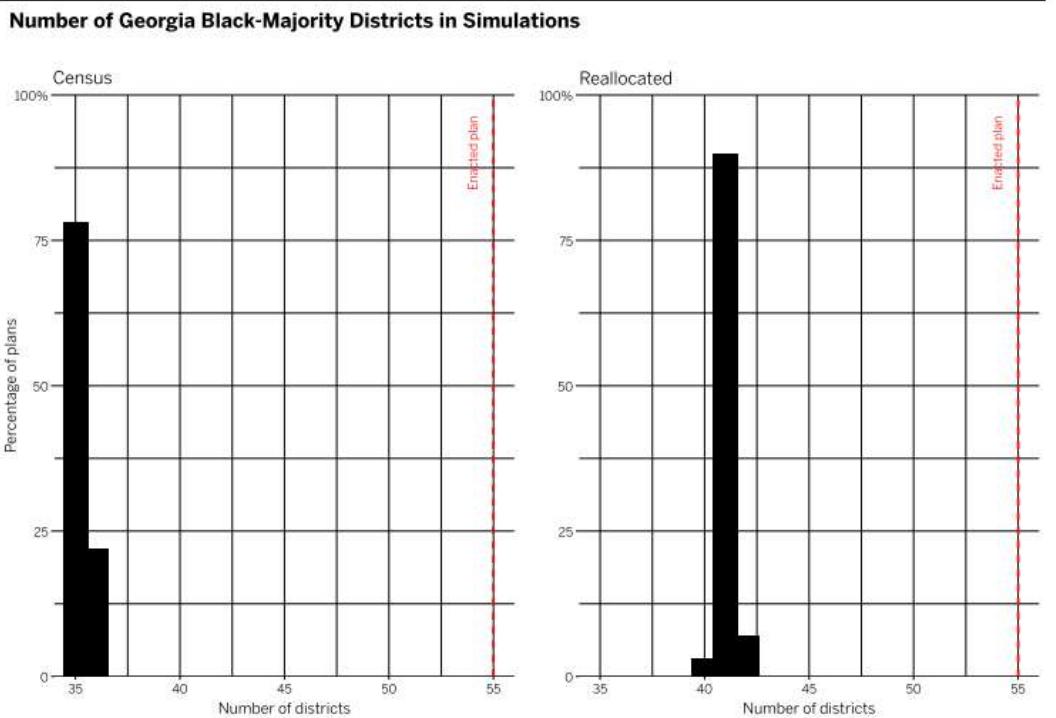
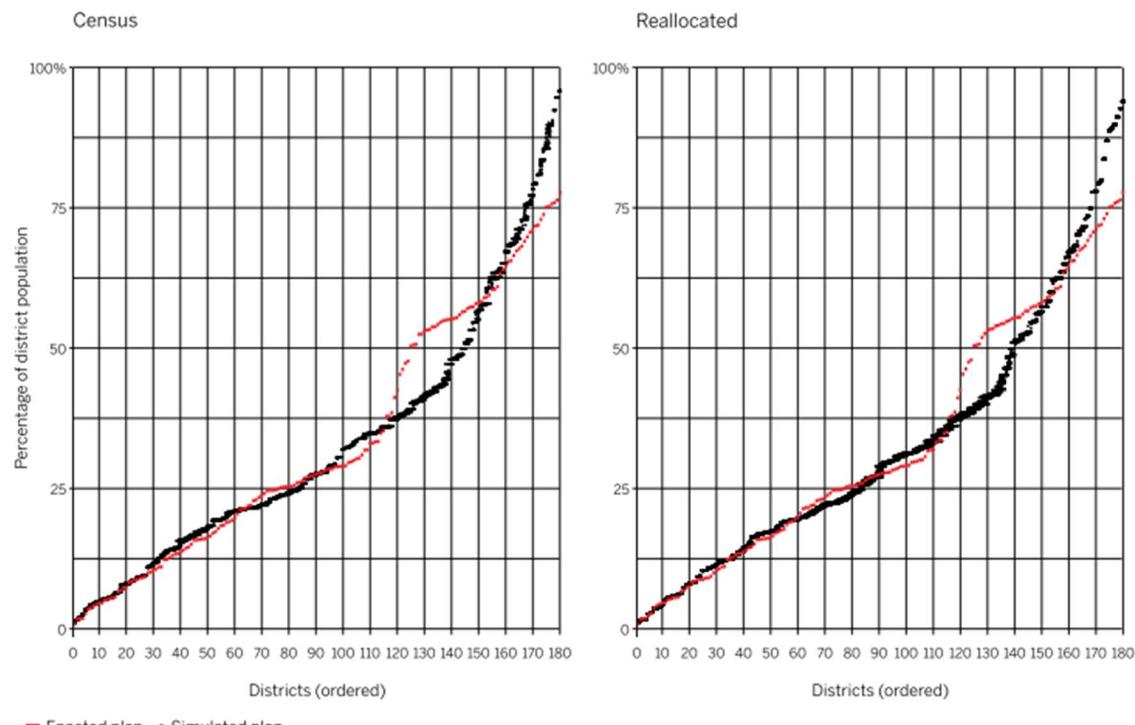


Figure A1

Georgia's Black Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Democratic Districts

Figure A17

Number of Georgia Democratic-Majority Districts in Simulations

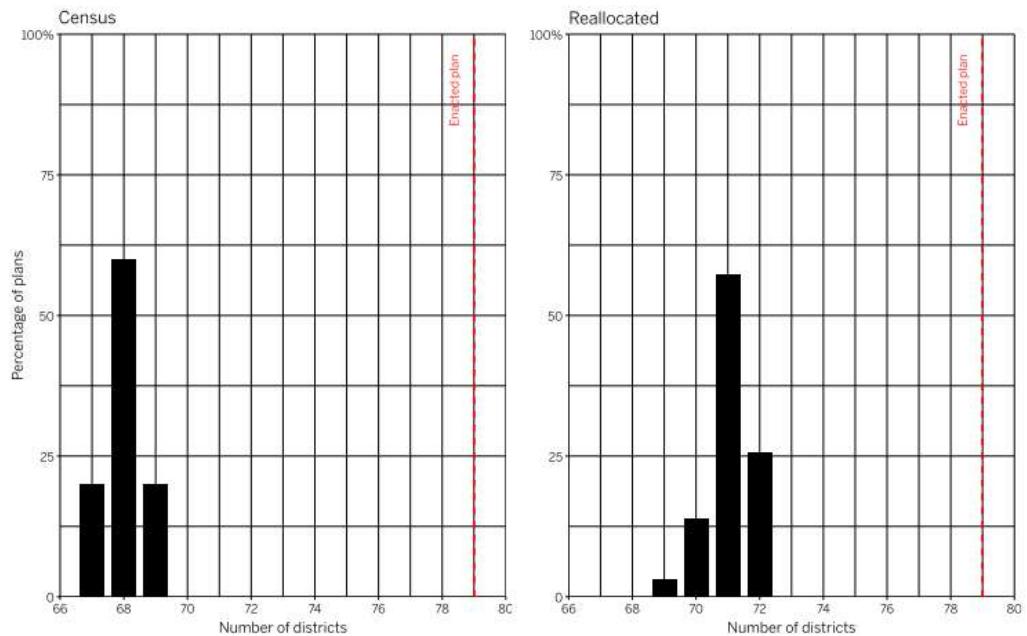
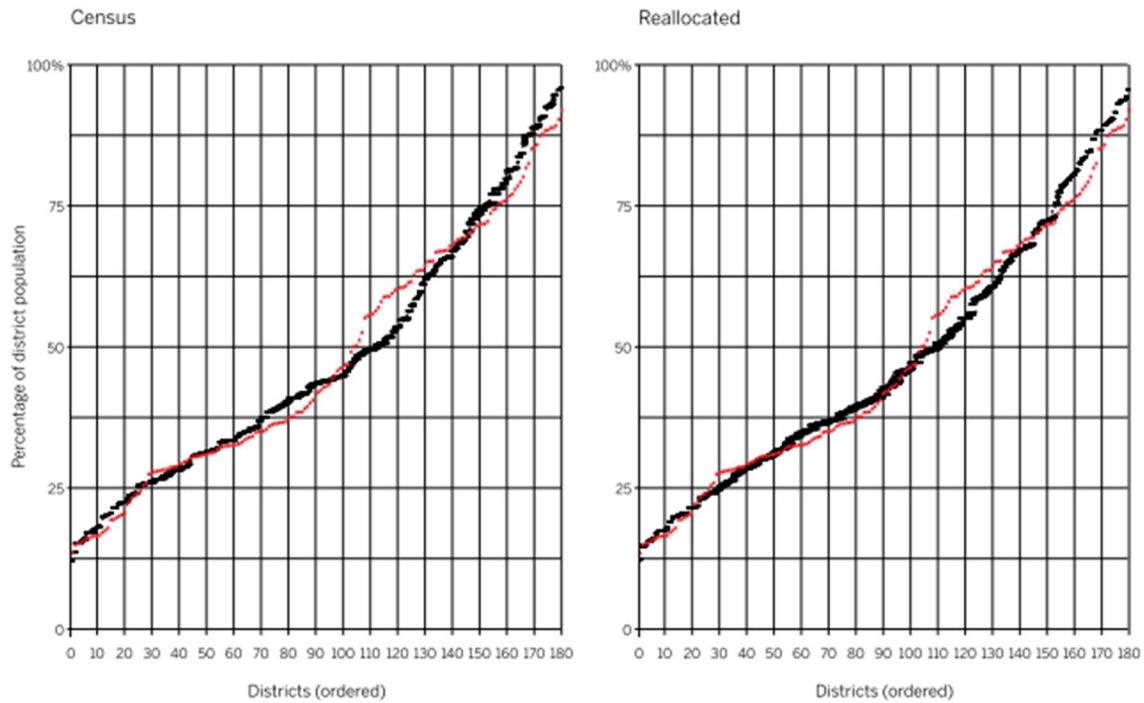


Figure A18

Georgia's Democratic Population in Simulations Compared with Enacted Districts



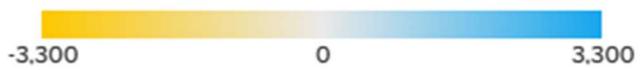
Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

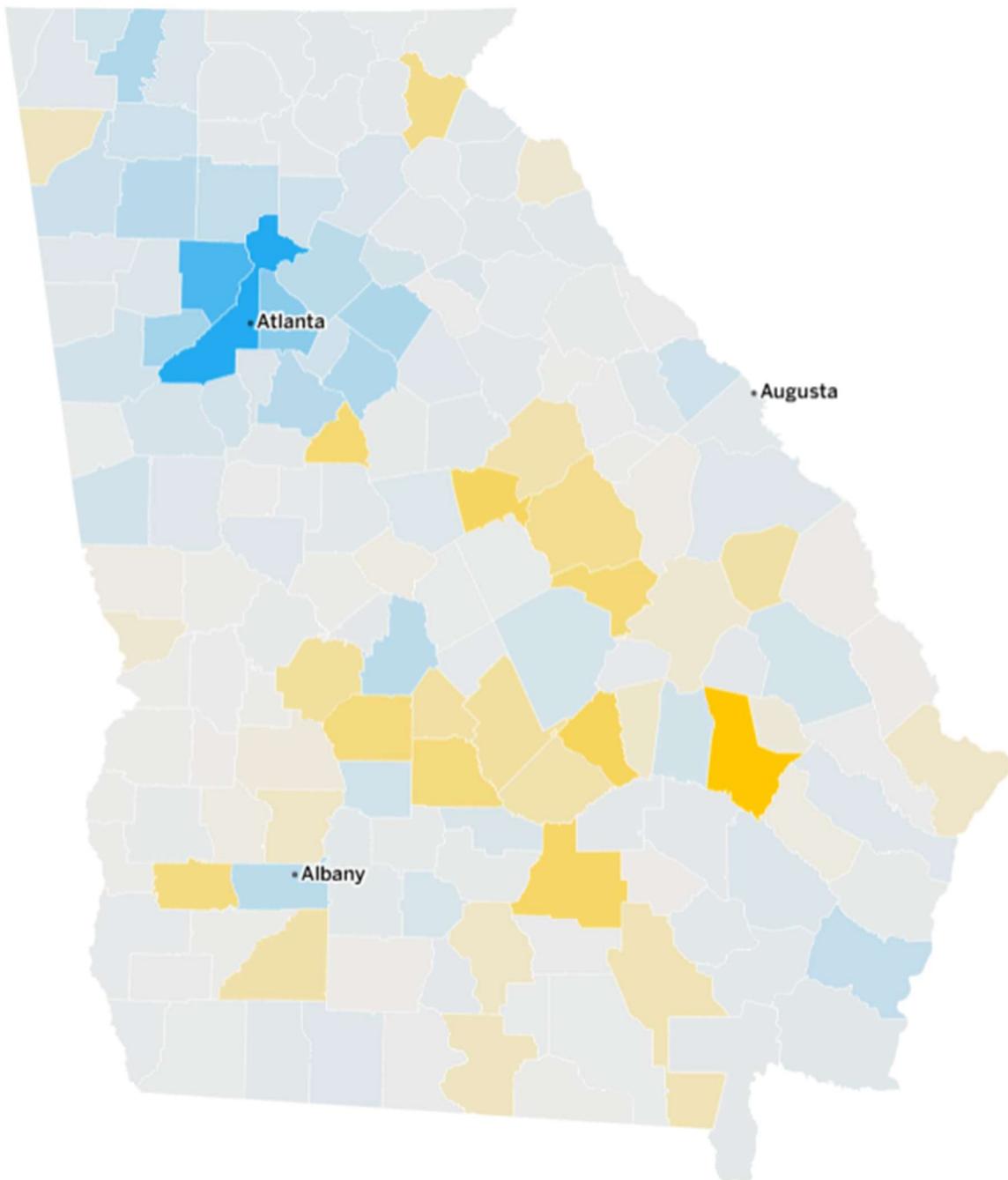
Figure A19

Georgia County Population Changes Due to Reallocation of Incarcerated Populations

Population difference due to reallocation



-3,300 0 3,300



A.5 Illinois

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Black Districts

Figure A20

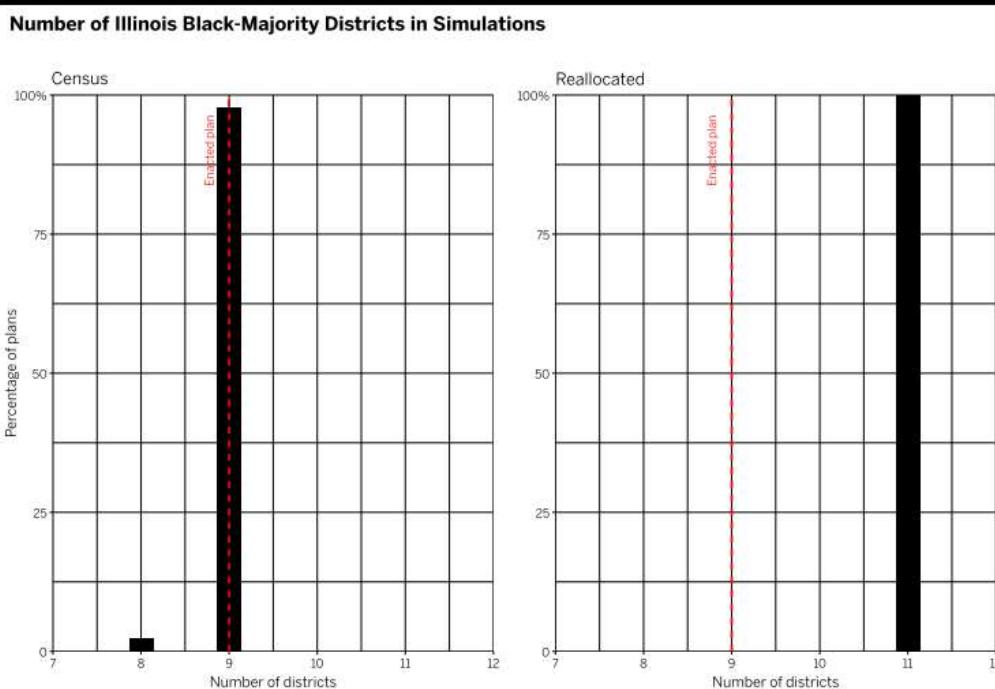
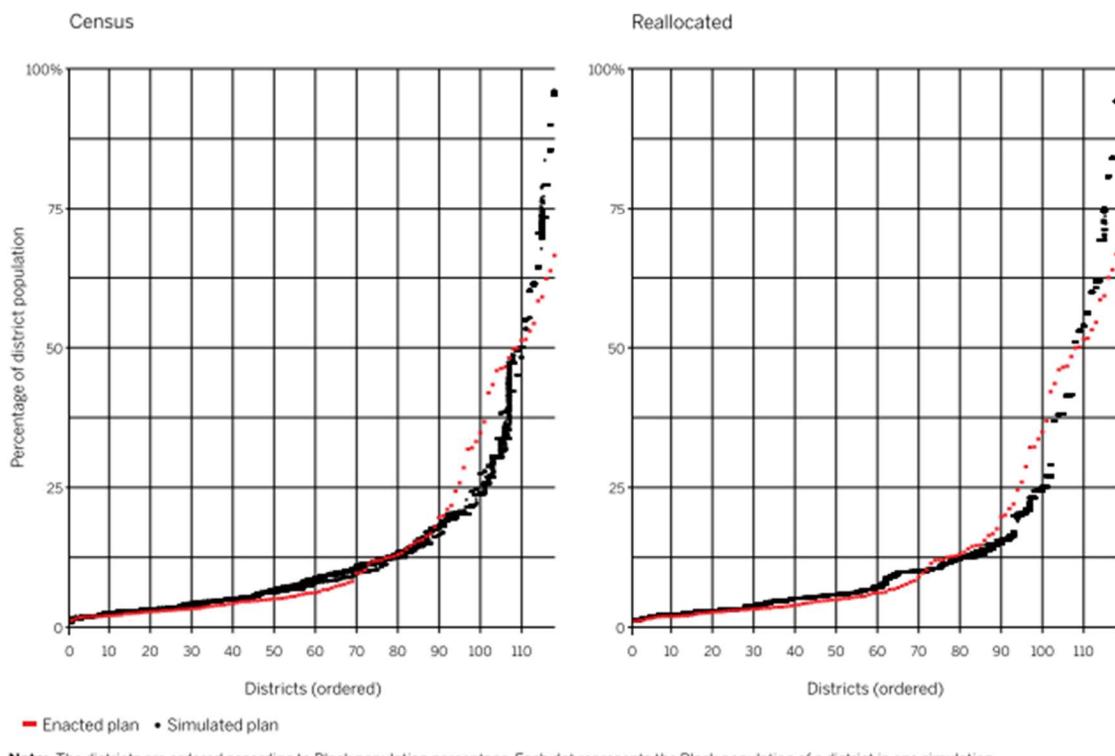


Figure A21

Illinois's Black Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Latino Districts

