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New Lines, New Districts, New Representation: Institutional Impacts of Congressional Redistricting

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Abstract

How do decisions made by political institutions during the congressional redistricting process impact the representation of politically vulnerable groups in the United States? Using an original data set covering six decades of congressional redistricting plans, this paper finds that demographic minorities and the economically vulnerable are more likely to be shifted among congressional districts than the general population. Further, the magnitude of these shifts varies by redistricting institution, with the largest changes caused by partisan institutions. Demographic groups, including foreign-born and Black constituencies, are more likely to be shifted collectively, while economically vulnerable populations are more likely to be diffused throughout the state. These findings have normative implications for the quality of representation that politically vulnerable populations receive, and how different redistricting institutions prioritize mapmaking goals. This manuscript also presents an original dataset of historical redistricting trends, introducing an opportunity for future research on representations, underrepresented populations, and redistricting.

Keywords

redistricting, congressional representation

Each decade, following the U.S. Census, the Constitution requires House of Representatives seats to be reapportioned among the states. Subsequently, the legislative districts are redrawn by the states, with the goal of maintaining accurate representation as the dynamics of society change. Over time, requirements of equal population (*Kirkpatrick v. Preisler* 1969; *Wesberry v. Sanders* 1964), minority group protections (Voting Rights Act 1965), and changing populations have added to mapmakers' considerations of how, and where, to draw congressional boundaries. Substantial scholarly attention has been paid to the impact of reapportionment and redistricting on the distribution of partisan power in Congress, and on its implications for political elites, such as the behavior of members of Congress (Adler and Lapinski 1997; Bertelli and Carson 2011; Bowen 2014; Crespin 2010; Gamble 2007; Gelman and King 1994a; Hayes et al. 2010; Niemi et al. 1986). It's also well understood that institutions, parties, groups, and politicians can use these processes to enhance or protect their own power, such as through partisan gerrymandering or incumbent protection redistricting (Campagna and Grofman 1990; Erikson 1972; Gelman and King 1994; McDonald 2004; Stephanopoulos 2017). But what is less understood is how the politics of representation and the institutions of redistricting interact, and which Americans are most affected by changes.

At the congressional level, even small adjustments to the boundaries of districts can affect thousands of constituents in concrete ways—changing how votes are aggregated and where power lies geographically. Redistricting and reapportionment determine how constituents are grouped and represented relative to one another; who votes where, with whom and for whom; which groups compose majorities or minorities in each district; and how counties, cities and towns are grouped or divided among districts. Understanding these dynamics is particularly important for groups that have a history of

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underrepresentation, including racial minorities and those of low socioeconomic status (Gay 2001; Miler 2018; Tate 2004; Whitby and Krause 2001). In a country where opportunities of representation have been constrained for certain demographic and economic groups over time, understanding how—and who—these institutions influence has democratic implications (Mansbridge 1999; Minta 2020; Rouse and Swers 2013).

This paper evaluates the impact that reapportionment and redistricting have on voters and constituents, paying particular attention to racial minorities and the economically vulnerable that have been historically underrepresented in both descriptive representation and policymaking (Miler 2018; Schlozman et al. 2012; Tate 2004). Specifically, we consider how institutions responsible for redistricting utilize their role in the electoral process to enhance, or diminish, the power of electorally vulnerable populations. While previous scholarship has shown how reapportionment disproportionately impacts certain subgroups in the mass public (Gaynor and Gimpel 2021) and that variation in redistricting institutions correlates with variation in redistricting criteria (Campagna and Grofman 1990; Hayes 2024; Lindgren and Southwell 2014; Nelson 2023; Stephanopoulos 2017), we build on this scholarship to analyze how variation in the state institution responsible for redistricting impacts specific subgroups of the constituent population.

To do so, we use an original data that covers six decades of congressional reapportionment cycles (1970–2022) and capture variables such as state redistricting institutions, whether a state gained or lost a congressional seat during the reapportionment period, and subgroup district population shifts. We consider how five demographic populations are shifted around the state during this process: Black constituents, Foreign-born constituents, the unemployed, and constituencies from the agriculture and manufacturing industry. Not only are each of these groups measured across our historical timespan—allowing us to compare how institutions evolve over time—but more importantly, each of these groups have clear policy goals, juxtaposed against a history of underrepresentation in both descriptive and substantive terms (Mansbridge 1999).

Ultimately, we find empirical evidence of historical, consistent imbalance: vulnerable populations are particularly susceptible to district changes, and importantly, these changes are correlated with *specific redistricting institutions*. Partisan legislatures are the most likely to shift populations among districts in a state—either by packing populations into new congressional districts, or by removing populations out of districts and dispersing them throughout the state (cracking), while nonpartisan commissions and judicial rulings are more likely to maintain existing in-district groups. This is particularly felt for demographic minorities: In relation to the state's general population, Black constituents are more likely to be "packed" into districts by federal court action, while foreign-born constituents are most likely to see their congressional district change under all redistricting institutions, particularly when a state gains or loses a congressional seat due to reapportionment (what we refer to as a "dynamic" environment). The economically vulnerable—unemployed, blue-collar workers, and agricultural workers—are also susceptible to district change, even when there are no changes to the number of congressional seats in the state (which we refer to as a "static" environment). These substantial shifts are not mirrored in the general population, indicating that these are political and strategic decisions, made most often by partisan redistricting institutions.

This research has implications for not only understanding the decisions that redistricting institutions make, but the role that these decisions have on representation, particularly for underrepresented demographic groups. That certain groups—such as foreign-born and low-income Americans—are, in a sense, shuffled around more than other constituents, presents hurdles for their ability to petition the government. This research also presents another way to evaluate the priorities and considerations of the often behind-the-scenes, convoluted processes of congressional redistricting. And the longevity of this analysis—over six decades of congressional redistricting—offers greater depth in not only the history of state institutions, but the evolving electoral vulnerability of Americans. By systematically documenting how, and when, populations are shifted during the redistricting process, potential reforms can be better informed.

Below, we discuss existing research on redistricting and the role of congressional reapportionment on representation. We expect that political institutions, and their inherent goals of self-preservation via partisan advantage or reelection, will be more inclined to strategically move vulnerable populations than potentially nonpartisan institutions, such as independent commissions or federal courts. We then turn to our data, methodological analysis, and findings, including the presentation of a novel dataset of congressional redistricting from 1970 to 2022. Ultimately, the type of institution responsible for drawing congressional boundaries does impact how populations are moved (or not), and thus, the electoral representation that they receive.