Figure A22

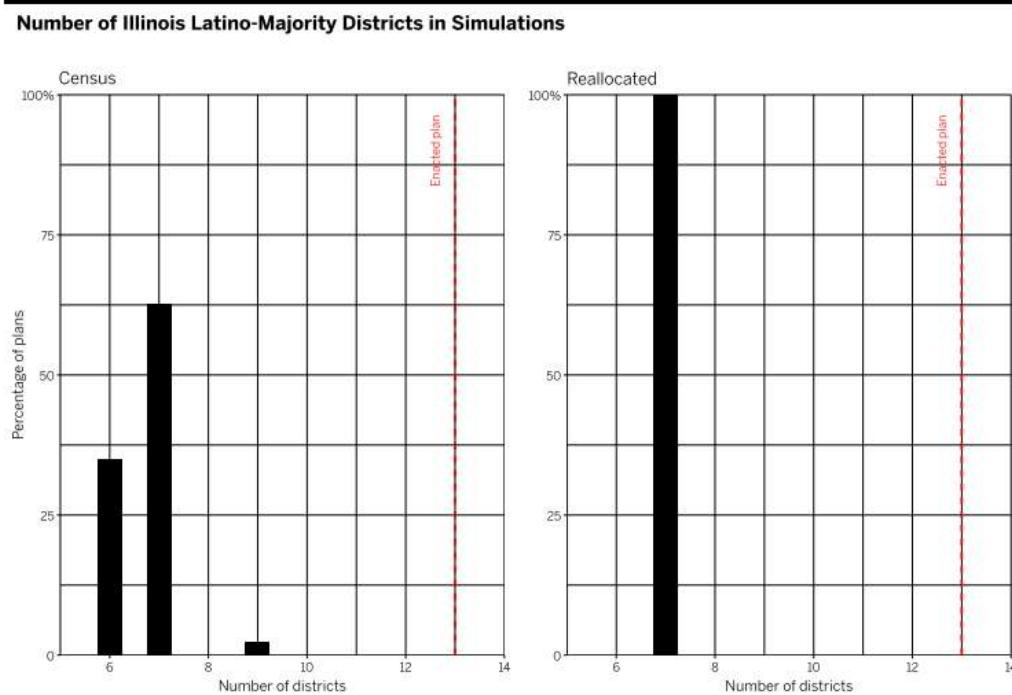
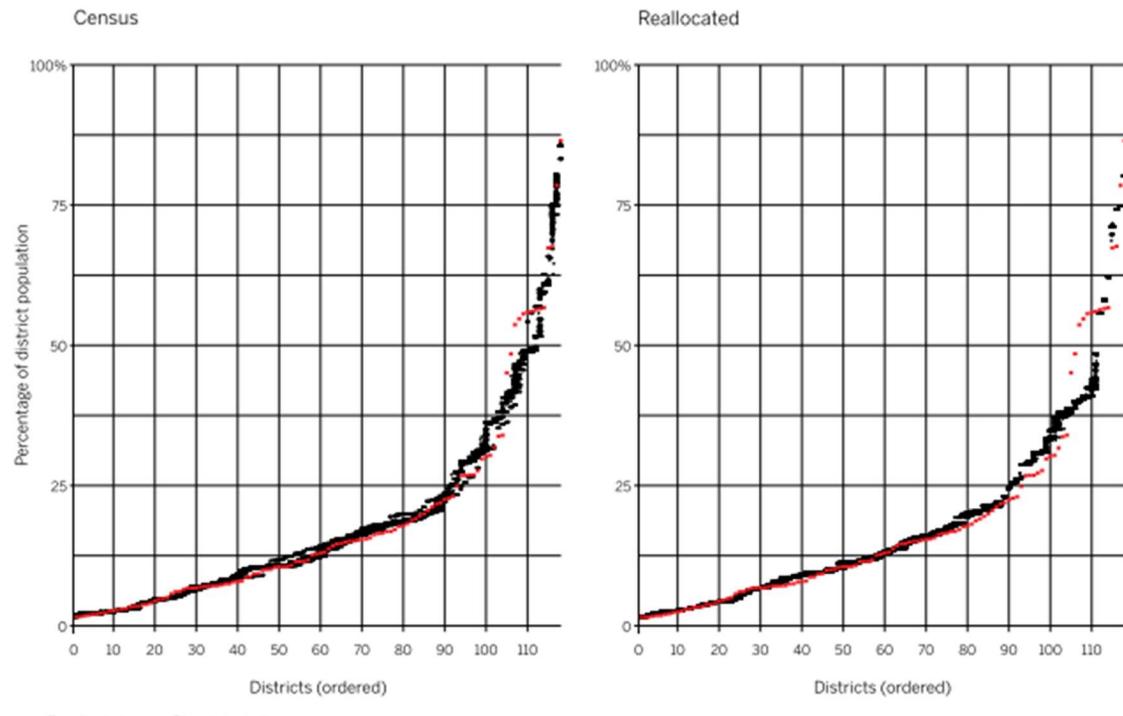


Figure A23

Illinois's Latino Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Latino population percentage. Each dot represents the Latino population of a district in one simulation.

Democratic Districts

Figure A24

Number of Illinois Democratic-Majority Districts in Simulations

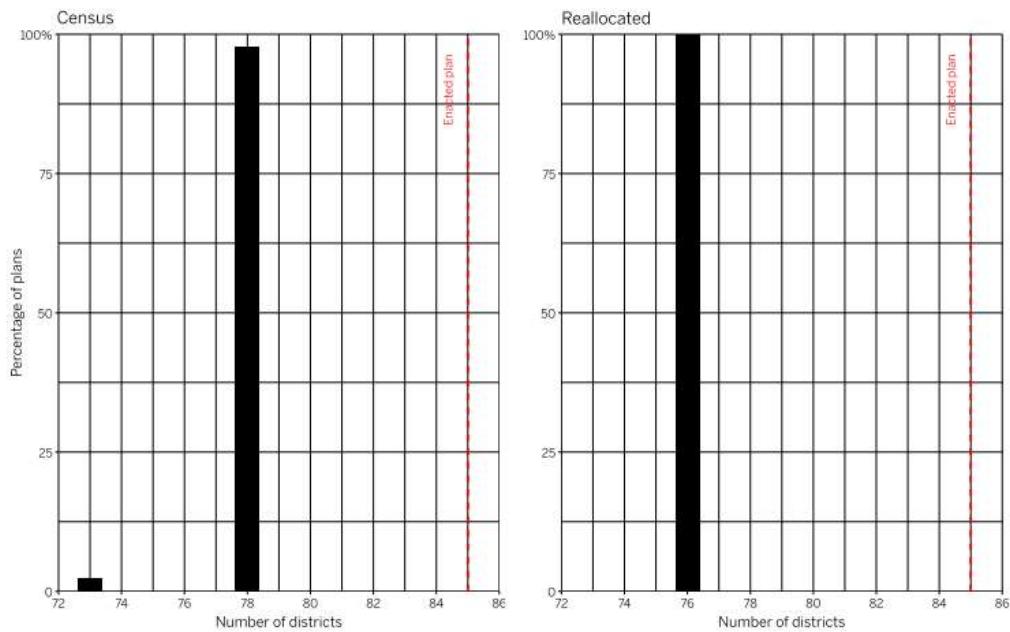
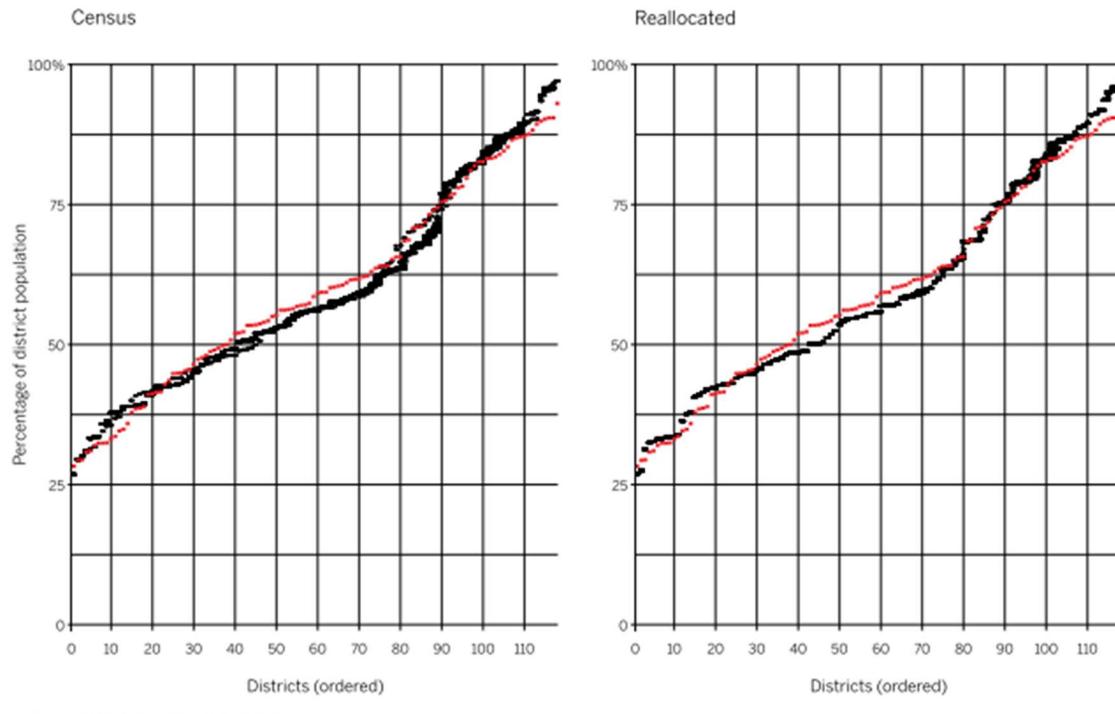


Figure A25

Illinois's Democratic Population in Simulations Compared with Enacted Districts

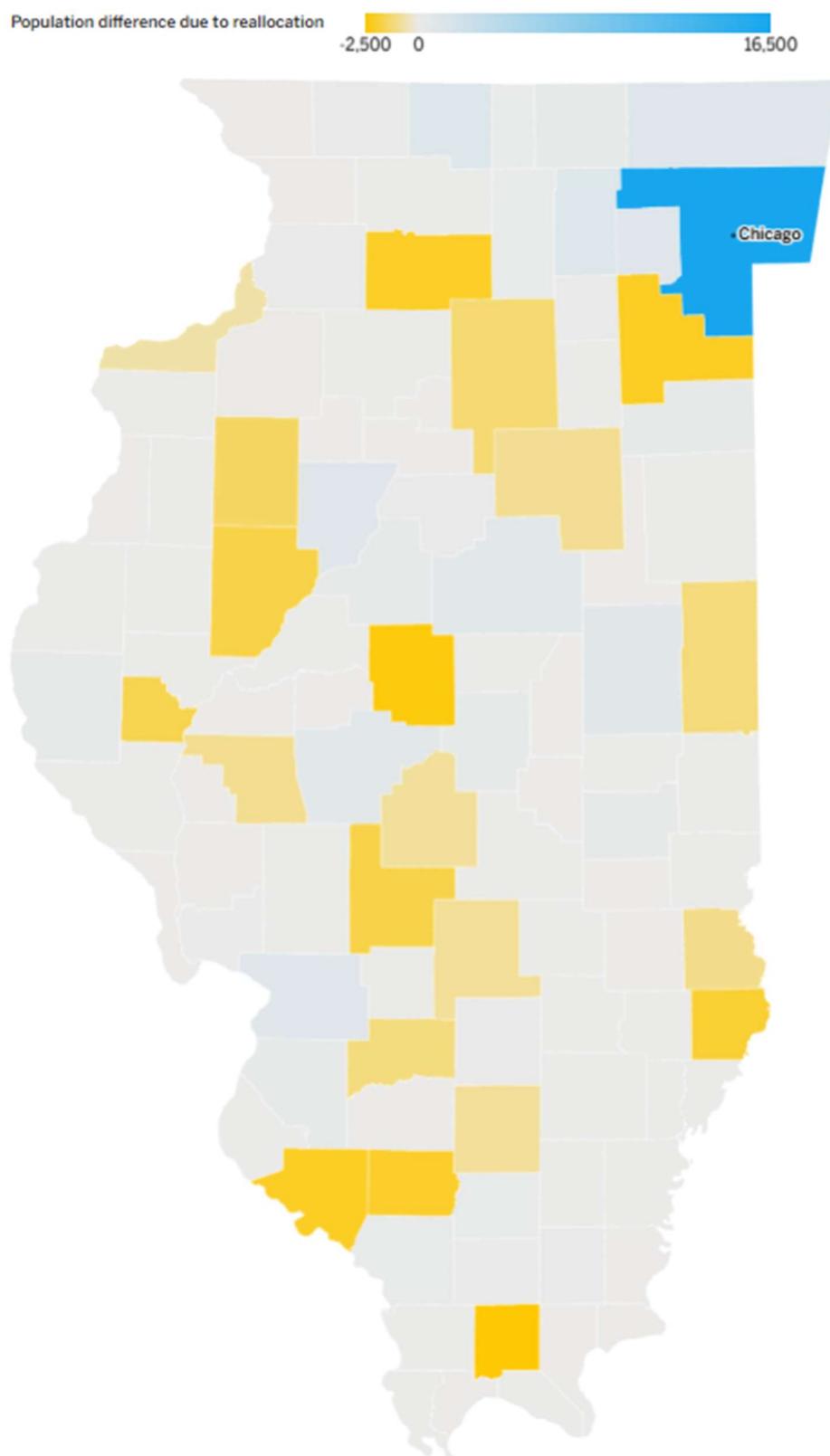


Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

Figure A26

Illinois County Population Changes Due to Reallocation of Incarcerated Populations



A.6 Louisiana

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Black Districts

Figure A27

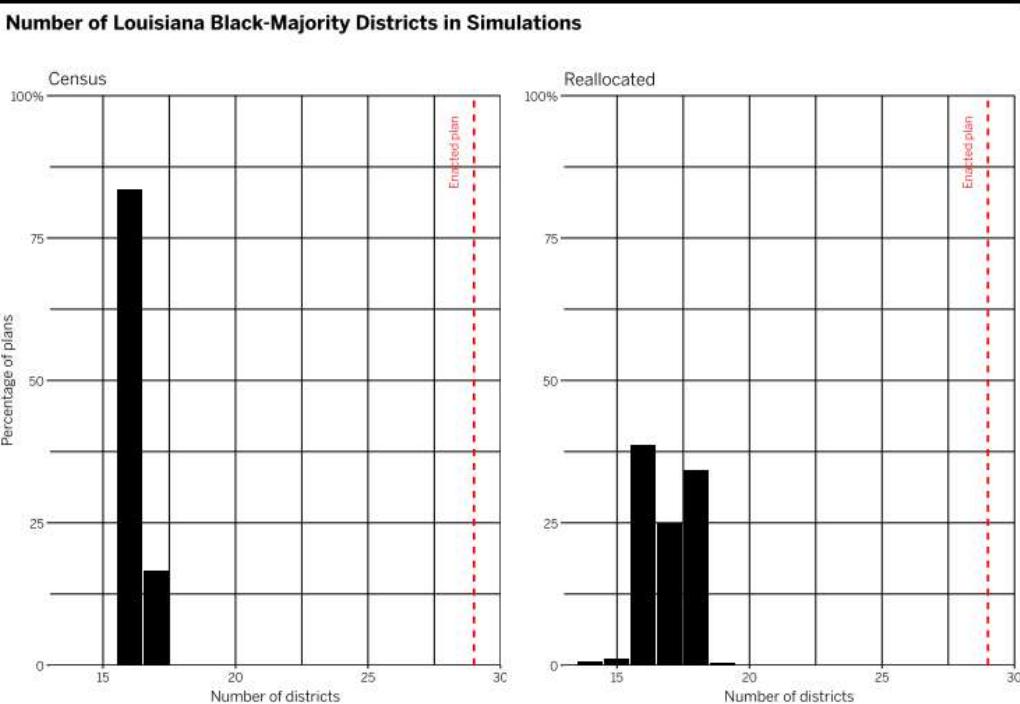
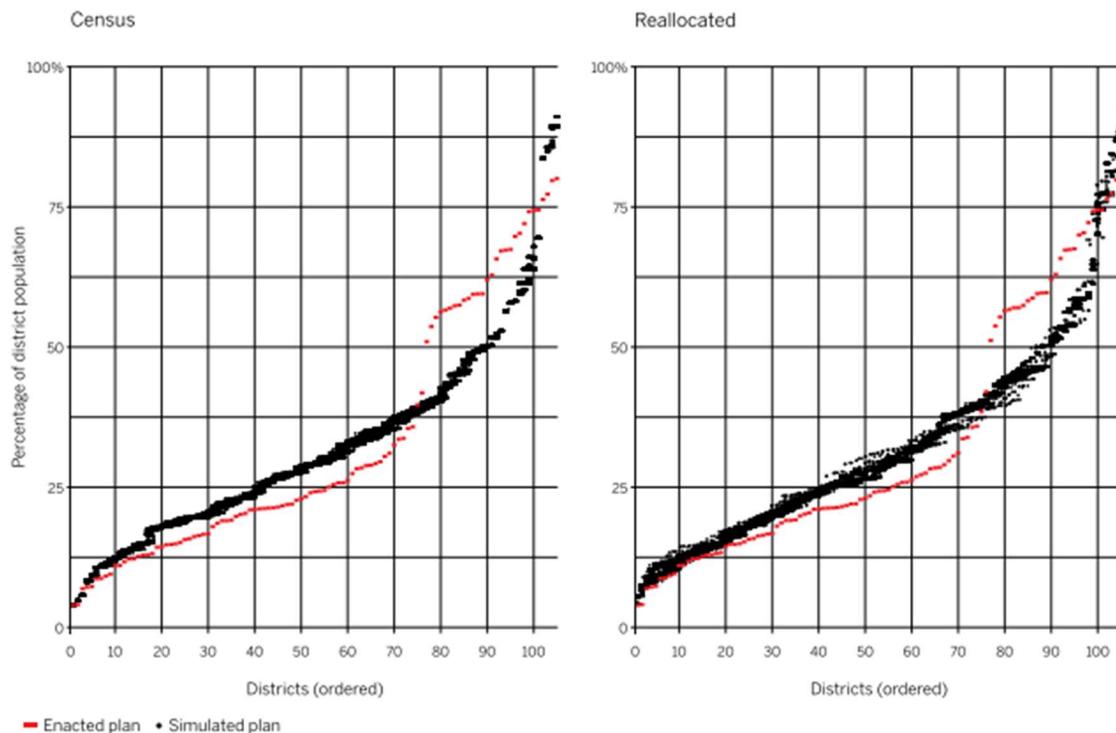


Figure A28

Louisiana's Black Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Latino Districts

Figure A29

Number of Louisiana Latino-Majority Districts in Simulations

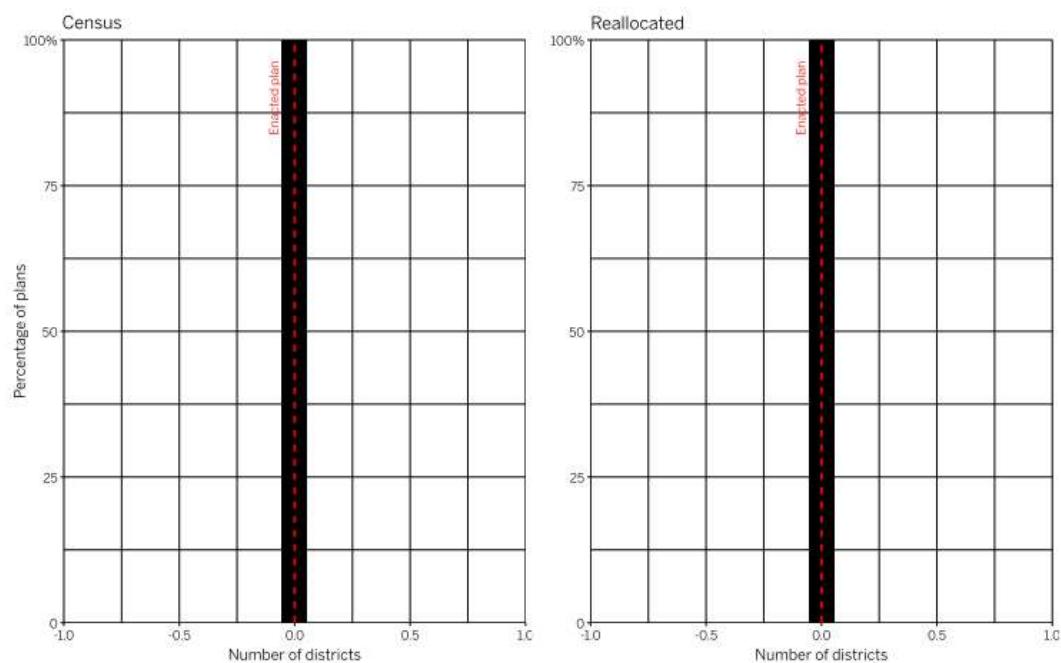
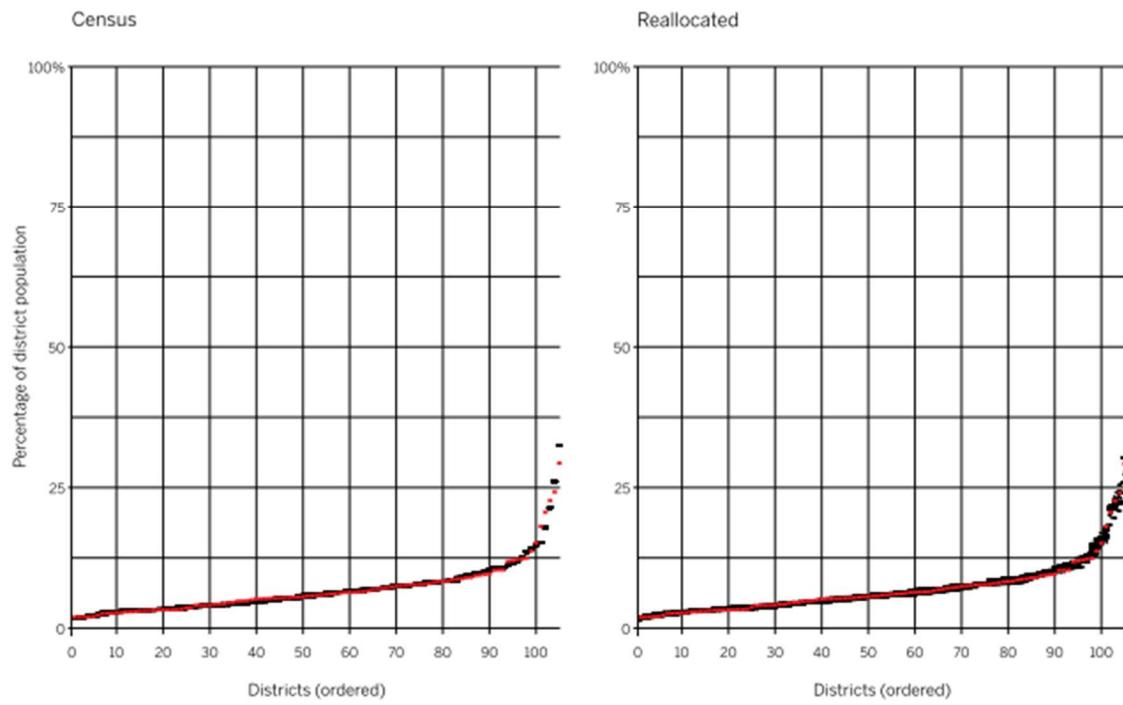


Figure A30

Louisiana's Latino Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Latino population percentage. Each dot represents the Latino population of a district in one simulation.

Democratic Districts

Figure A31

Number of Louisiana Democratic-Majority Districts in Simulations

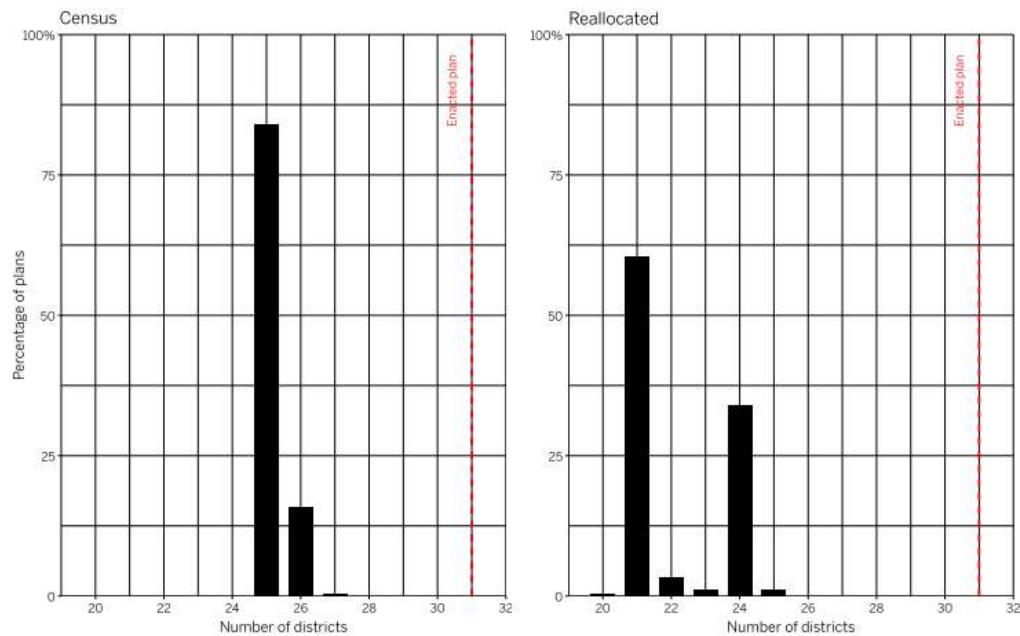
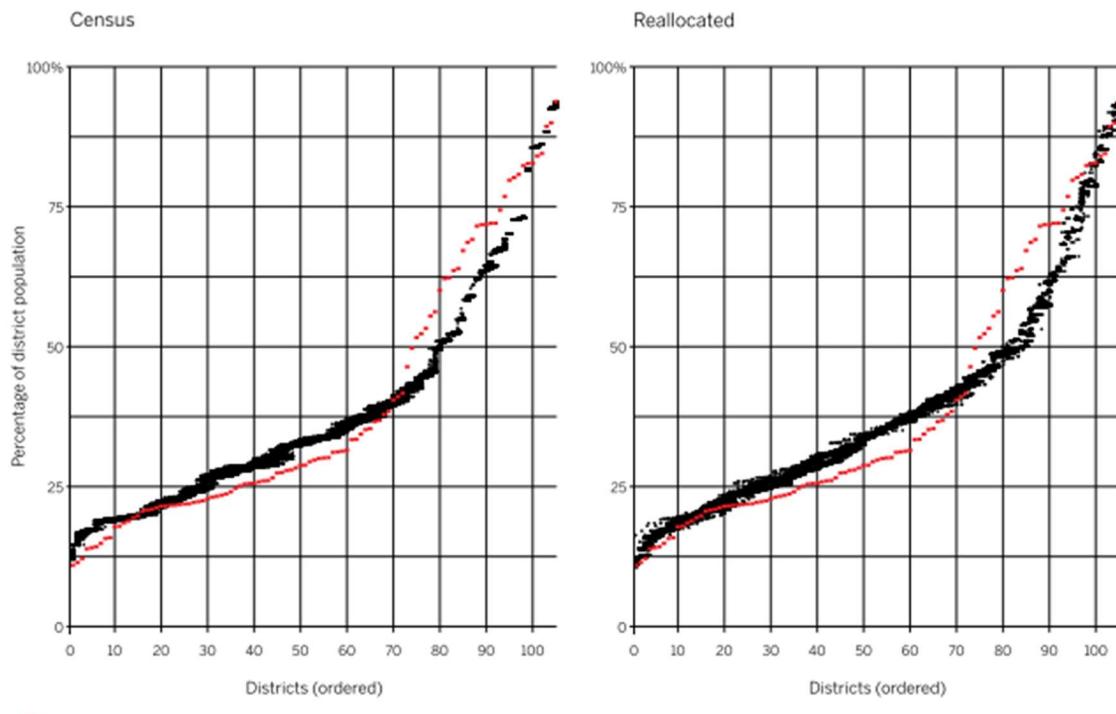


Figure A32

Louisiana's Democratic Population in Simulations Compared with Enacted Districts

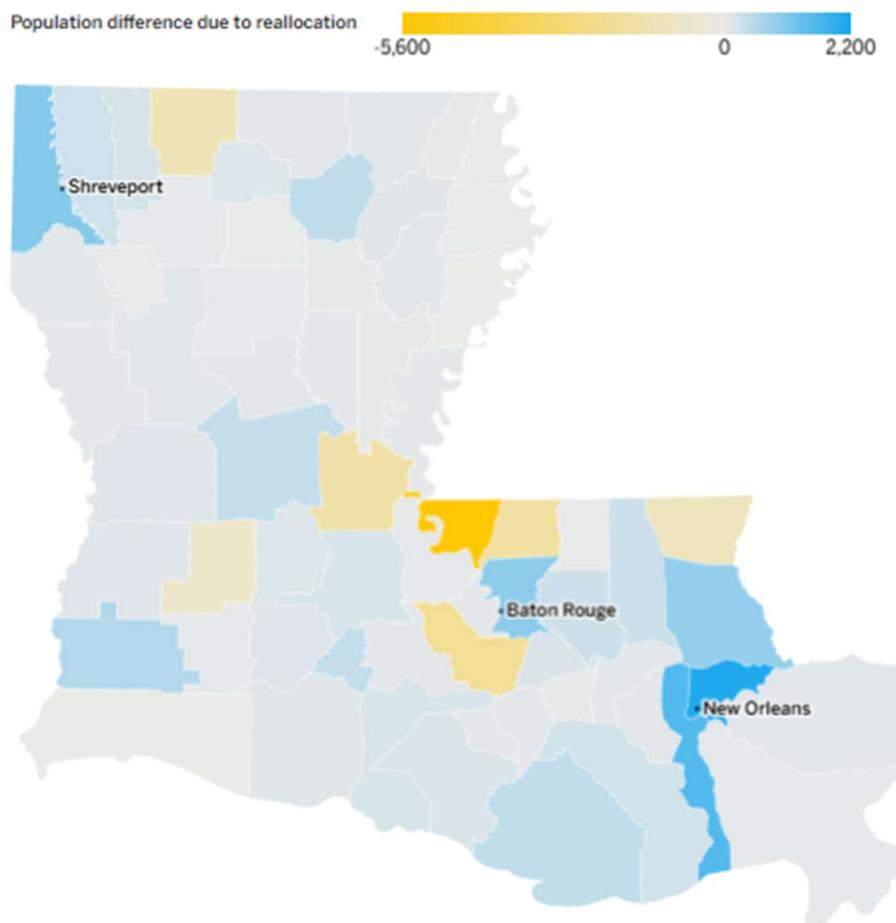


Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

Figure A33

Louisiana County Population Changes Due to Reallocation of Incarcerated Populations



A.7 Mississippi

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Black Districts

Figure A34

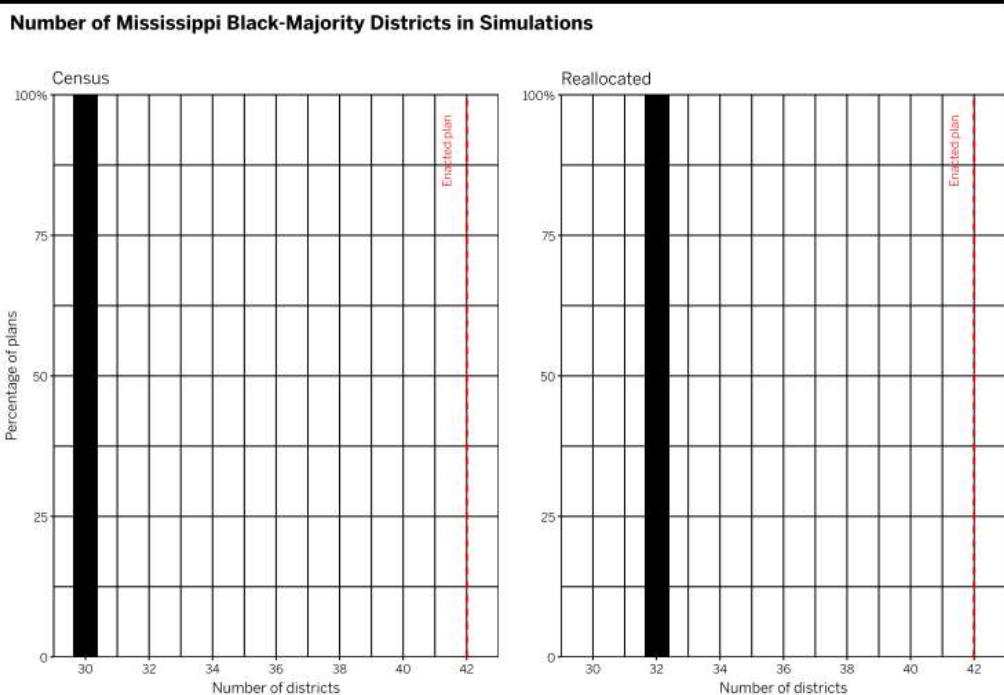
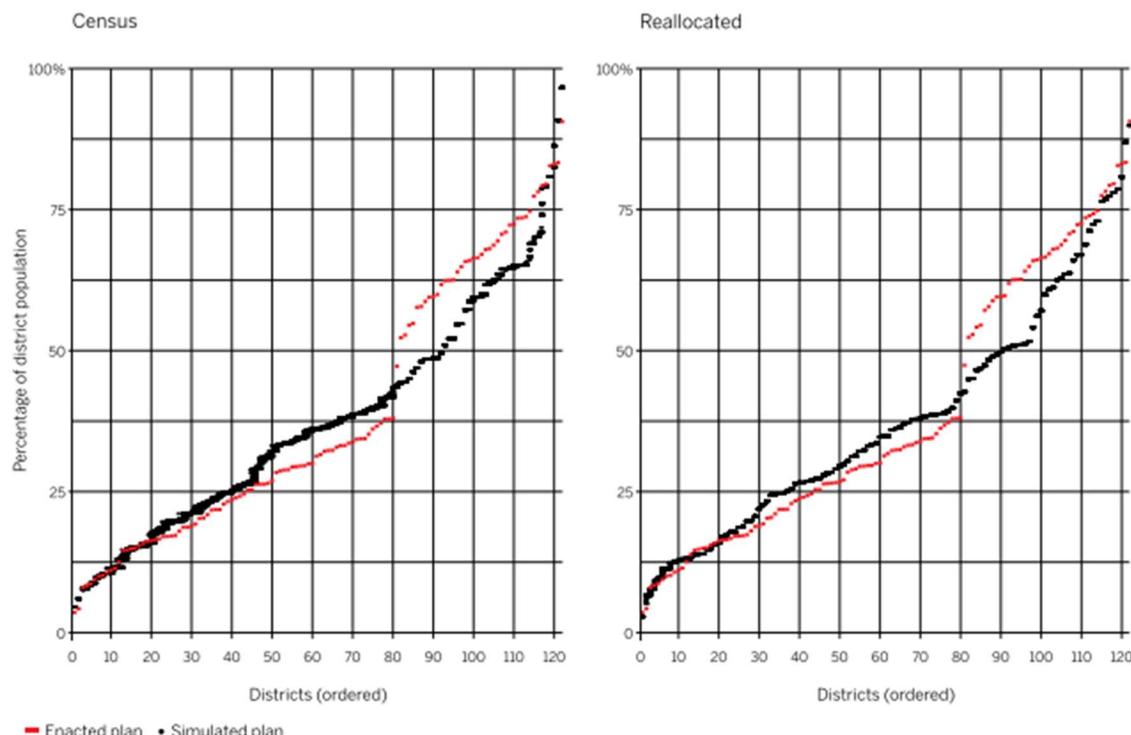


Figure A35

Mississippi's Black Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Latino Districts

Figure A36

Number of Mississippi Latino-Majority Districts in Simulations

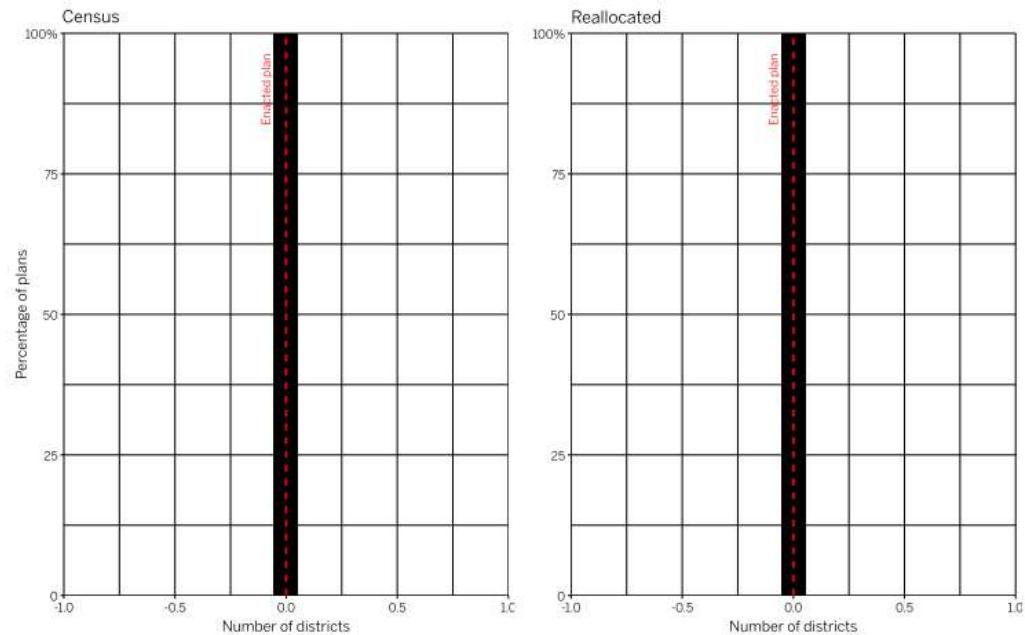
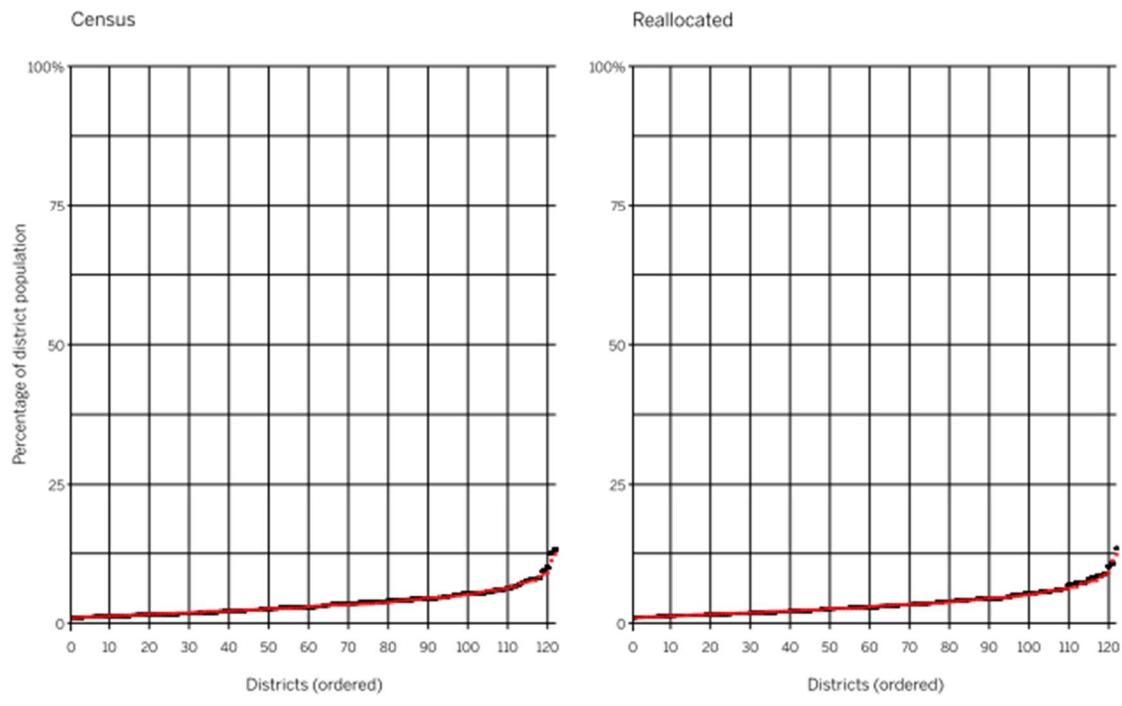


Figure A37

Mississippi's Latino Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Latino population percentage. Each dot represents the Latino population of a district in one simulation.