Reapportionment, Redistricting, and Institutions

Under the Apportionment Act of 1941, states have 2 years following the U.S. Census to draw and implement new

House of Representative districts to reflect changes in the population. This law also capped total House seats at 435—as a result, states with high growth often gain a seat(s), while states with stagnant or slow growth can lose seats. Locations that have sustained growth of new populations are typically those granted additional congressional districts (Baumle and Poston 2019; Cowan 2015; Peralta and Larkin 2011), while places that have an aging population, racial segregation, poverty and reduced employment are correlated with the loss of a congressional seat (Quillian 1999; Wilson 2008). Thus, the congressional reapportionment process typically awards seats to states with growing and affluent populations, while taking seats from districts with manufacturing sectors, low-income populations, and high percentages of Black residents—especially in the 2000 and 2010 redistricting cycles (Gaynor and Gimpel 2021).

Although the Apportionment Act of 1941 outlines the formula to determine which states will gain or lose congressional seats based on the U.S. Census data, the decision of where to draw the new district lines is left up to the states.[1] When states lose a congressional seat, redistricting institutions are responsible for choosing which districts lose their representative, and when states gain seats, they select which populations are rewarded with additional representation. And while all states must adhere to the federal judiciary's interpretation of the 14th Amendment and Voting Rights Act requiring strict, equal district population for Congress (*Kirkpatrick v. Preisler* 1969; *Wesberry v. Sanders* 1964), and non-discriminatory racial districting (*Shaw v. Reno* 1993; *Thornburg v. Gingles* 1986), there is diversity in the state laws to which redistricting must adhere. Some state laws or constitutions require states to draw maps with compact districts or protections of communities of interest or political subdivisions. Some states require the redistricting institution to favor competition between the two parties or ban maps that favor one party or incumbent.

Historically, state legislatures have been in control of redistricting for congressional districts. Recently however, independent redistricting commissions have become more common, sometimes passed by popular ballot measures.[2] As of 2022, eight states required independent commissions for congressional redistricting (AZ, CA, CO, ID, MI, MT, NY, and WA) and three used politician commissions (HI, NJ, and VA). In the 2010–2012 redistricting cycle only four states used independent commissions. In the other 33 states with multiple congressional districts, state legislatures are responsible for redistricting, although some have advisory (IA, ME, UT) or back-up commissions (CT, IN, OH). States with only one congressional seat are not redistricted.[3]

Although states designate redistricting institutions to redraw their congressional districts, these institutions are not always who ultimately makes the final congressional map. In every redistricting cycle since the 1960s, state or federal courts have become redistricting institutions, drawing remedial plans for legislative districts that are ultimately used in elections. For example, a large majority of states had their congressional plans challenged in either state or federal court (or both) in 2000 (37 states) and 2010 (42 states).[4] In some instances, these challenges were rejected. In others, the initial redistricting institutions were required to make new plans, which were then approved by the courts. In others still, the courts drew or imposed redistricting plans themselves, becoming the redistricting institution for that state because its map was used in the election.[5]

This variation in institutional—and partisan—control of the redistricting process is important because research has shown that different institutions draw different districts. The clearest finding is that single-party control of legislative redistricting leads to less competitive districts, with a legislative map that favors their own party (Campagna and Grofman 1990; Erikson 1972; Gelman and King 1994; Hayes 2024; McDonald 2004; Stephanopoulos 2017). All other institutional arrangements—commissions, courts, bipartisan legislatures—are less partisan and districts are more electorally competitive than partisan-controlled legislatures on average (Carson and Crespin 2004; Carson et al. 2014; Cottrill and Peretti 2013; Lindgren and Southwell 2014; Nelson 2023). Independent commissions are likely to draw more compact districts, with more retained cores of previous districts and fewer split political subdivisions (Edwards et al. 2017; Grainger 2010) and maps made by divided or bipartisan legislatures may lead to incumbent protecting gerrymanders or court fights (McDonald 2004) as well as lower partisan favoritism (Stephanopoulos 2017). The variation in criteria favored by different redistricting institutions carries implications for group representation because each criterion emphasizes distinct group categories (Hayes 2024).

The results of these reapportionment and redistricting processes impact congressional representation and elite behavior. The composition of a congressional district impacts the actions of members of Congress: district populations can impact a representative's committee selection (Adler and Lapinski 1997; Frisch and Kelly 2004), policy positions and legislative sponsorship (Burden 2004; Glazer and Robbins 1985), roll call votes in the House (Bertelli and Carson 2011; Bullock 1995; Cnudde and McCrone 1966; Sharpe and Garand 2001), and their electoral strategies and fortunes (Carson et al. 2010; Mayhew 1974; McKee et al. 2006), among other behaviors. In short, decisions made during the redistricting process can have an impact on a range of legislative activity.

Reapportionment, Redistricting, and Mass Representation

The makeup of a district impacts constituents' experience, too. Although all population groups retain congressional representation when redistricting and reapportionment occur, shifts of populations can have substantial effects for how effectively people and interests are represented. One way to think about (and measure) representation is through the concept of groups—and how large (or small) a group is in a district will inherently impact the attention they are given by their member of Congress. For example, following the 2010 Census, despite no change in the number of congressional seats assigned to the state, California's redistricting commissions took on the redistricting process to reflect the internal movement of the state's population. These slight shifts in district boundaries drastically changed the demographic makeup of California's 17th district in Silicon Valley. In the 111th Congress, prior to redistricting, the district contained 174,819 foreign-born constituents, making up about 27 percent of the district's population. Following redistricting, in the 113th Congress, the foreign-born population made up 45 percent of California's 17th—almost doubling the size of the foreign-born population in the same district. This strengthens group cohesion or "packing" into the district, and the relative weight of this population group in the district means that their interests are more likely to receive interest for the legislator, because his or her electoral fortunes are connected to this group. For instance, Rep. Ro Khanna (D-CA), representative of the district, touts the diversity of the district, as well as his own immigrant upbringing, prominently on his website.[6]

But, if after redistricting, a population is dispersed throughout surrounding areas—as was the case for the foreign-born population in California's 47th district during this same redistricting period, this group can experience diminished political power. Following the 2012 redistricting period, despite covering the same major cities of Anaheim and Long Beach, the foreign-born population in California's 47th district declined by 18 percent, as these populations were diffused into neighboring districts, or "cracked." As a result of the boundary shifts, Latino Representative Loretta Sanchez (D-CA), herself the daughter of immigrants, ran in the neighboring district, and a new member, Rep. Alan Lowenthal (D-CA), a former Long Beach Councilmember, took her place. In this scenario, the district's representative is potentially less motivated to cater to them, due to both a lack of descriptive representation and personal connection, as well as inherent need to cater to other, larger constituencies. Even for legislators with demographic groups top of mind, new representatives will need to develop new expertise relevant to this population.

Thus, when population groups are redistricted from one district to another (or among others), the quality of their representation is at stake. A population's political power is tied to its role in the composition of the constituency and the voters (Fenno 1978; Hunt 2021). An increase in the size of a subgroup within a district does not strictly guarantee political power and representation for that group (Gamble 2007), but it does provide the potential for more power and effective representation. Legislators interested in their electoral fortunes will service the interest of key constituencies in a district. Additionally, changes to electoral processes—such as which district one votes in, or where a polling place is located—can increase the cost of voting for individuals, introducing further challenges to representation (Riker and Ordeshook 1968). In Congress, a legislator's own understanding of their district and constituencies may be related to the more static and entrenched populations in a district—those that are less transient in each decade's redistricting. Members of Congress have limited time and resources to dedicate to policy issues, and the population they represent impacts their legislative decisions (Miler 2010).