Democratic Districts

Figure A38

Number of Mississippi Democratic-Majority Districts in Simulations

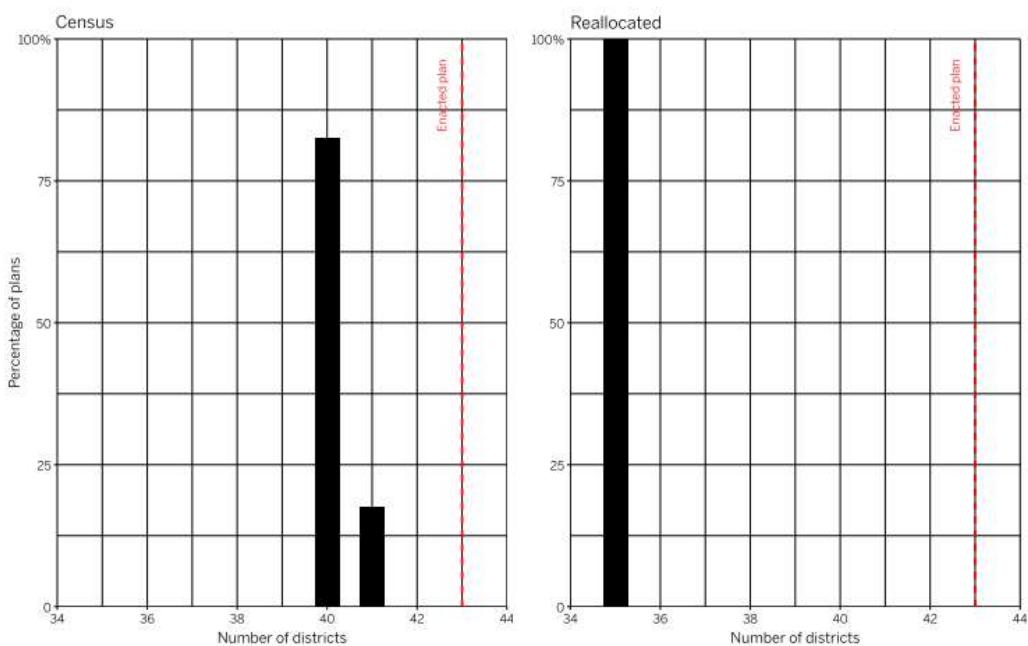
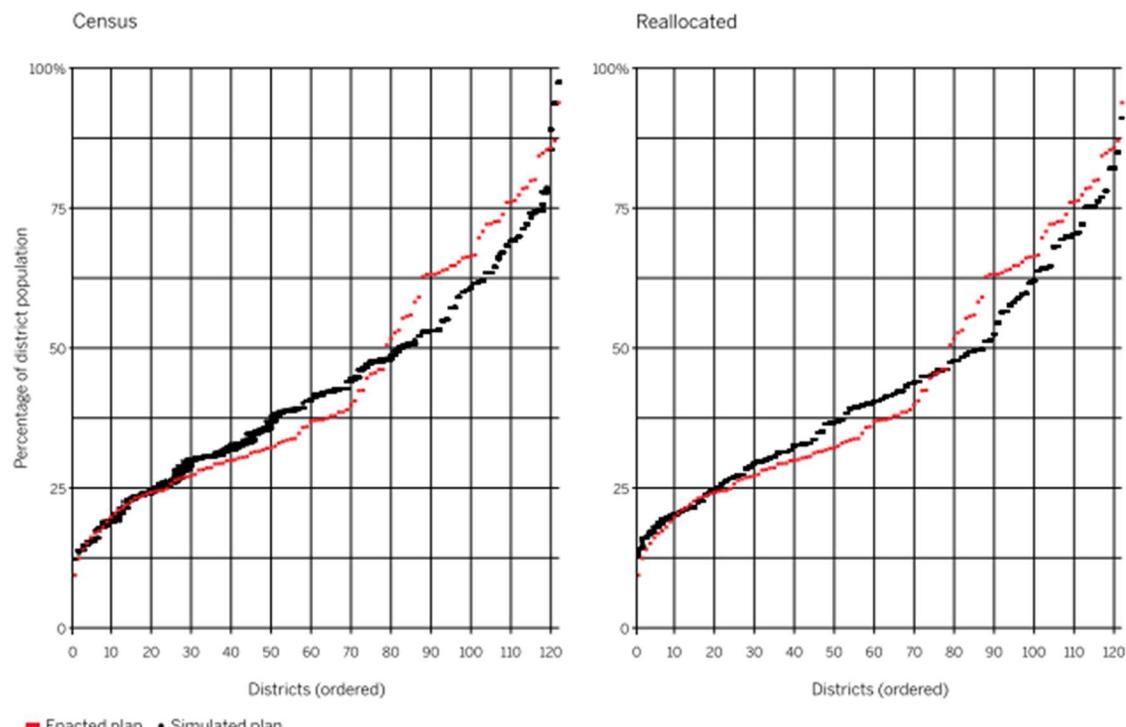


Figure A39

Mississippi's Democratic Population in Simulations Compared with Enacted Districts

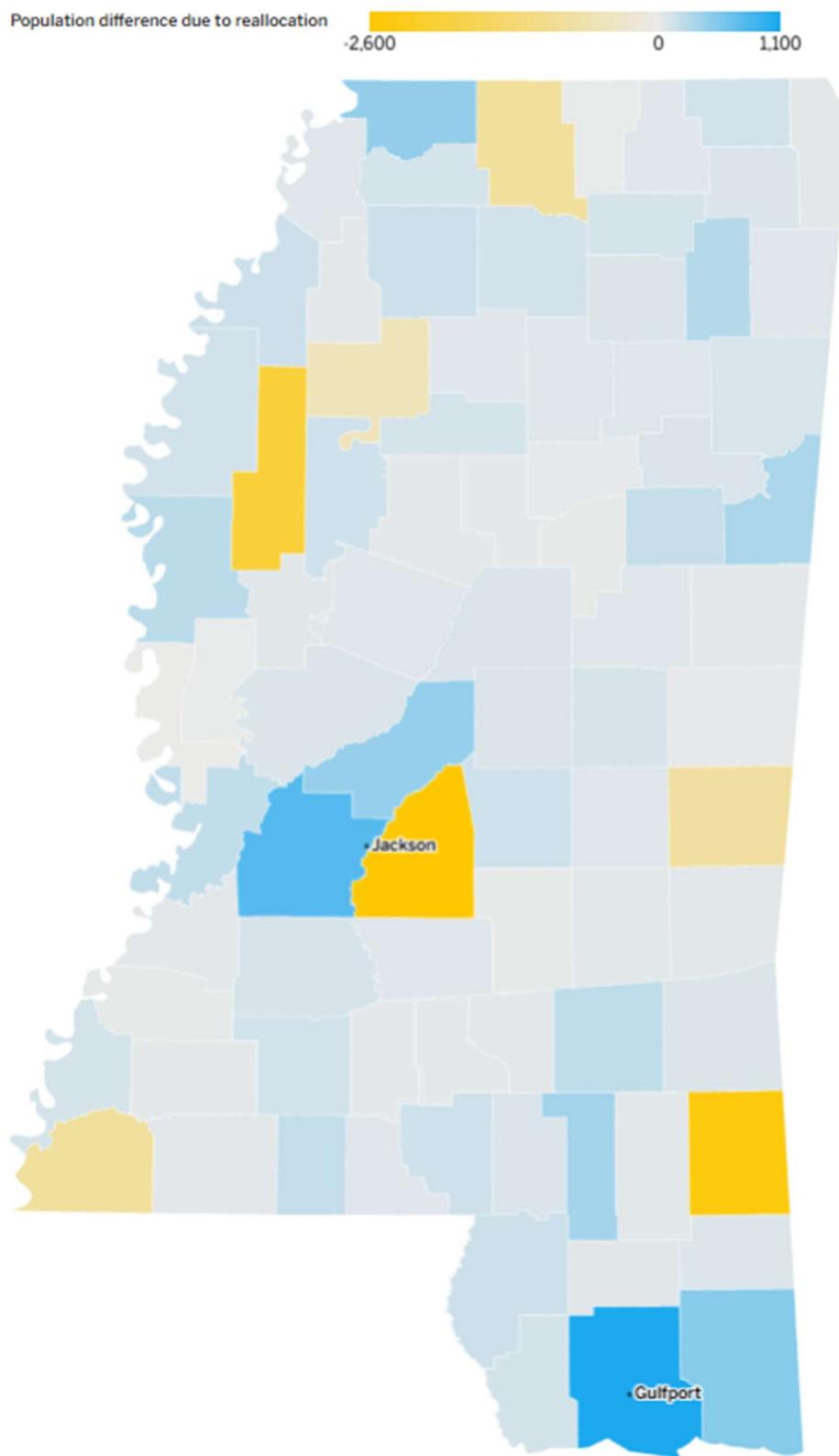


Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

Figure A40

Mississippi County Population Changes Due to Reallocation of Incarcerated Populations



A.8 North Carolina

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Black Districts

Figure A41

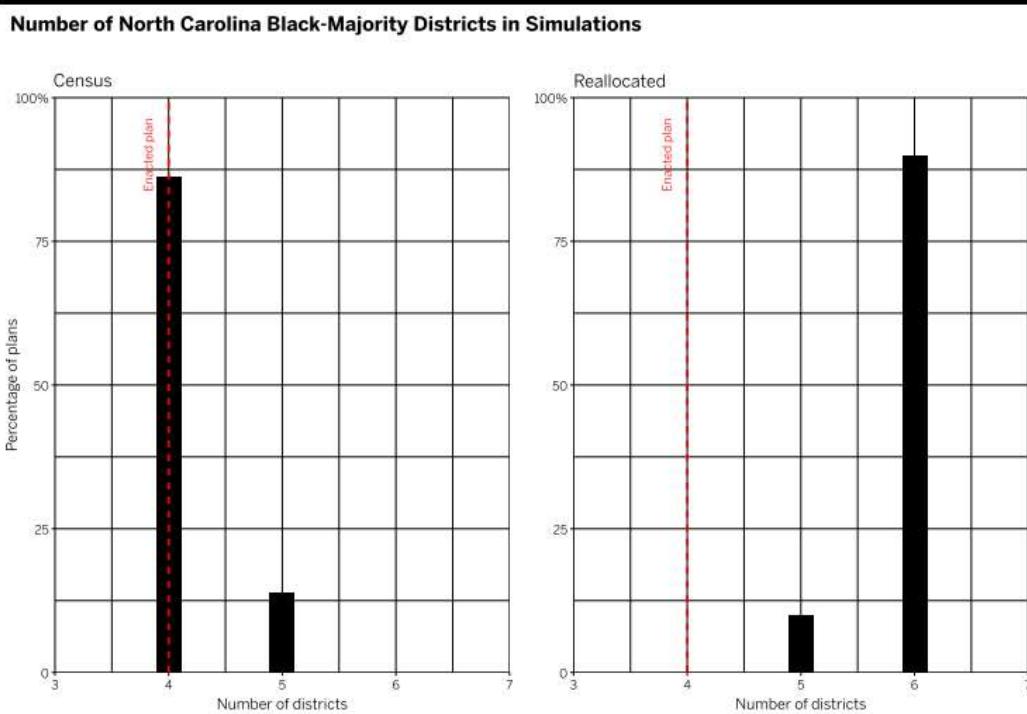
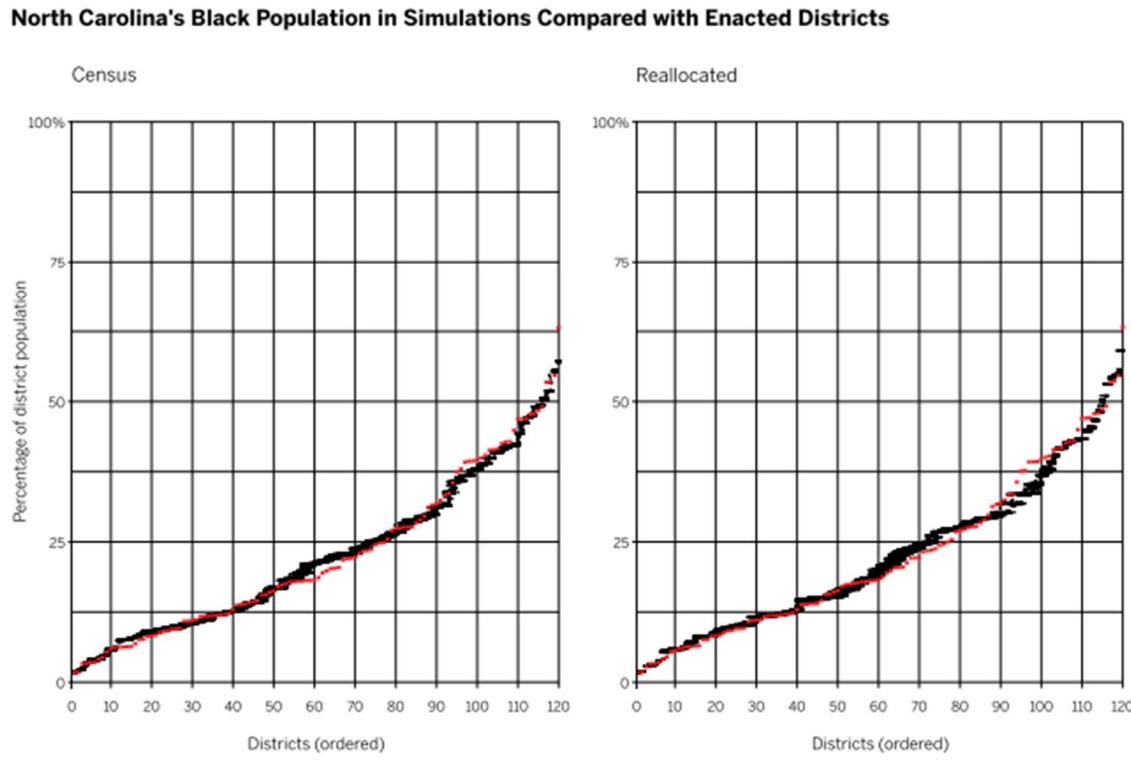