Redistricting and Politically Vulnerable Groups

Redistricting is unavoidably political (Cain 1985). It is an opportunity for political elites to manipulate electoral boundaries to alter the relative power of groups in both the district and in the legislature, such as partisan gerrymandering by state legislators. Group identity is an important factor for individual political behavior and group representation is an important aspect of representative government (Achen and Bartels 2017; Schattschneider 1960). Yet, decades of research have shown consistent bias in the representation of groups and their interests by elected officials. Groups with more resources, particularly those that represent economic interests and individuals with higher socioeconomic status, are better represented in Congress than other groups and group identities (Miler 2018; Schlozman et al. 2012). Likewise, race-based inequality has a long history in American electoral politics, and even the occasional institutional attempts to rectify representational imbalances has still resulted in minority populations being underrepresented in the federal government (Casellas and Leal 2011; Lublin 1997; Tate 2001).

In our analysis, we focus on five groups that have a history of underrepresentation descriptively and/or via substantive policymaking decisions (Mansbridge 1999): Black Americans, Foreign-born citizens, the unemployed, and constituencies from the agriculture and manufacturing industry. Each of these groups has the potential to be a

salient and powerful constituency within a given district, connected to group-specific policy preferences, yet face challenges in coalition building and political responsiveness in a way that moneyed interests may not. Further, these groups are geographically dispersed across the United States, allowing us to consider the effect on these groups over time and across states. Given the importance of group identity in American political behavior, we wanted to account for potential group identities beyond the partisan identities that are so often the focus of redistricting scholarship. Lastly, these groups present a methodological benefit: they are captured in Census data over the course of our dataset, allowing us to consistently compare the redistricted movement of population relative to the district population at large.

Black voters and residents are critical groups in American politics and have frequently been impacted by reapportionment and redistricting over the past 60 years. Black constituents have been at the center of major gerrymandering disputes over this time period, often in federal court cases related to the Voting Rights Act of 1965. Research has found that Black voters are particularly liable to gerrymandering (Canon 1995; Canon and Posner 1999). Court cases about reapportionment and redistricting often focus how redistricting institutions treat race, and groups of Black constituents specifically, questioning if communities being maintained or divided by new district lines (*City of Mobile v. Bolden* 1980; *Shaw v. Reno* 1993; *Alexander v. South Carolina State Conference of the NAACP* 2024; and *Louisiana v. Callais* (ongoing at time of writing)). Black constituents have also been historically underrepresented in politics, only recently achieving congressional representation proportional to the national population (Burgat et al. 2025; Tate 2004).

Yet, despite (and in large part, in response to) a history of electoral prejudice and representational inequity, Black voters have become an important constituency for the Democratic party (Frymer 2011; Key 1955). Today, Black voters overwhelmingly support Democratic candidates. The national Democratic party, too, relies heavily on the support of groups such as the Congressional Black Caucus or prominent Black leaders for both electoral, policy-making, and public support (Canon 1995; Griffin and Newman 2019). This dynamic has in part been facilitated by the creation of majority-minority districts. Majority-minority districts, almost all of which are represented by minority candidates, have a positive effect on not only improving Black representation in Congress, but increasing the likelihood of Black turnout (Barreto et al. 2004; Highton 2004; Swain 1993). As a result, Black constituents represent a group in redistricting that can be both electorally powerful, particularly for Democratic representatives, or vulnerable to vote dilution—potentially both "cracked" and "packed."

Foreign-born constituents, which are defined by the U.S. Census Bureau as anyone who is not a U.S. Citizen at the time of birth, are also susceptible to redistricting changes.[7] Like Black voters, foreign-born populations are descriptively underrepresented in the federal legislature. Similarly, related substantive policy provisions related to immigration and foreign status are politically salient, as immigration remains one of the most polarizing public policy issues of the twenty-first century. Yet, at the same time, foreign-born groups are an indicator of high-growth population districts, particularly in the last two decades (Gaynor and Gimpel 2021). This tension has vexed candidates of both parties, who are eager to cater to high-growth areas, but are challenged by the polarizing nature of immigration policy—all of which is exacerbated by the lack of substantial experiences and often, political knowledge of these groups. Foreign-born populations also vary in their electoral involvement, with some communities representing a powerful, cohesive voting bloc while others are mainly non-voting constituents (Barreto 2005; Goldsmith and Holzner 2015). This tension presents opportunities and challenges in redistricting—again, presenting potential for strategic "packing" or indifferent "cracking."

Also at risk for representational volatility in the redistricting process are the economically vulnerable. Perhaps by more than any other metric, the U.S. Congress is particularly unrepresentative of economic demographics: Today, the average net worth of a member of Congress is five times that of the average American citizen (Hawkings 2018). Research by Kristina Miler (2018) has found that this descriptive imbalance is further exacerbated by the upper-class accent of political participation, with the average member of Congress believing their district to be wealthier and whiter than reality. Yet, a robust history of blue collar and farm worker unions also presents historical variation in their representative power. While low-income voters are one of the most underrepresented groups in terms of interest groups or substantial representation, consistently high turnout makes working class voters a powerful electorate (Carnes 2018; Schlozman et al. 2012). Yet, opposite the foreign-born, these groups face electoral challenges that arise with representing declining blue-collar sectors and areas of high unemployment. The "rust-belt" area of the United States has seen consistent declines in the number of apportioned seats, particularly in the last four redistricting cycles (Gaynor and Gimpel 2021).

These groups also face policy challenges beyond socioeconomic status. Blue-collar workers, often representing manufacturing industries, are often impacted by trade policies, regulatory policy, and other national legislation. Likewise, agriculture workers, as members of a declining industry but also particularly reliant on

government assistance via crop and equipment subsidies, also act as a special interest in Congress. Given both the electoral and policy implications of these economic groups, these constituents benefit from having an outsized presence in their district. While the political malleability and economic vulnerability of "Obama-Trump voters" has received outsized attention by political scientists and politicians alike (Carnes and Lupu 2021; Reny et. al 2019), how they are treated in terms of redistricting is unknown. Thus, we seek to understand how—or if—redistricting institutions treat the understudied demographics of the economically vulnerable, captured as the unemployed, blue-collar workers, and agricultural, and if this has changed over time.[8]

All together, these populations capture several important qualities of economics and policy, party, and geographic mobility—and the type of redistricting institution that draws the new district map will have different goals, and effects, on the composition of the constituency when choosing which population groups to shift and condense.