Figure A42



— Enacted plan • Simulated plan

Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Democratic Districts

Figure A43

Number of North Carolina Democratic-Majority Districts in Simulations

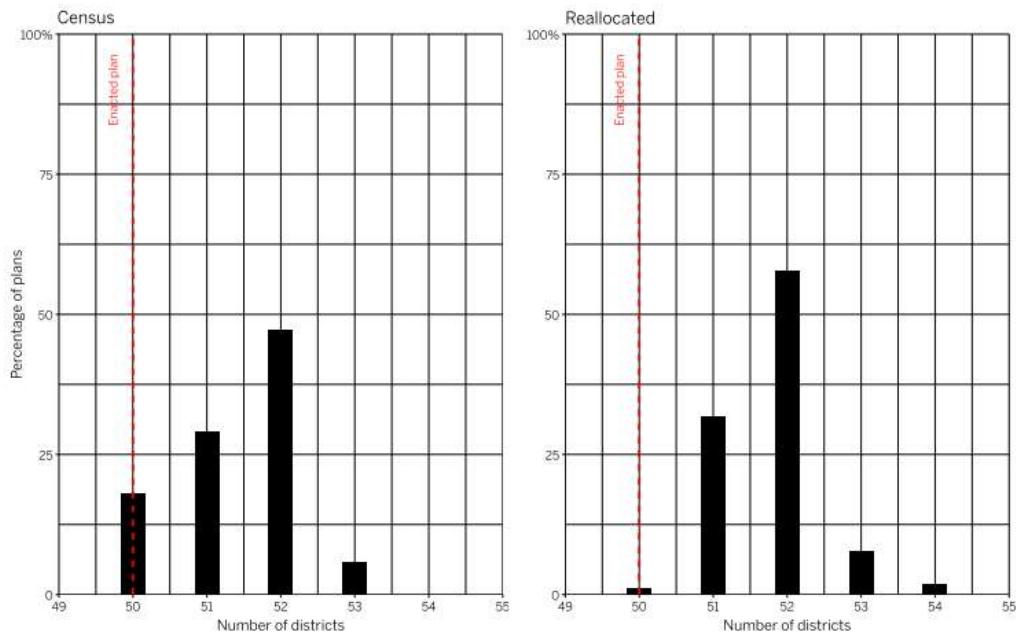
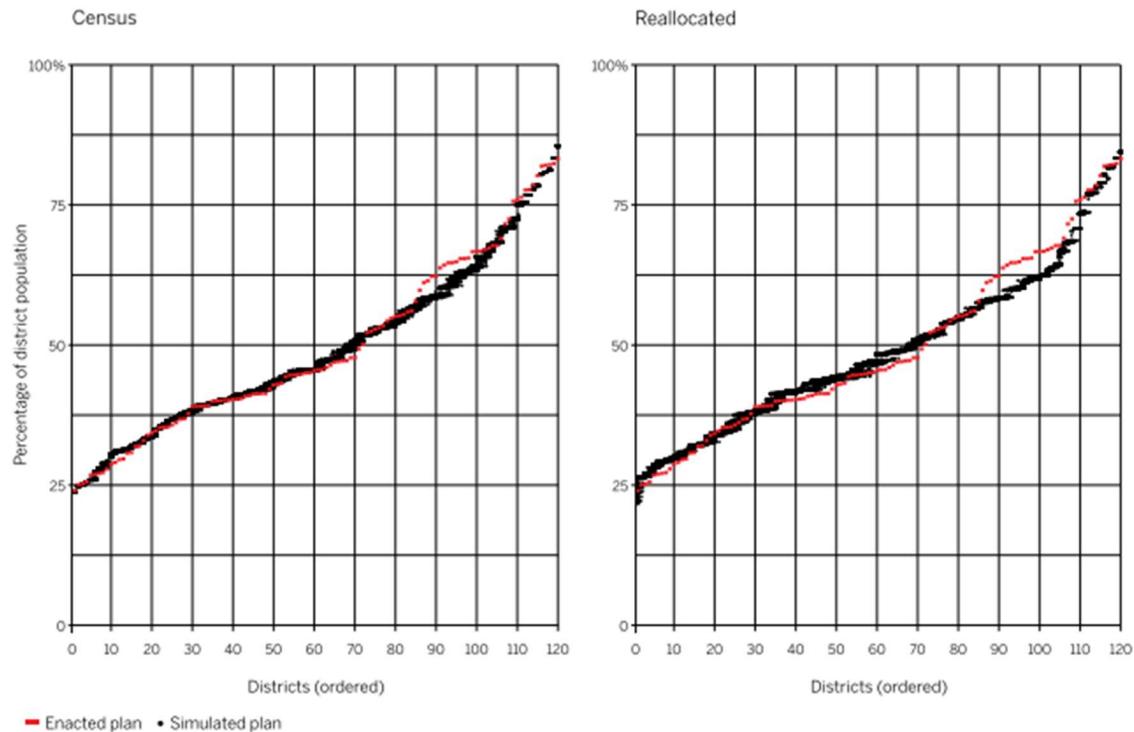


Figure A44

North Carolina's Democratic Population in Simulations Compared with Enacted Districts



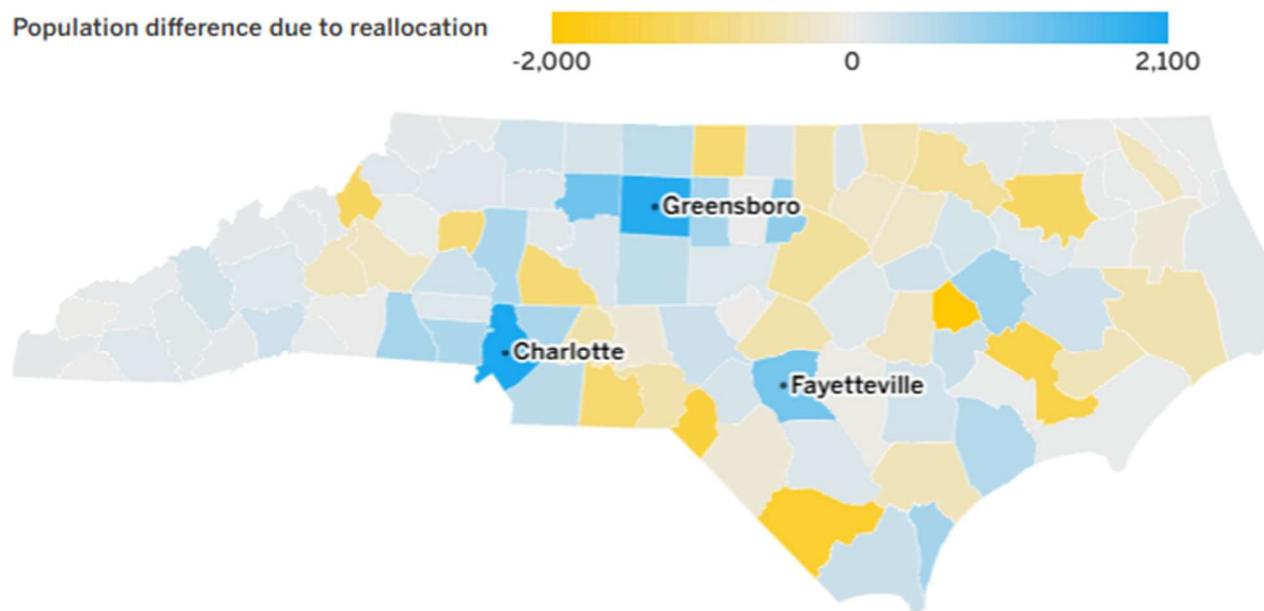
— Enacted plan • Simulated plan

Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

Figure A45

North Carolina County Population Changes Due to Reallocation of Incarcerated Populations



A.9 New Mexico

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Black Districts

Figure A46

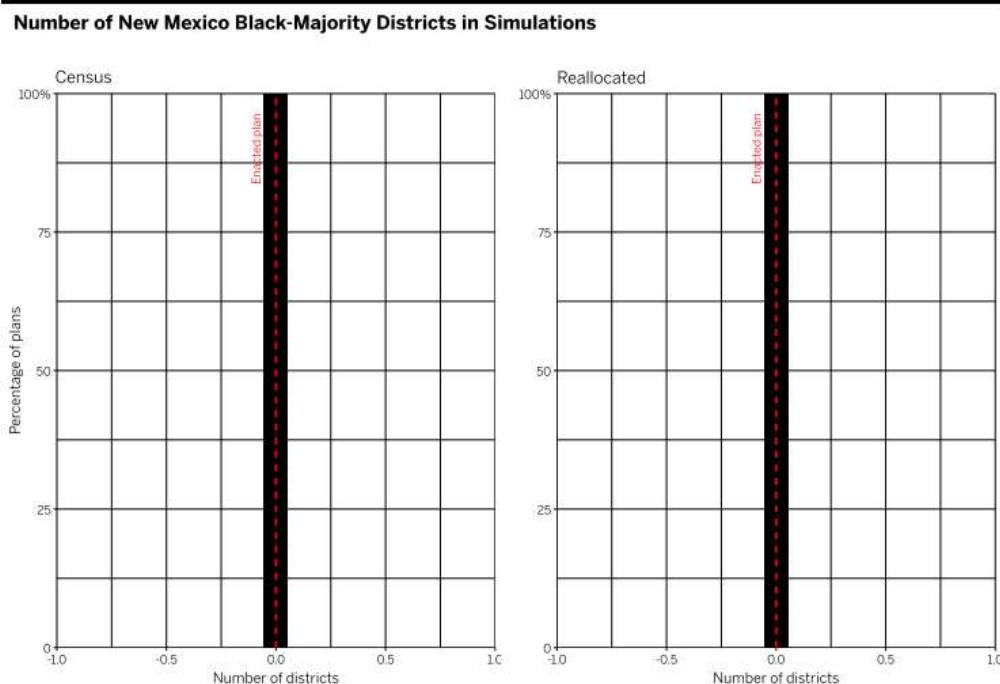
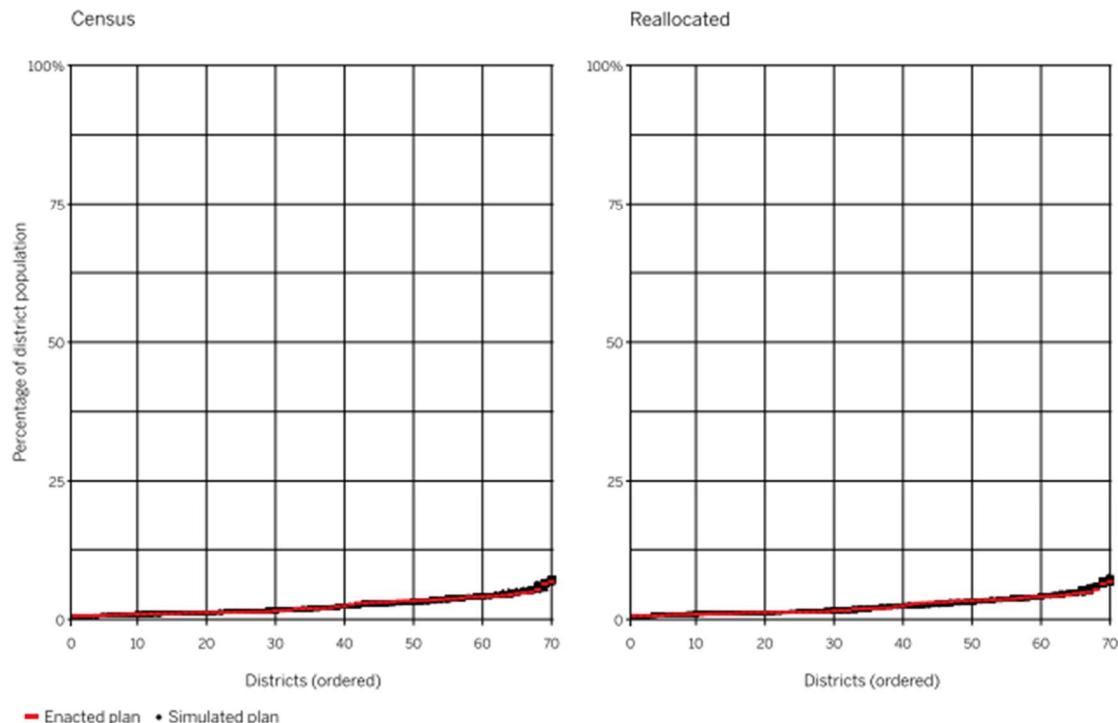


Figure A47

New Mexico's Black Population in Simulations Compared with Enacted Districts



— Enacted plan • Simulated plan

Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Latino Districts

Figure A48

Number of New Mexico Latino-Majority Districts in Simulations

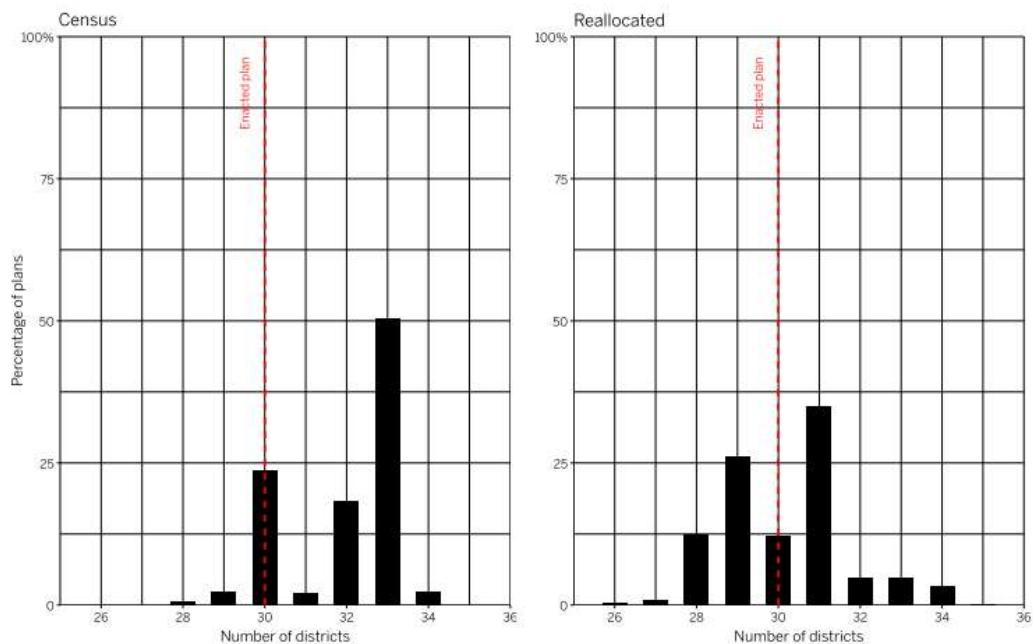
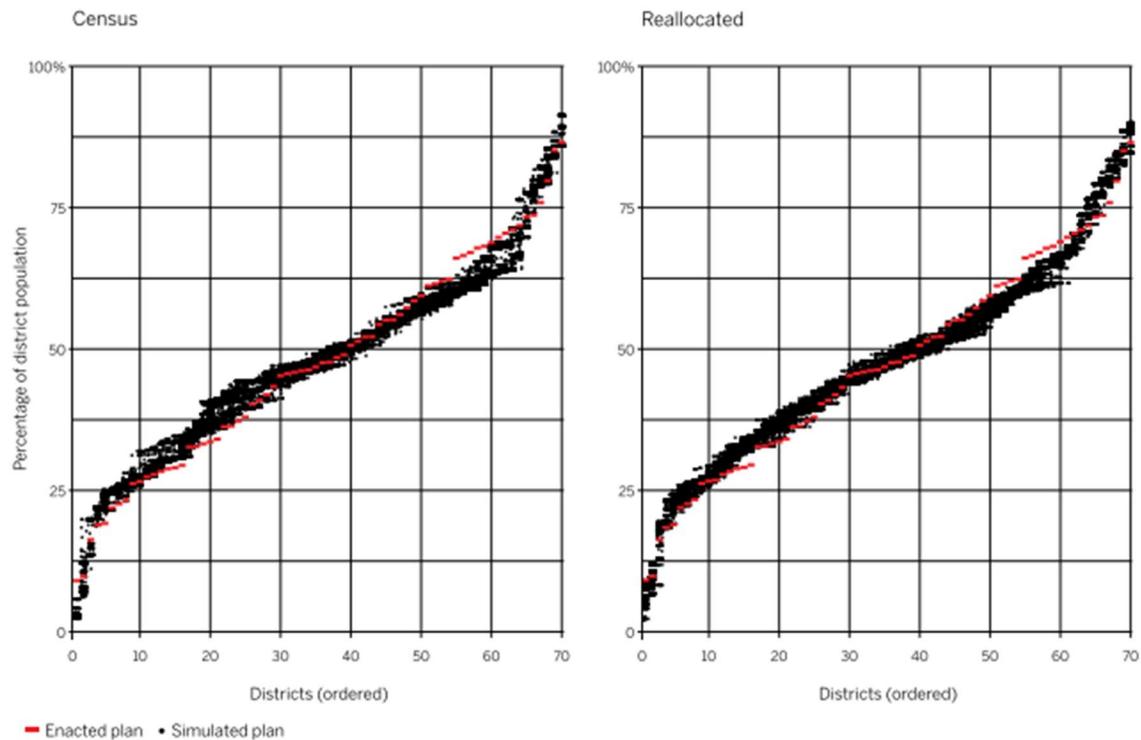


Figure A49

New Mexico's Latino Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Latino population percentage. Each dot represents the Latino population of a district in one simulation.

Democratic Districts

Figure A50

Number of New Mexico Democratic-Majority Districts in Simulations

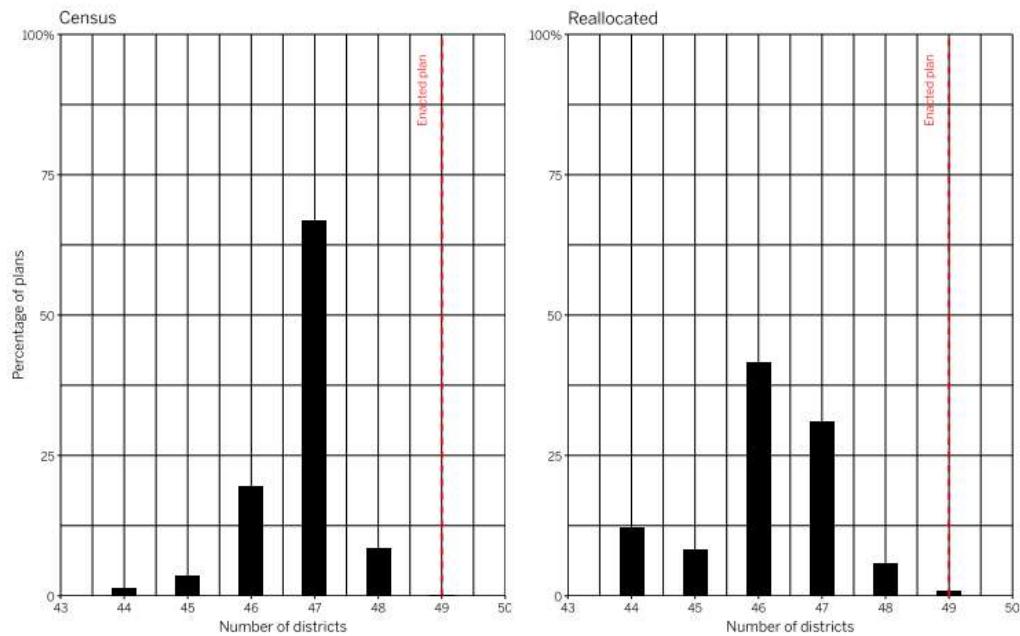
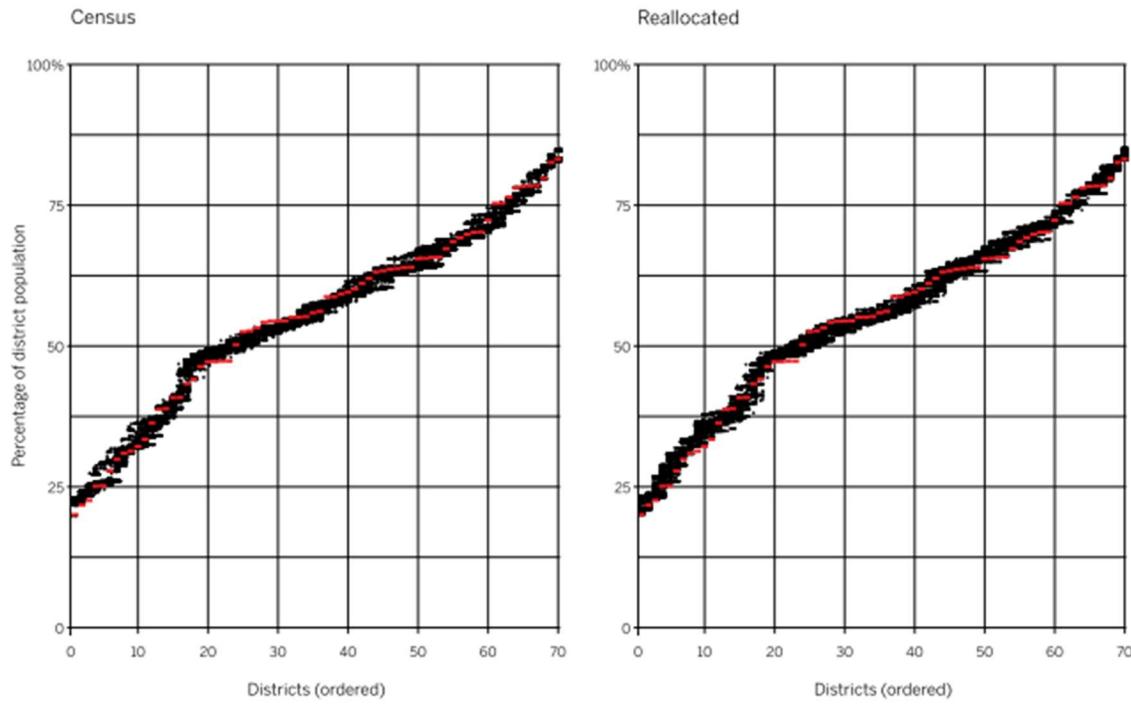