Theory: How Institutions and Congressional Reapportionment Impact Populations

Where legislative district lines are drawn—and where congressional seats are added—matters. But despite documented implications of the congressional district makeup on quality of representation, there has been little work connecting the role of redistricting environments and institutions to affected populations. Redistricting institutions are distinct from one another, and different institutions create distinct maps, drawing lines and dividing districts in different ways (Cottrill and Peretti 2013; Hayes 2024; Lindgren and Southwell 2014; Nelson 2023). Because of this, we expect disparate impacts on certain populations—both institutional factors and group-level demographics will impact the movement of populations in and out of congressional districts.

First, we expect that (H1) the institution responsible for redistricting will dictate the outcome of redistricting. Specifically, we expect that the political incentives and legal constraints of legislatures will have a more volatile effect on populations than courts and commissions, given the partisan (and likely self-serving) nature of state legislatures charged with drawing their own maps, compared to the courts' and commissions' proclivity towards the status quo.

If partisan goals are driving redistricting decisions, minority groups present strategic opportunities to "pack" or "crack" their political power. Thus, we expect that (H2) partisan institutions will be more likely to shift minority groups in strategic ways, compared to the rest of the population. We expect Republican legislatures to be more likely to strategically dilute the demographic groups, as they are more consistently Democratic voters. Conversely, under Democratic-majority legislatures, Black voters, who are often assumed to be safely democratic (White and Laird 2020), may be used to create politically safe or minority-majority districts within a state ("pack") for Democratic lawmakers. The policy challenges of foreign-born populations, and the economically vulnerable voters, the unemployed, blue collar and agricultural worker, as well as their lack of relative judicial protections[9] also make them susceptible to seeing their district change, given their history of underrepresentation and related policy challenges. We expect partisan legislatures to be less attuned to their demands, ultimately "cracking" their power across state districts as they focus on other areas of partisan gain.

Yet because research has already shown these groups to be inherently affected by the reapportionment process, often in epicenters of population growth or decline (Gaynor and Gimpel 2021), we also take into consideration whether a state is "dynamic" or "static." Rural areas and the rustbelt region of the U.S. continue to suffer from population loss, leading to a consistent decrease in congressional seats over the past several decades, while foreign-born populations spread throughout the high-growth areas of the Sun Belt. Thus, (H3) we expect these temporal factors to be reflected in congressional redistricting, with greater shifts under dynamic environments.

Data and Methods

To evaluate how populations are shifted during redistricting, we develop an original dataset that contains archival demographic and political information about every congressional district from 1970 to 2022, and variables on the state's institutional and reapportionment environment. Our dependent variable is population change, and we capture specific populations that research has shown to be particularly susceptible to purposeful redistricting—minority populations and economic groups.

To create this variable, we take the difference in district populations directly before the redistricting cycle (years ending in "0"), and directly after (years ending in "2").[10] The population prior to reapportionment (years ending in zero) are the populations that state mapmakers use when evaluating districts. The populations after reapportionment are the districts after a new map has been implemented.[11] Although there is domestic migration between districts and states (Borjas et al. 1992), as well as natural population gain as birth rates continue to exceed death rates, because our data compares population

changes over a short amount of time (2 years) any natural changes will have only a slight impact (Gaynor and Gimpel 2021). Furthermore, by capturing the population directly before and after redistricting, we are capturing the population observed by mapmakers, as well as the intended population changes for the updated districts.[12] While we lack some historical data on specific populations, for the most part we were able to collect information on the demographic and economic makeup of congressional districts over time. This is a simple, but effective way to evaluate how the boundaries and population being represented by a member of Congress have changed.

In addition to capturing the net change of a population in a district, we also capture change in the percentage of the district's population for each of our groups of interest: Black, foreign-born, unemployed, blue-collar, and agriculture constituents. This approach allows us to compare the likelihood that institutions opted to move demographic minorities and the economically vulnerable compared to the net population. Because populations—minority and otherwise—are not equally dispersed throughout the country, we take the signed natural log of the change in the percentage of the minority population for our analysis. Given that there are negative shifts (i.e., a decrease in the share of a population in a district), the signed natural log approach allows us to maintain this negative-to-positive spread. Model results using the net population change in groups of interest can be found in the Appendix.[13]

Districts that are removed or added following reapportionment are not included in the dataset (as there is no population to compare to). However, populations in removed districts are still distributed around the state to other districts in a new map—and new districts are made up of populations from pre-existing districts. Thus, whether a state lost or gained congressional districts will obviously impact the populations of the rest of the state's district. We include a dichotomous variable for whether the state lost or gained districts during the census reapportionment period (dynamic), allowing us to control for the impact of dynamic reapportionment environments. We also remove any single-seat states from our dataset, as there is no federal redistricting occurring. The result is an original dataset with 2,500 entries, across six decades of congressional reapportionment.

We pair our variables of district population change with state-level variables of redistricting institutions. Using archived editions of Congressional Quarterly, we collected detailed information for which institution drew the map that was used in the election. Often, either state legislatures or commissions are tasked with the responsibility of redistricting from the outset, but partisan gridlock and legal challenges can lead to alternative or remedial redistricting options, such as plans drawn by the federal courts, state courts, back-up commissions or the governor. As Figure 1 indicates, there is variation among years—many states, initially relying on the legislatures to develop congressional maps, turn to commissions or the courts in later years, and then back to legislatures again. The most recent redistricting period is dominated by GOP legislatures.

Our dataset includes six categories of institutions that determine the redistricting plan: Democratic-majority legislatures, Republican-majority legislatures, split-party legislatures, commissions, state courts, and federal courts.[14] While states are ultimately responsible for the redistricting institution they utilize, federal courts require a critical caveat: they are only involved in redistricting

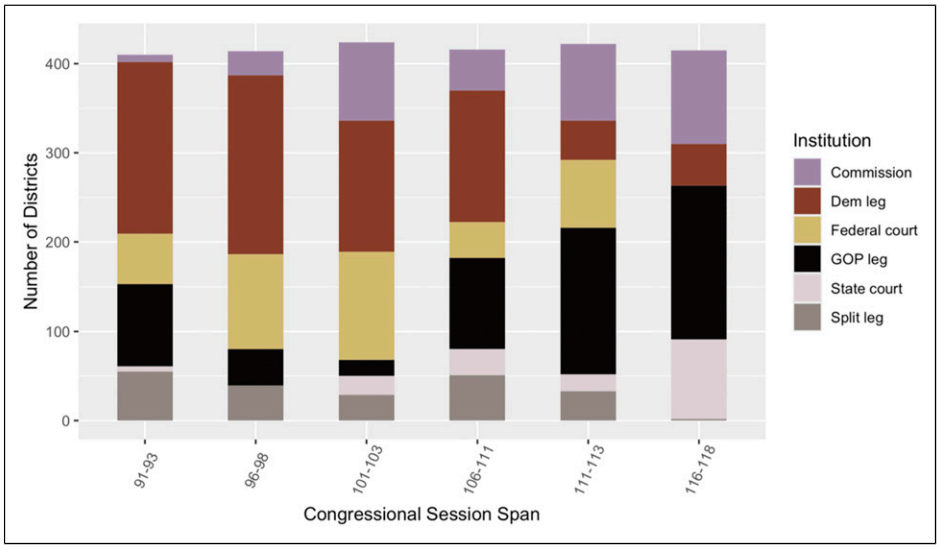

Figure 1. State institutions responsible for mapmaking, 1970–2022.

when there is a violation of federal law. Often, although not exclusively,[15] the violation of law may involve the Voting Rights Act and Black group representation. These variables are merged with the district-level information, allowing us to apply regression analysis on our variable of interest: population change following redistricting.

Results

We find little descriptive evidence that a state's static or dynamic redistricting status alone impacts the likelihood net changes in and out of districts. Across our time period (1970–2022), dynamic states change the population of each district by 59,529 on average, while static states change their average district population by 55,284 on average. As visible in Figure 2, population shifts are largely consistent across redistricting periods whether or not a state gains or loses a seat, with dynamic states having on average, greater net population change.

To evaluate the impact of redistricting institution and reapportionment environment on population change, we first run a linear regression model that compares net population change in all congressional districts for each redistricting period. The log-transformed net change of the population in Table 1 serves as a baseline for district change, and aids with interpretation of the log-transformed percentage change in the following tables. Redistricting institutions are the main independent variable of interest, represented as dichotomous variables. We also control for whether a state is static or dynamic, as well as fixed effects for the year of redistricting, which allows us to capture environmental shifts—such as post-Voting Rights Act requirements. We also include a control for former-Confederate states, given these areas' history with race-based voting discrimination.

A positive result indicates that more people were collectively shifted into a new district than not and likely reflects mapmakers trying to keep a group together—whether that be a demographic neighborhood or a manufacturing hub (i.e., "packing" populations into a given district). A negative result indicates that more people were diffused throughout other districts in the state (i.e., "cracking"). Lack of statistical significance indicates that population shifts were likely relatively balanced, some populations were moved in and out of districts, but there were no measurable collective shifts. While this metric is somewhat blunt—for instance, there is no way to know if a collective shift into one district is negated by a collective shift from another district—it does capture statistically significant patterns correlated with categories of redistricting institutions. Statistically significant findings are notable—there is an inherent bias towards stagnant population change, as even the most politically mapmakers must comply with requirements to prevent malapportionment.

Because we rely on the net change in a population, the results in Table 1 can be interpreted as a direct estimate of how many people are likely to be moved under a given institution, controlling for state and temporal dynamics. Table 1 indicates few statistically significant patterns of net population change by redistricting institutions. Rather, environmental factors play the biggest role in net population shifts. As expected, dynamic states that have gained or lost a seat are more likely to pack around 4,400 people into new-to-them districts: filling new districts and rehoming constituents who have lost districts requires strategic movement. There is also variation by

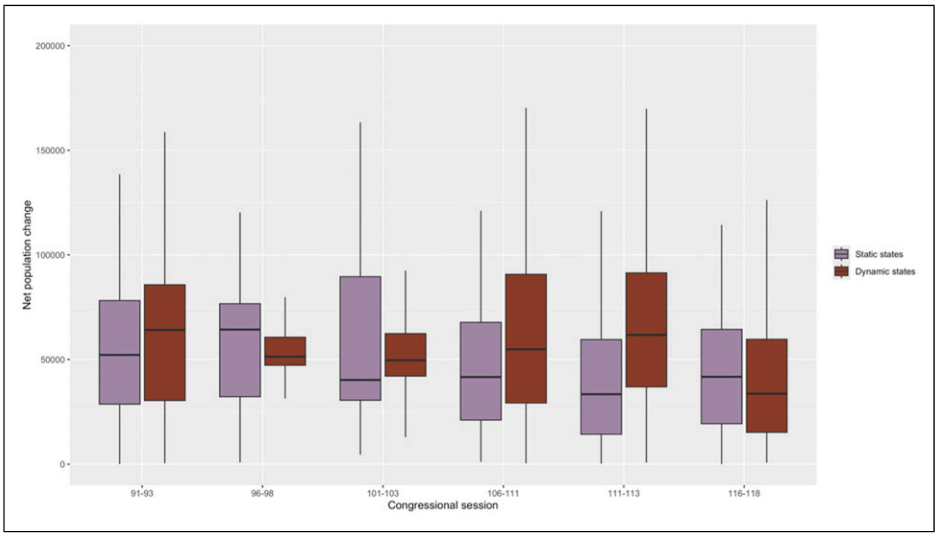

Figure 2. Average net population change in district during redistricting, 1970–2022.

Table 1. Net population changes under redistricting

	Dependent variable	
	Population change, raw	Population change, signed log-transformation
Dem legislature	−1,349.321	−0.098
	(3,402.611)	(0.067)
GOP legislature	−4,118.218	−0.090
	(3,347.918)	(0.066)
Split legislature	−3,054.903	−0.041
	(4,287.216)	(0.084)
Federal court	−6,091.158	−0.043
	(3,715.774)	(0.073)
State court	274.641	−0.003
	(4,522.639)	(0.089)
Dynamic state	4,443.114**	0.196***
	(1,978.657)	(0.039)
Former confederacy	3,389.241	0.093**
	(2,205.448)	(0.043)
1970 redistricting	−1,436.172	−0.110
	(3,400.666)	(0.067)
1980 redistricting	−8,157.179**	−0.013
	(3,306.919)	(0.065)
2000 redistricting	−1,756.731	−0.134**
	(3,332.721)	(0.065)
2010 redistricting	−6,430.910*	−0.286***
	(3,392.553)	(0.067)
2020 redistricting	−13,202.430***	−0.502***
	(3,593.078)	(0.071)
Constant	61,889.150***	10.738***
	(3,502.097)	(0.069)
Observations	2,500	2,500
Adjusted R^2	0.008	0.042

Note. *$p < .1$; **$p < .05$; ***$p < .01$. Redistricting commissions and the 1990 redistricting period serve as the baseline categories.

redistricting session: the two most recent redistricting periods, 2010 (111th–113th Congress) and 2020 (116th–118th Congress) are significantly more likely to crack populations across the states.

To test our theory—that we expect population groups with a history of disenfranchisement or a lack of representational power to be shifted more during the redistricting process than the general public—we run five linear regression models to predict the change of a demographic populations' share in the district, measured as the change in the percentage of the net population shift (signed log-transformation). A positive coefficient indicates that the group's share of net change increased (on a log scale), and a negative coefficient indicates a decreased share. Substantively, given the baseline population and the raw population shifts (Table 1), we estimate that a one-unit shift translates to a shift of around 5,000 individuals, with exponential growth with each unit.[16] Table 2 presents these results.