Figure A51

New Mexico's Democratic Population in Simulations Compared with Enacted Districts

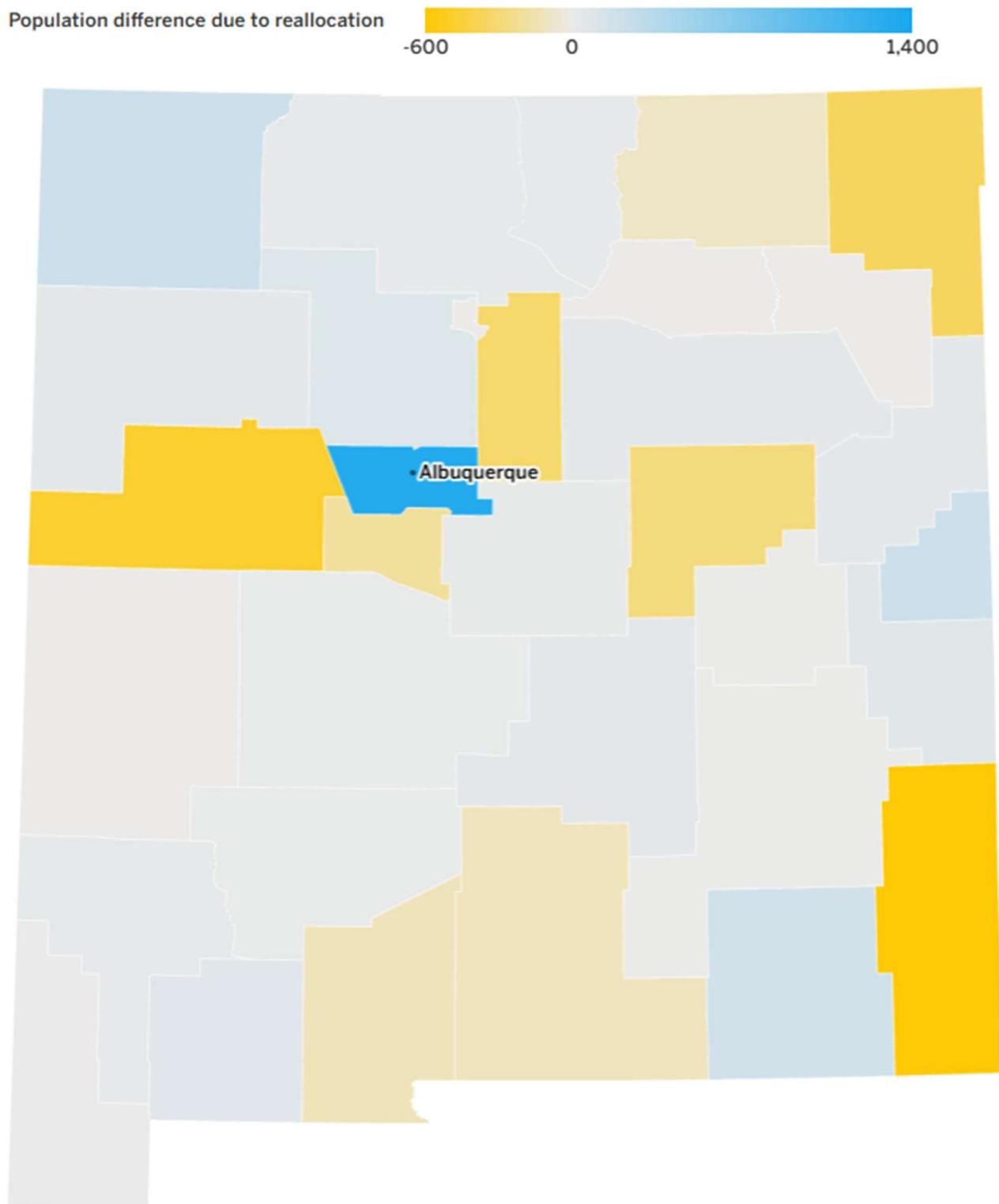


Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

Figure A52

New Mexico County Population Changes Due to Reallocation of Incarcerated Populations



A.10 Ohio

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Black Districts

Figure A53

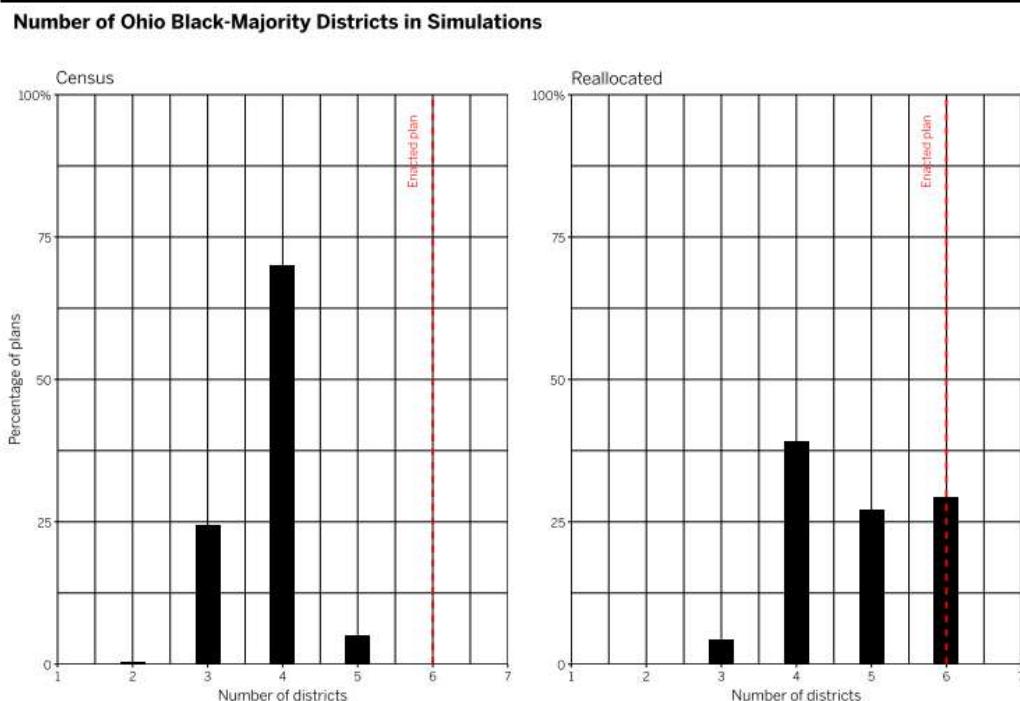
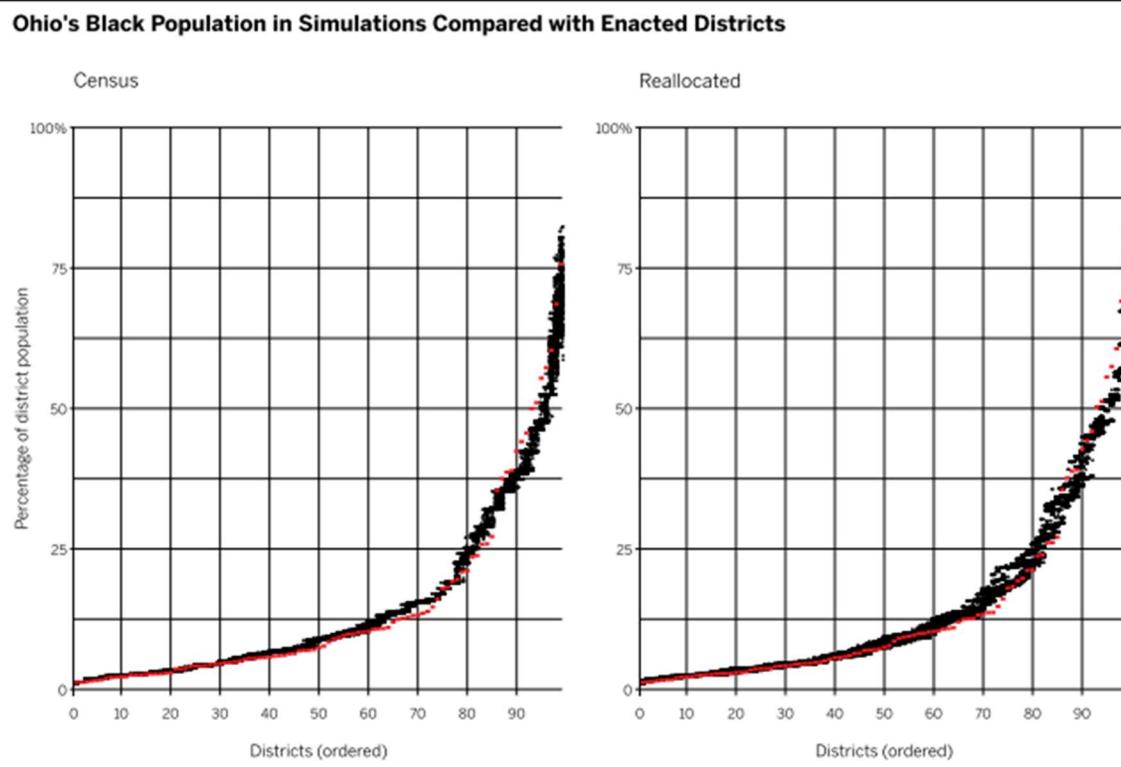


Figure A54



— Enacted plan • Simulated plan

Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Democratic Districts

Figure A55

Number of Ohio Democratic-Majority Districts in Simulations

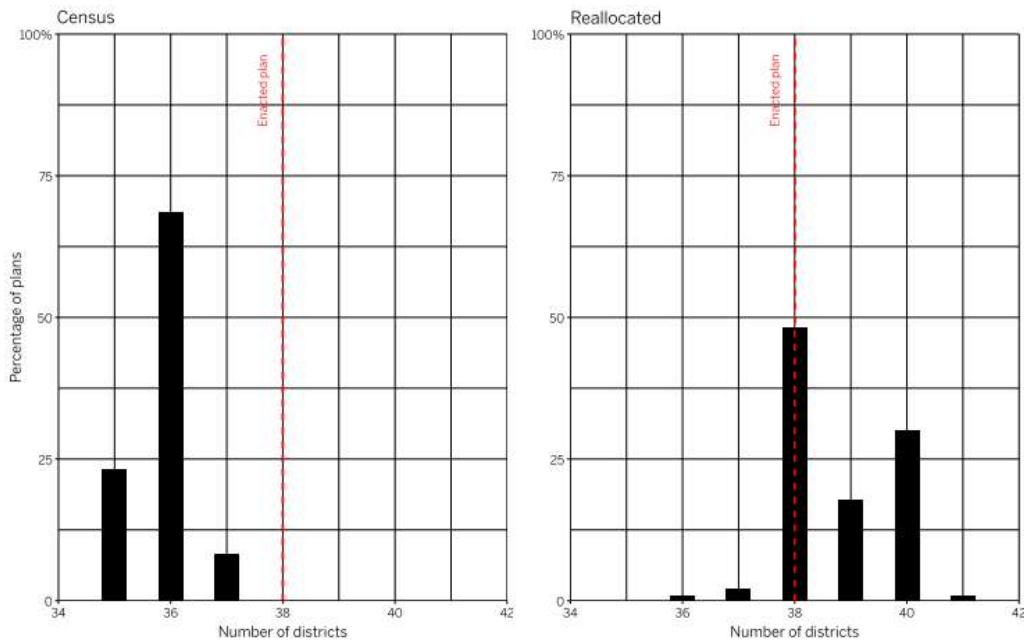
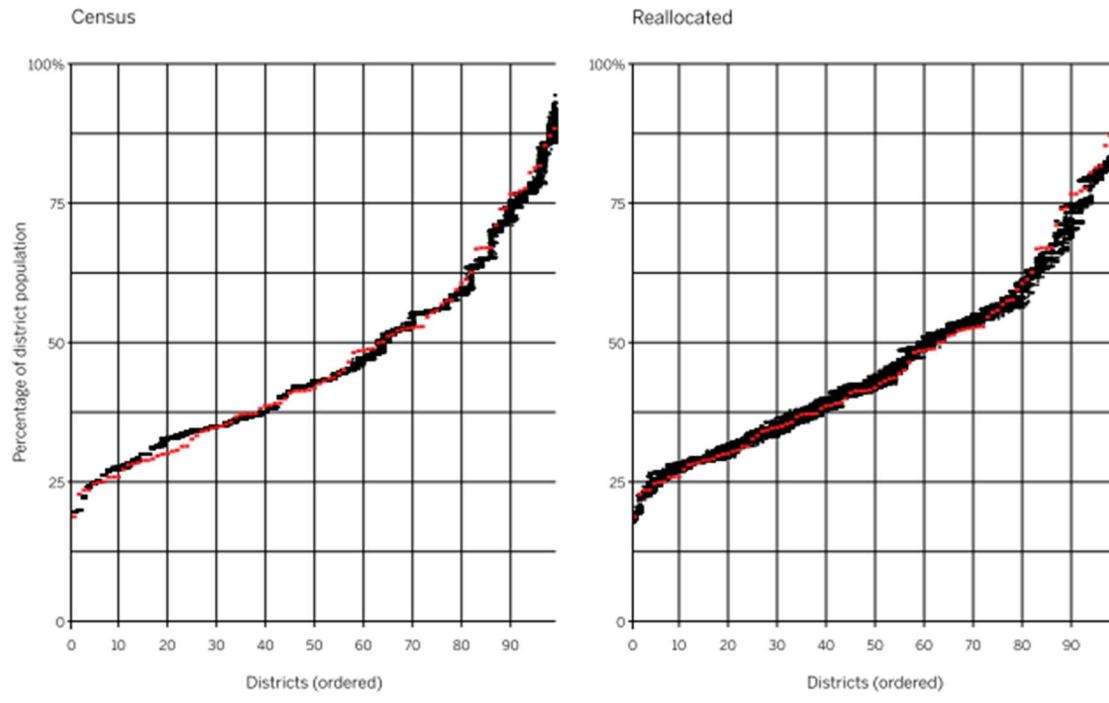