While no institution has a significant effect on the net population shift, it's clear that not all constituents are treated the same in redistricting. First, considering Black constituents: somewhat unexpectedly, partisan legislatures neither pack nor crack these populations, but federal courts are more likely to "pack" Black populations (likely into majority-minority or "influence" districts) compared to the rest of the population, at significant and substantial rates. Again, because federal courts only step in when the redistricting institution has violated federal law, we recognize this creates complications for exogeneity. But in real-world terms, these findings suggest that the federal courts boost the relative size of Black groups in the congressional districts they make, likely in comparison to districts that were drawn and led to a lawsuit. In contrast, state courts are more likely to diffuse Black voters among districts.

There are also historical considerations are also at play: former-Confederate states are more likely to pack Black populations into districts at both statistically significant and substantive levels. In former-Confederate states, the Black population accounted for 3.79 more points (signed

Table 2. Percent of district change under redistricting by population, 1960–2022

	Dependent variable: % change in share of population change				
	Black	Foreign-born	Unemployed	Blue collar	Ag workers
Dem legislature	0.836	−6.205***	0.180	−0.360	−4.270***
	(1.299)	(1.138)	(1.164)	(0.944)	(1.219)
GOP legislature	−0.240	−9.002***	−0.570	−2.131**	−4.369***
	(1.278)	(1.120)	(1.180)	(0.929)	(1.182)
Split legislature	−0.680	−7.053***	0.713	−3.428***	−3.017*
	(1.637)	(1.433)	(1.510)	(1.190)	(1.561)
Federal court	3.470**	−4.253***	1.075	−2.103**	−4.217***
	(1.419)	(1.242)	(1.248)	(1.031)	(1.276)
State court	−3.160*	−12.019***	−3.035**	−3.392***	−10.101***
	(1.727)	(1.513)	(1.496)	(1.255)	(1.609)
Dynamic state	2.318***	6.577***	1.105*	−0.005	0.344
	(0.755)	(0.662)	(0.661)	(0.549)	(0.697)
Former confederacy	3.793***	−3.314***	−1.926**	−0.444	2.313***
	(0.842)	(0.737)	(0.753)	(0.612)	(0.790)
1970 redistricting	−0.878	−2.573**	−9.282***	8.949***	−10.853***
	(1.298)	(1.137)	(0.944)	(0.944)	(1.109)
1980 redistricting	−1.423	1.467	5.579***	16.268***	−8.997***
	(1.263)	(1.105)	(0.906)	(0.918)	(1.074)
2000 redistricting	3.009**	13.015***		4.929***	
	(1.272)	(1.114)		(0.925)	
2010 redistricting	9.895***	9.770***		1.889**	−12.322***
	(1.295)	(1.134)		(0.942)	(1.110)
2020 redistricting	19.963***	12.316***	23.511***	0.465	−13.268***
	(1.372)	(1.202)	(1.041)	(0.997)	(1.189)
Constant	79.854***	79.692***	74.965***	76.979***	77.787***
	(1.337)	(1.171)	(1.127)	(0.972)	(1.199)
Observations	2,500	2,498	1,659	2,500	2,084
R^2	0.152	0.188	0.451	0.171	0.115

Note. *$p < .1$; **$p < .05$; ***$p < .01$. Results are changes in the signed log-transformation of net population changes. Redistricting commissions and the 1990 redistricting period serve as the baseline categories.

log-transformed) of the total change (an estimate of around 16,000 people, per district, on average). Black populations are significantly more likely to be shifted in recent redistricting cycles. Under the 2010 and 2020 redistricting cycle, Black populations accounted for nearly 10 and 20 points of net population change—significant substantial demographic shifts.

Of any group, Foreign-born constituents are most likely to be affected during the redistricting process—yet these shifts do not appear to be driven by net population change alone. While Foreign-Born populations are likely to increase under dynamic states—indicative of their role in high-growth areas (Gaynor and Gimpel 2021)—redistricting institutions are far more likely to crack their voting power across the state. GOP-controlled legislatures and state courts are particularly likely to divide this group, decreasing the share of the foreign-born population in a district by an average of 9 and 12 points of log-transformed net share, respectively (an estimated 19,000 and 23,000 people, respectively). And again, former-Confederate states are more likely to decrease the share of the foreign-born population in a district.

The effect of redistricting on our economic subgroups varies. Only state courts have a significant impact on the unemployed and are more likely to diffuse these populations around the state. District change for unemployed citizens are more likely driven by environmental factors: packed into congressional districts under dynamic settings (likely reflective of a state losing a congressional district) and during more recent redistricting periods. Former-Confederate states diffuse these populations around the state.

Blue collar and agriculture workers are overall more subject to change: Blue-collar workers are more likely to be cracked under all institutions, except for Democratic legislatures—yet, this shift appears to be driven by latter redistricting periods, as the earlier cycles in our data (1970, 1980) indicate that blue-collar workers had more

collective power as they were packed into congressional districts. Trends of agriculture workers' power in the district reflects larger trends of the declining industry: as time progresses, agriculture workers see their relative share of the district decrease.

To put these shifts in perspective, Figure 3 highlights the breadth of variation in constituency movement. While the scope of change is in large part due to the size of the population (i.e., there are more foreign-born constituents than agriculture workers), the direction of the shift is reflective of purposeful cohesion ("packing") or diffusion ("cracking").

But perhaps more importantly, is the variation of population shifts by *institution*. Black constituents are more likely to see significant, positive effects during redistricting under federal courts—indicating they are more likely to be "packed" into districts in these environments and perhaps illustrating the power of the VRA. Yet, these population groups are largely unchanged under partisan-controlled and split legislatures. The most consistently, negatively affected group are foreign-born constituents. Under every institution, foreign-born populations are more likely to see their relative power in a district diminish, as they are "cracked" throughout the state. This is most egregious under GOP legislatures and decisions made by state courts. Economic groups are also subjected to potential institutional preferences. Individuals in the manufacturing and agriculture industry are more likely to be negatively affected under GOP legislatures, and federal and state courts. While the foreign-born population is overall larger than that of economic groups, and in several cases, the Black population, this alone does not explain the substantive shift this group is facing. This model captures what percentage of district population change is made up of these subgroups—as such, the relative size and statistical significance of the foreign-born shift across institutions is notable.