Figure A56

Ohio's Democratic Population in Simulations Compared with Enacted Districts

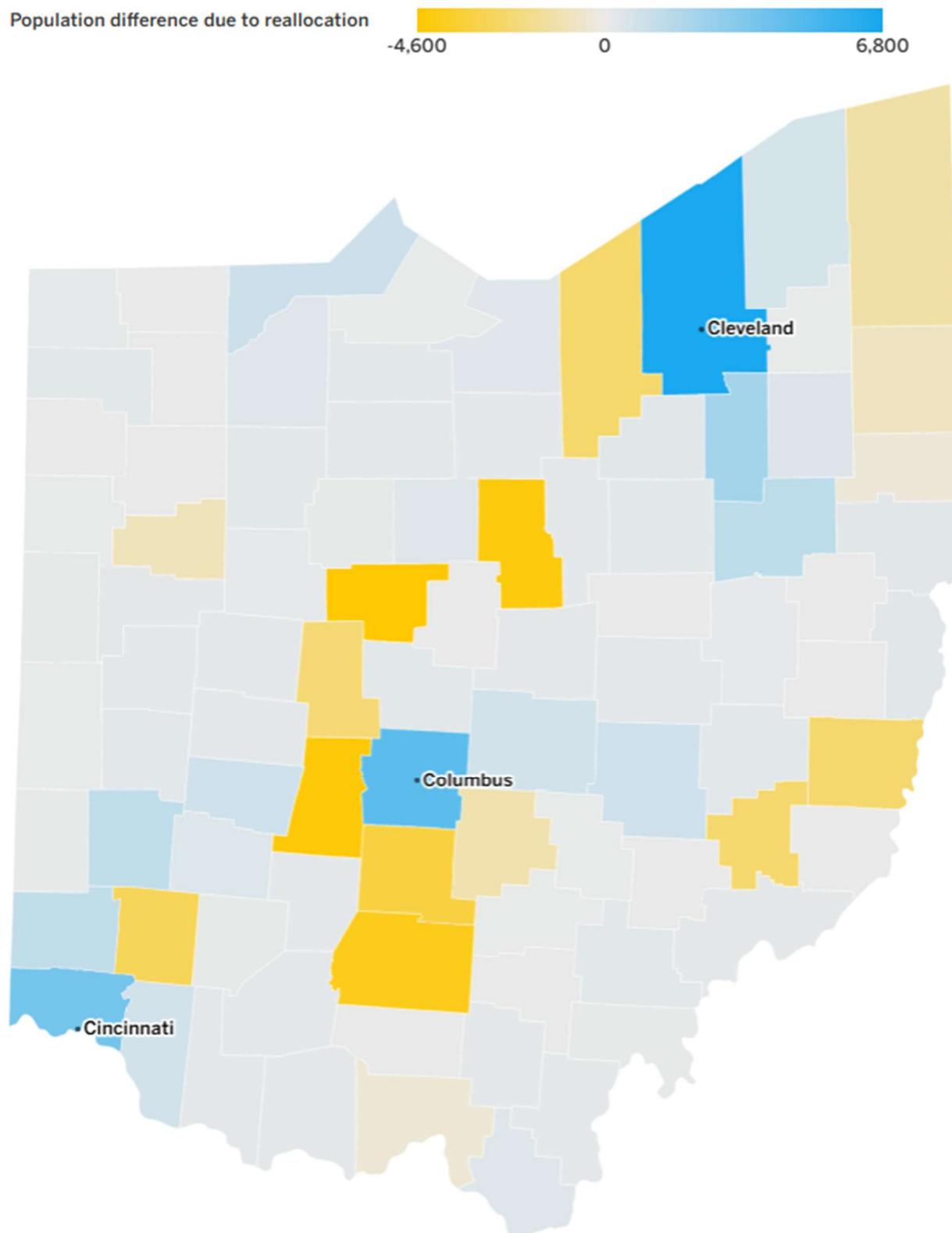


Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

Figure A57

Ohio County Population Changes Due to Reallocation of Incarcerated Populations



A.11 Texas

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Black Districts

Figure A58

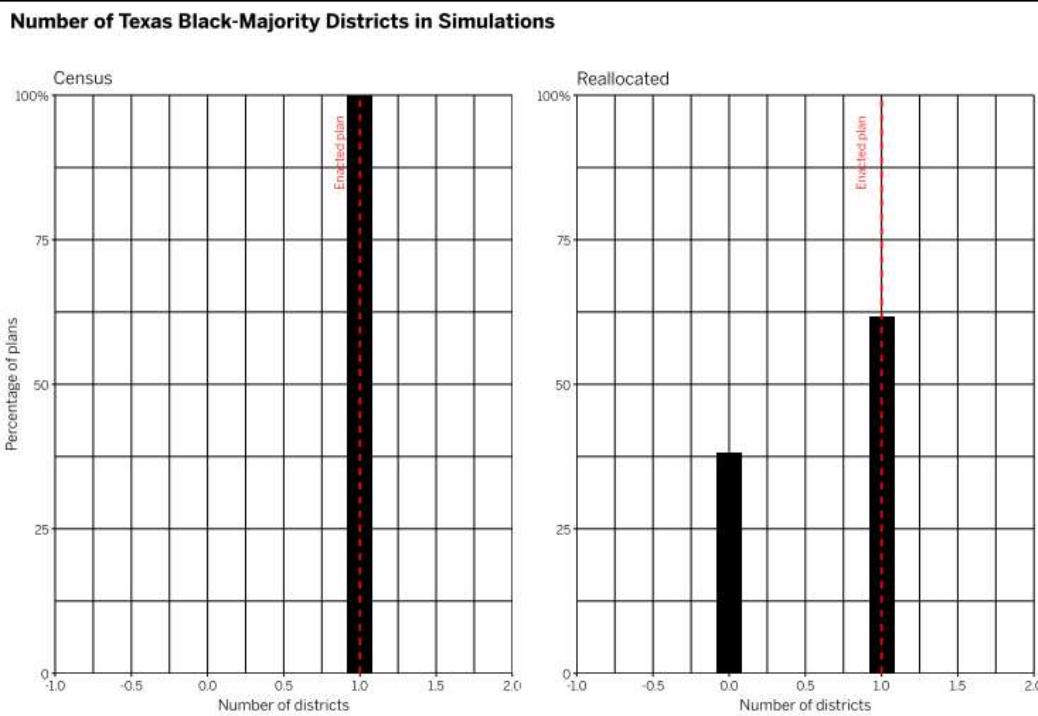
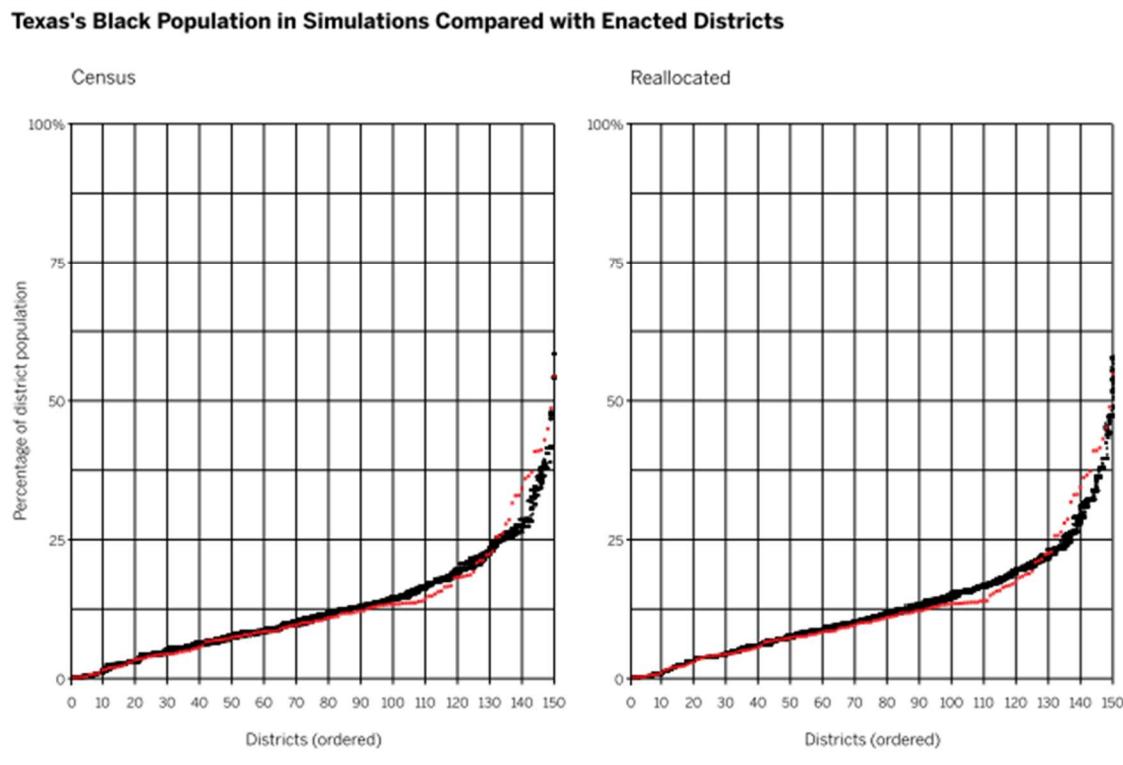


Figure A59



Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Latino Districts

Figure A60

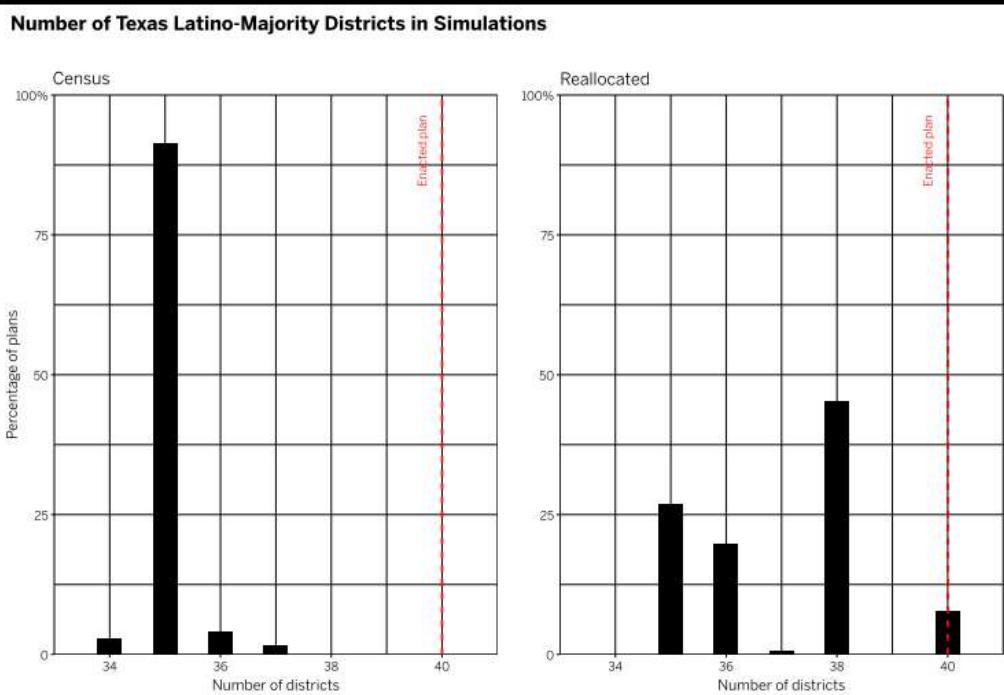
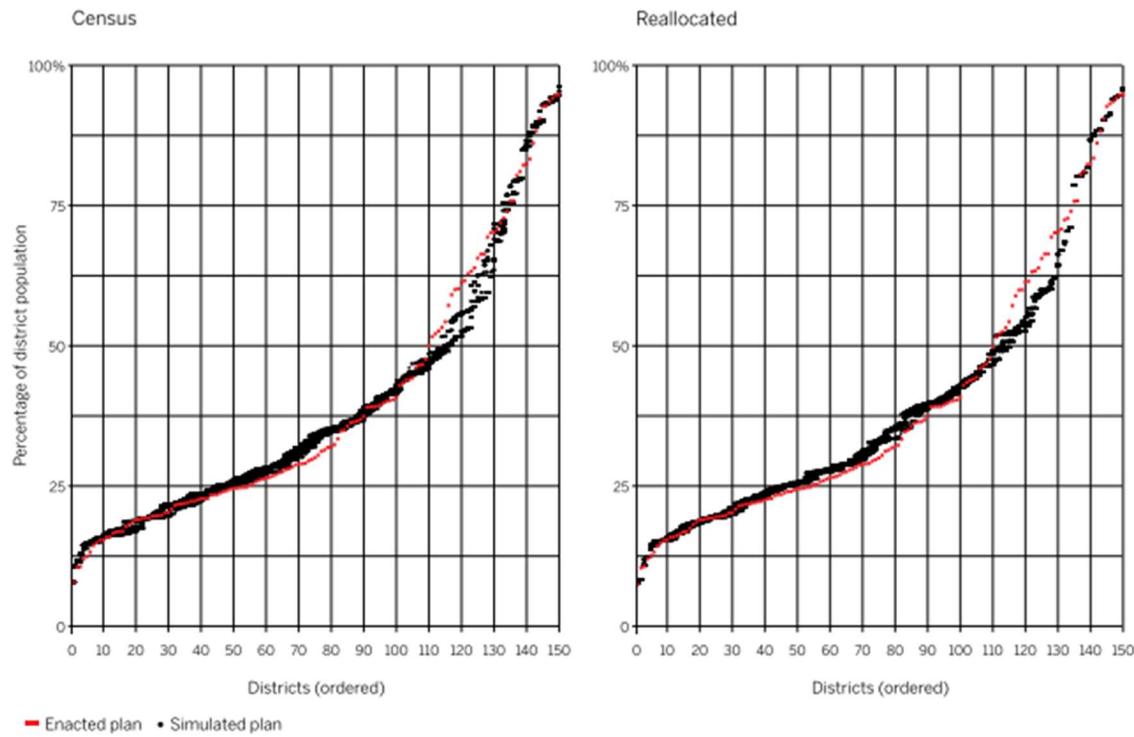


Figure A61

Texas's Latino Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Latino population percentage. Each dot represents the Latino population of a district in one simulation.

Democratic Districts

Figure A62

Number of Texas Democratic-Majority Districts in Simulations

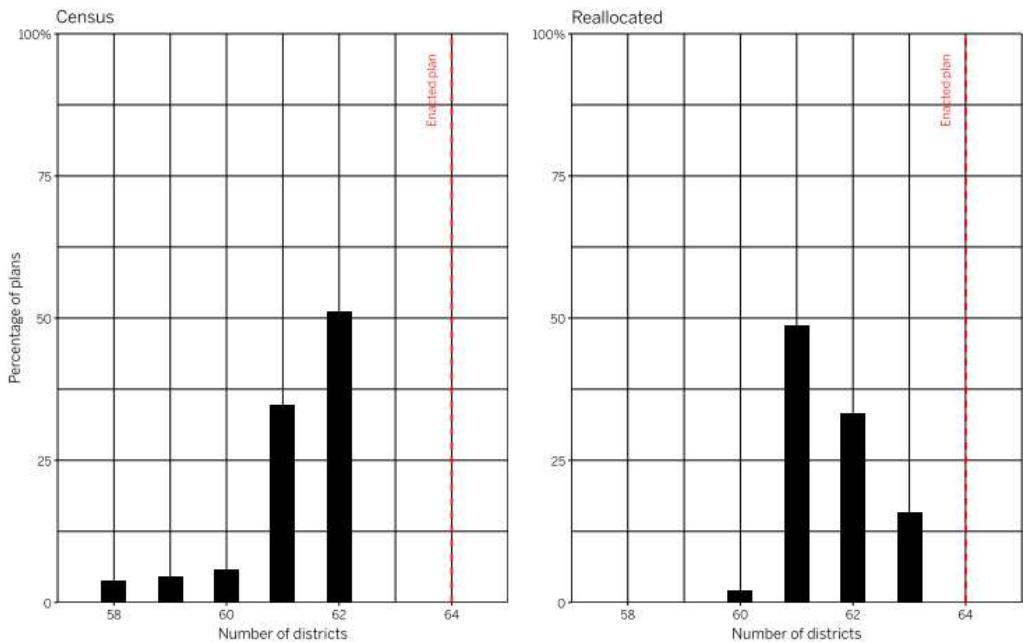
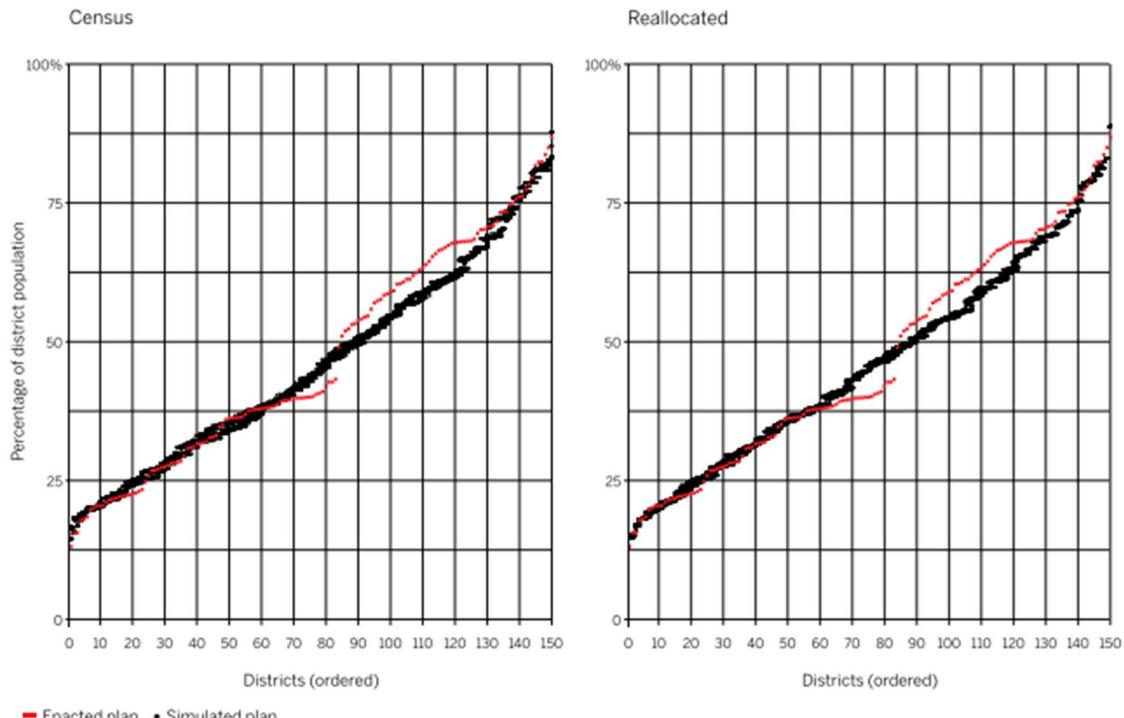


Figure A63

Texas's Democratic Population in Simulations Compared with Enacted Districts

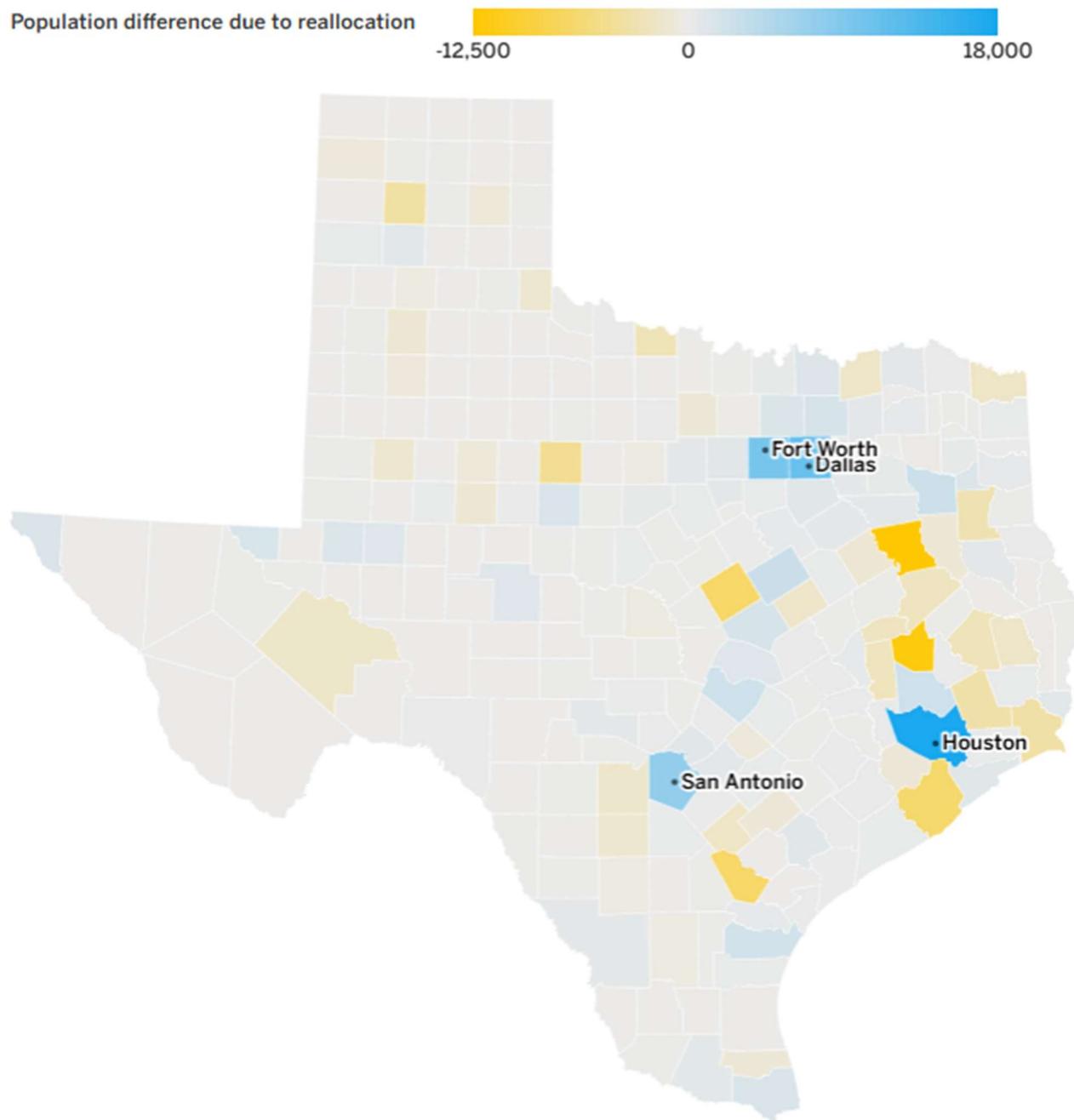


Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

Figure A64

Texas County Population Changes Due to Reallocation of Incarcerated Populations



A.12 West Virginia

Refer to Arkansas Black district graphs for explanations of how to read the graphs below.