While dynamic states were more likely to shift populations around the state (out of inherent necessity), these shifts pale in comparison to the changes that demographic minorities face under redistricting. And even in dynamic environments, our work has found that populations are not treated the same during redistricting. Demographic minorities and the economically vulnerable are more likely to see their district boundaries change than the average constituent. We also find that much of these shifts are driven by specific institutions. While we expected partisan legislatures to shift all demographic minorities, partisan legislatures were no more likely to affect Black constituents, largely maintaining these groups compared to state and federal courts. Foreign-born constituents face negative movement out of a district under every institution, and this effect is particularly substantive under GOP legislatures and state courts. Given that our economic indicators are increasingly correlated with population decline (and thus the loss of a congressional seat), the changes in population for blue-collar workers are also notable. GOP-

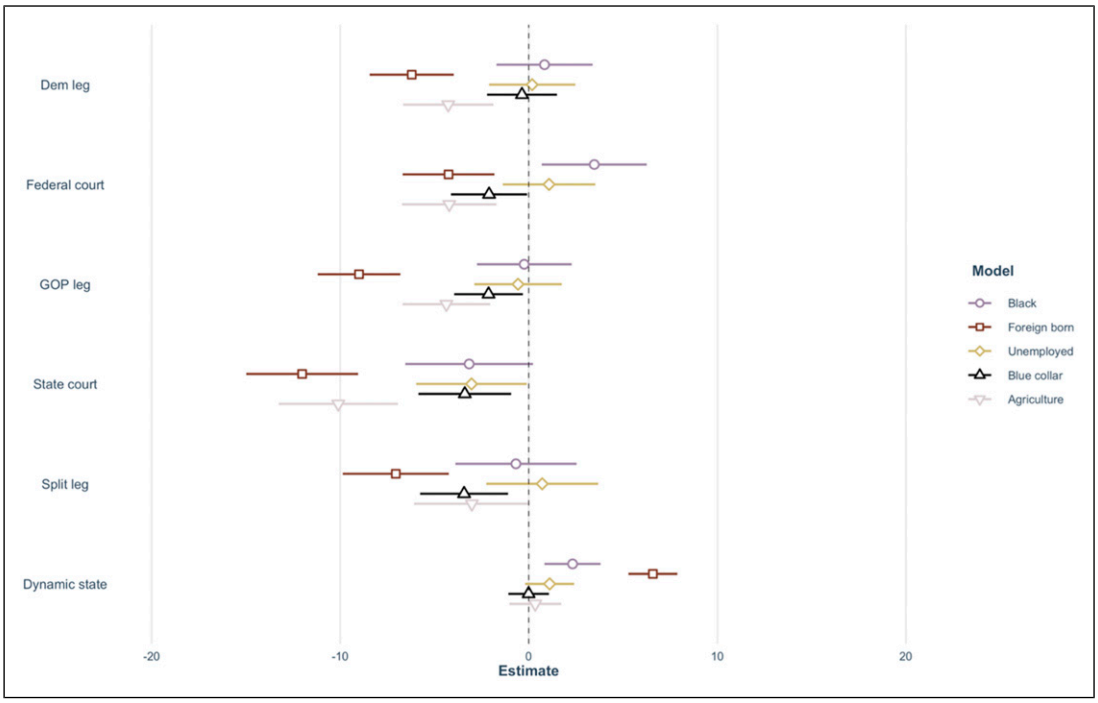

Figure 3. Coefficient plot of state institutions on demographic and economic population shifts, 1970–2022.

run legislatures and split legislatures are more likely to shift these populations even when a new map is not necessary, while Democratic legislatures shift these groups to a less substantive degree.

Our results also indicate that temporal effects matter greatly: the volume of redistricted populations increases on average, over time, particularly for Black constituents in the most recent redistricting cycle. These recent shifts were particularly substantive for Black constituents in the 2020 redistricting cycle. An average of nearly 50,000 Black constituents were moved into a new district ("packed") during this time period. Reflective of this, the seven most sizeable Black population shifts across all time periods all occurred during the 2020–2022 redistricting cycle. In three of the states (Mississippi, Louisiana, and Alabama), the shifts were egregious enough to invoke legal challenges.[17] All three of these new maps were drawn by GOP-controlled legislatures. This finding adds to growing academic research about how the end of Section 5 Preclearance in the Voting Rights Act impacts redistricting and Black constituencies (Stephanopoulos et al. 2024).

Foreign-born constituents are also significantly likely to be shifted in recent redistricting cycles, particularly during the 2000 and 2010 redistricting period. While this modern trend reflects their growing share of the U.S. population (Gaynor and Gimpel 2021), the emphasis of the earlier 2000s period is perhaps reflective of their political standing at the time. There is also evidence that historical wounds are still immensely relevant, as former-Confederate states are more likely to "pack" Black constituents. This is exemplified by the court disputes following the 2020 redistricting period. This increasing volatility of minority voters following a post-VRA stay echoes prior work on the waning power of judicial rulings and institutional rules (Hayes and Gaynor 2024), and raises important questions for the quality of representation in an increasingly diverse country.

Conclusion

Congressional redistricting is a process that allows political elites to alter the composition of legislative districts, and carries major implications for group representation and political power. When a group is diffused throughout the state (negative effect), their relative standing in a district declines, while a positive effect indicates a population has been unified, or "packed" into a congressional district. While any change to congressional district lines impacts the quality of representation that an individual receives, those groups that see their power "cracked" or diffused throughout the state are at a particular disadvantage. When a group's relative share declines in a congressional district, so does their potential power and relevance to their member of Congress.

This research indicates that mapmaking institutions play a role in determining this dynamic, particularly for those with historical inequities, as well as the fastest-growing population in the United States: foreign-born. Republican-controlled legislatures made more substantive shifts than nonpartisan commissions, Democratic legislatures, and split legislatures, but state courts, many of which are elected, too, also make some of the most aggressive population shifts. These shifts occur under both dynamic and static environments, emphasizing the power of elite institutions on group representation in redistricting, which lends evidence to the theory that map making elites may be more likely to move a group from one district to another to help their electoral prospects regardless of the redistricting environment. We also find that the redistricting *period* matters. While there is an overall decline in the size of net population shifts following passage of the VRA, the sizes of these shifts steadily increase over time, with demographic shifts becoming more likely—and more substantive—with each progressing redistricting period. For all constituents, an average of 13,000 people per district saw their district lines change as they were distributed to other districts in the 2020 election cycle.

This research offers an essential step to understand how the type of institution used for redistricting impacts the constituent populations, and how state-wide reapportionment factors impact these populations. These are new and novel approaches to answering the long-asked, general question in American political science: *why does redistricting matter?* These findings provide political scientists and practitioners with a tangible understanding of how different mapmaking institutions impact certain constituents, and our analysis provides evidence of the granular consequences redistricting has on voters and constituents.

The findings here have implications for the electorate. For instance: that foreign-born constituents experience significant levels of change is unsurprising, given the fast growth of this constituency, particularly in the south and southwest areas of the United States. As Florida, Texas, and Arizona yet again top the nation in population growth, the migration of foreign-born constituents is largely to thank. Yet, this growth does not necessarily result in a relative gain in the share of the district population—in fact, we find the opposite. Mapmakers are more likely to crack the power of this population than the average population, and more than any other subgroup examined here.

The economic and demographic groups examined here have long faced challenges in access to quality representation, and this research indicates that the redistricting

period creates yet another hurdle. First, there is an inherent loss of information—the district makeup changes the policy goals of a member of Congress, logistics like polling locations are made complicated, and relationships with incumbent representatives are lost. The very act of voting is self-enforcing, and even minor changes to voters' processes have shown to decrease turnout (Gerber et al. 2003). But on a much larger scale, reapportionment and changes to congressional maps affect the quality of representation. Shifting populations from one district to another also changes the composition of the constituency, thus altering the weight of political power in a district. The composition of a given congressional district can have a substantial impact on how members of Congress deal with constituents, campaign donations they receive, committees they join, and legislation they support (Adler and Lapinski 1997; Bullock 1995; Carson et al. 2010; Gamble 2007; Miler 2010). When demographic groups are split up, or united, this affects their quality of representation.