Black Districts

Figure A65

Number of West Virginia Black-Majority Districts in Simulations

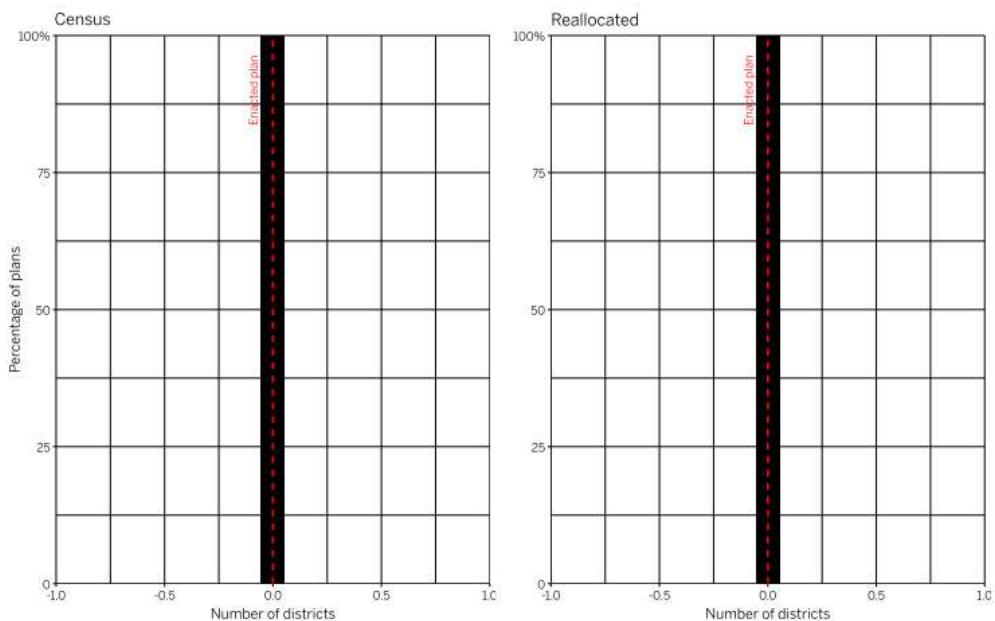
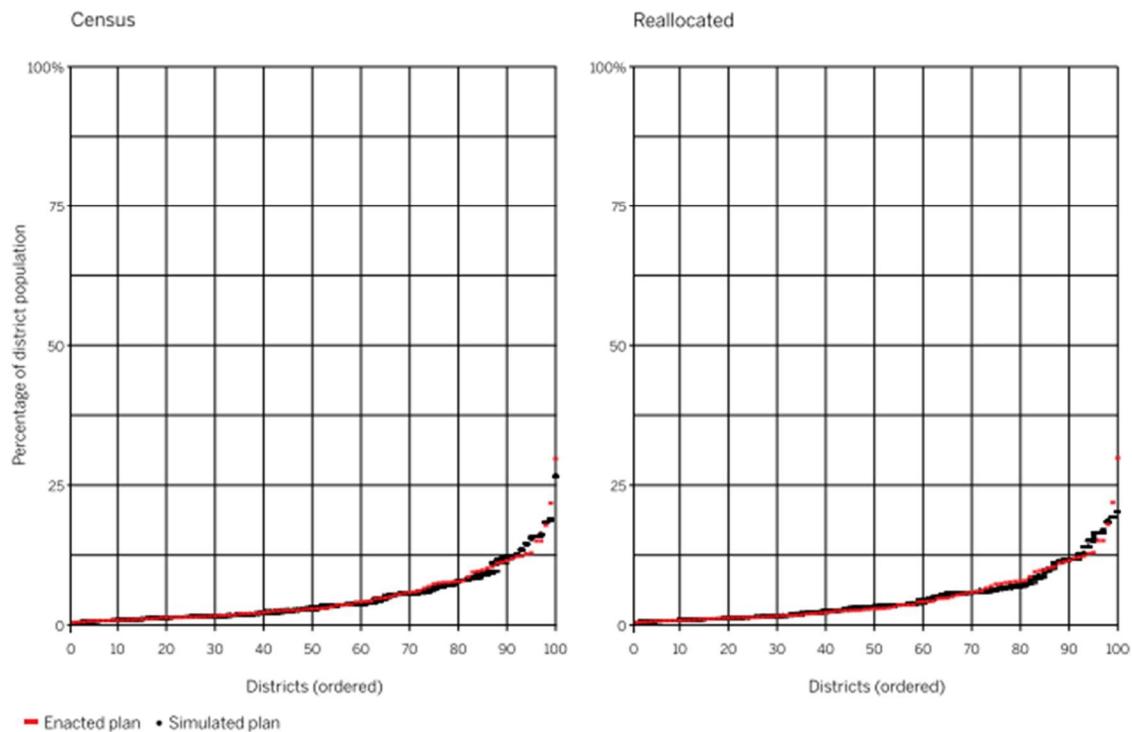


Figure A66

West Virginia's Black Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Black population percentage. Each dot represents the Black population of a district in one simulation.

Latino Districts

Figure A67

Number of West Virginia Latino-Majority Districts in Simulations

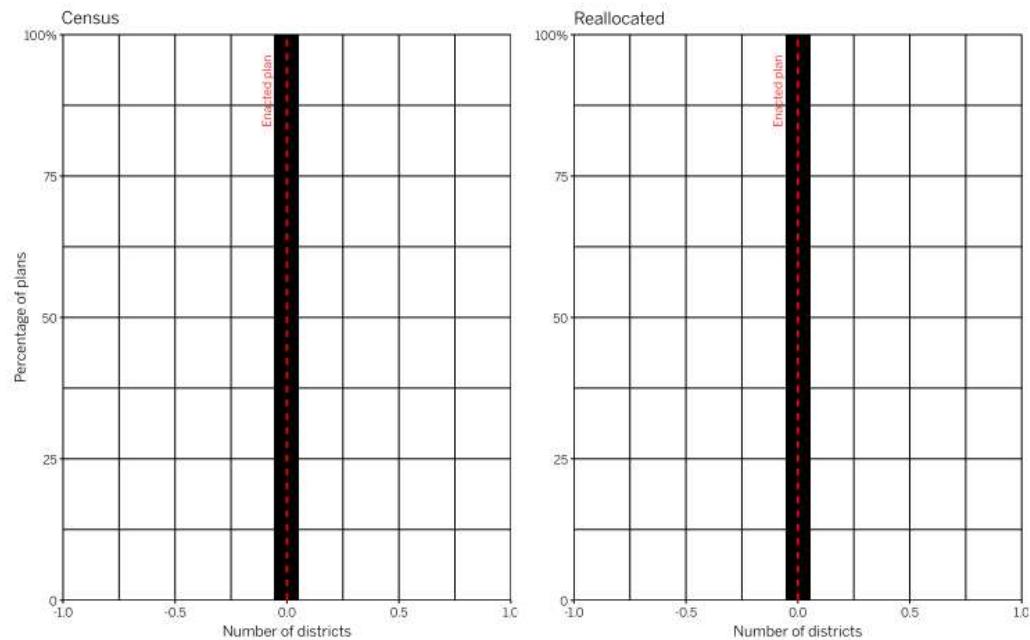
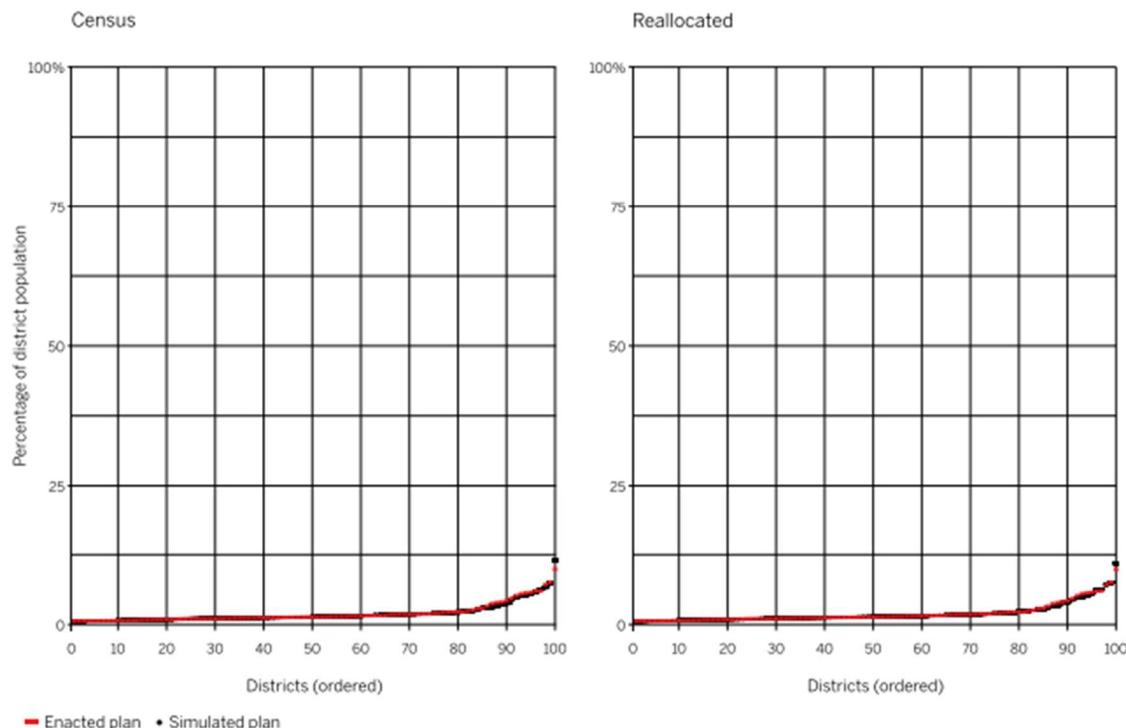


Figure A68

West Virginia's Latino Population in Simulations Compared with Enacted Districts



Note: The districts are ordered according to Latino population percentage. Each dot represents the Latino population of a district in one simulation.

Democratic Districts

Figure A69

Number of West Virginia Democratic-Majority Districts in Simulations

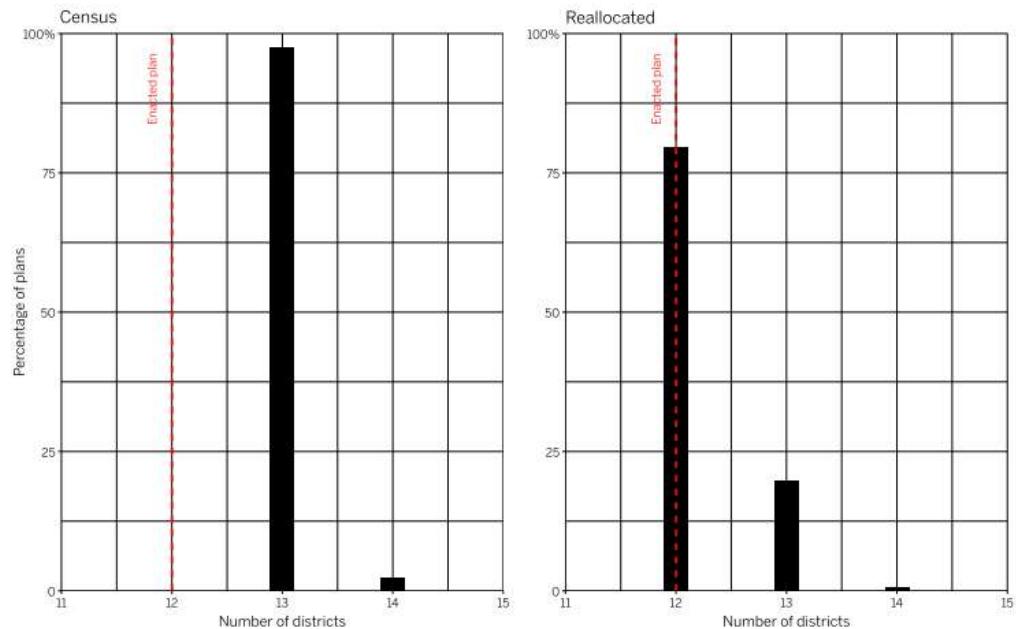
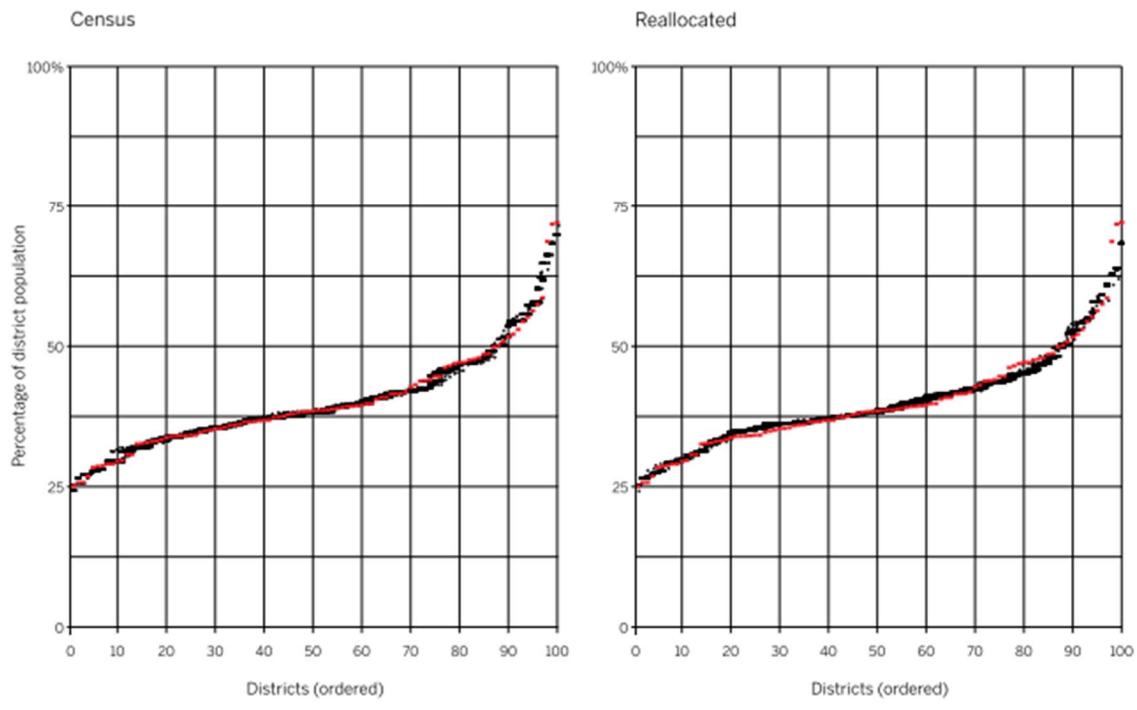


Figure A70

West Virginia's Democratic Population in Simulations Compared with Enacted Districts

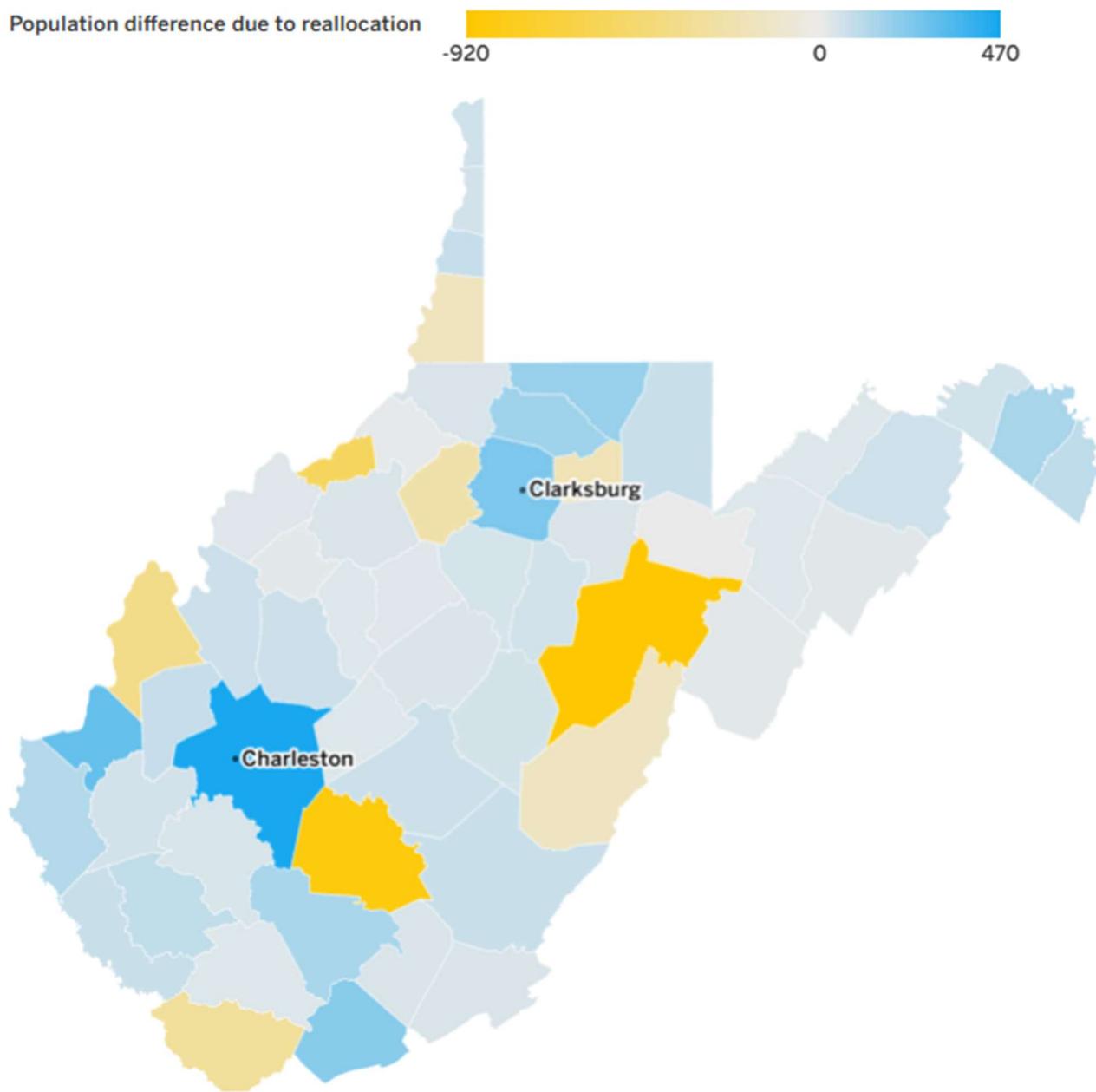


Note: The districts are ordered according to Democratic population percentage. Each dot represents the Democratic population of a district in one simulation.

County Population Change

Figure A71

West Virginia County Population Changes Due to Reallocation of Incarcerated Populations



Endnotes

¹ The full report can be found at <https://www.brennancenter.org/our-work/research-reports/prison-gerrymandering-distorts-representation>.

² Jowei Chen and Jonathan Rodden, "Tobler's Law, Urbanizations, and Electoral Bias: Why Compact, Contiguous Districts Are Bad for the Democrats," November 2009, 1, https://web.stanford.edu/~jrodden/chen_rodden_florida.pdf.