This research is premised on the idea that group identity is an important factor for political behavior and representation in the U.S. These findings provide evidence that some groups are impacted differently during redistricting based on who draws the lines. While this provides useful initial evidence, future research could expand the variety of groups or focus more directly on economic interests for a better contrast. Further, intersectional group identities may be a useful area of exploration for future research. Our group categories are not exclusive to each other, and the impact on a Black foreign-born constituent or a foreign-born blue-collar resident may add depth to these findings in important ways. Likewise, the geographic spread of these populations—and what the "cracking" and "packing" looks like on a map could further illuminate any challenges of representation—are groups that are already "packed" more likely to see their power shift? Future work should consider this application.

In the 2020s, there has been major political, legal and academic emphasis on redistricting, with substantial focus on racial and partisan gerrymandering in relation to congress. Our hope is that this work illustrates the real-world implications of what redistricting or gerrymandering really can mean to the people in a state when elite institutions pursue political goals. And as the Supreme Court reconsiders the long-term viability of the application of the Voting Rights Act to redistricting, and states engage in more overtly partisan redistricting efforts, this research sheds light on which populations are most likely to be affected. Particularly, our findings suggest that federal courts have been effective at increasing the size of Black groups within at least some of the districts in maps that they make. If the federal courts exit as redistricting institutions, there may be major implications for the relative power of racial and ethnic groups within congressional districts.

We aim to contribute to an improved discussion of the often-obscure connections between the individual voter or constituent and the political institutions that shape his or her political power and encourage pundits and academics alike to consider groups beyond the partisan binary. To that point, this research has generated a new, original dataset of district changes and redistricting institutions.[18] This dataset in and of itself is an important contribution to analyzing redistricting trends more broadly in law and political science. Our compilation and analysis should provide a useful foundation for other scholars to expand redistricting research and provide more detailed analysis of this political process and its comprehensive impact on American democracy.

Ultimately, this research sheds light on who mapmakers see as malleable—and thus, who is most likely to suffer from changes in representation. As boundaries change, members close offices, change committees, or take up new legislative endeavors. If disadvantaged groups are the most likely to be passed around from district to district, they can quickly become the least likely to receive the representation they desperately need.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. For more information on the apportionment process and formula, see: "The U.S. House of Representatives Apportionment Formula in Theory and Practice," CRS: R41357. (2013, August). https://www.everycrsreport.com/files/20130802_R41357_f2c1769587f502e8dde9260ca31377b7b23094d6.pdf.
2. National Conference of State Legislatures accessed 2024 via https://www.ncsl.org/redistricting-and-census/creation-of-redistricting-commissions.

3. In our dataset, six states total are not redistricted.
4. All About Redistricting, n.d., accessed 2018 via https://redistricting.lls.edu/nationaloverview/?colorby=CourtAction&level=Congress&cycle=2010.
5. Courts create complications for research design because they are never randomly assigned and other institutions may have an active role in shaping the maps that are made. State and federal courts both also face a range of legal and political constraints not shared with the other institutions. However, they have become consistent actors in redistricting and accounting for their institutional correlations are therefore critical for this study.
6. https://khanna.house.gov/about/about-rep-khanna.
7. Per the U.S. Census: "This includes naturalized U.S. citizens, non-citizen U.S. nationals, lawful permanent residents (immigrants), temporary migrants (such as foreign students), humanitarian migrants (such as refugees and asylees), and unauthorized migrants. Everyone else is counted among the native-born population, which comprises anyone who is a U.S. citizen at birth, including people born in the United States, Puerto Rico, a U.S. Island Area (Guam, the Commonwealth of the Northern Mariana Islands, and the U.S. Virgin Islands), or abroad to a U.S. citizen parent or parents" U.S. Census Bureau, n.d., retrieved October 10, 2025.
8. The U.S. Census defines unemployed as citizens over 16 that are not working but looking for and available to work; blue-collar workers as a large occupational group that includes craftsmen, manufacturers, transportation workers, and non-farm laborers; and agriculture workers and farm laborers and owners. U.S. Bureau of Labor Statistics, n.d.
9. There are few nation-wide restrictions on redistricting in the U.S. today. One constraint is the requirement for equal population among districts. The other is nondiscrimination under Section 2 of the Voting Rights Act. This protects against discrimination on the basis of race, color and language minority status, but does not provide a legal tool to challenge discrimination for immigrant groups in general or on the basis of class.
10. While some states have made notable shifts outside of the expected redistricting process, such as Texas in 2003, these cases are rare and are captured in the data collection process. For the 1970–1990, and 2010 cycles, we use the populations directly following reapportionment (years ending in two). For the 2000 redistricting cycle, we compare it with the next redistricting cycle (2010), due to limited data. Please see Appendix Table A1 for models excluding the 2000 redistricting cycle. Table A1 presents the percentage change in the district with signed log-transformation (similar to Table 2 in the manuscript).
11. For years 1970–1993, we rely data from Adler, E. Scott. "Congressional District Data File." University of Colorado, Boulder, CO. For years 2000, 2010, and 2020 we use Census data, prepared at the district-level.
12. We compare populations by using the district name (ex: Alabama's first Congressional District in 1960, vs. Alabama's first Congressional District in 1962). In some cases, boundaries can be shifted to a degree that members of Congress choose to run in different congressional districts—as was the case for Rep. Loretta Sanchez in California's 47th district in 2010 (p. 8). However, we found no evidence of a district being contained and superfluously renamed—some portion of the prior district make up the new district under the same name. Although using the district name is a blunt measure, it does capture which populations are moved in—and out—of a district. Given the consistency of net population change overtime (Table 1), this approach allows us to capture the nuance of population changes.
13. Given that some change in population is negative (populations were moved out of the district), we utilize the signed log-transformation (Wicklin 2014). See Table A2 in the Appendix for the net population change, and Table A3 for the log-transformed net change for all populations.
14. Some scholars have grouped commissions into multiple categories—whether they are nonpartisan, partisan or bipartisan, for example. We find no statistical difference in commission-type impact and thus group them together.
15. While the federal courts may draw redistricting maps due to violations of the Voting Right Act, they are not exclusively involved because of the VRA. In our sample, 10 out of the 28 state-wide plans drawn by the federal courts were in jurisdictions covered by Section 5 of the VRA—only 11 out of 28 were in states that were part of the confederacy.
16. The log-transformation is on the y variable $y_l = sign(y)\log(y+1)$, and a one-unit change is estimated via inverse transformation: $y = signe\,(y_l)(e_l^y - 1)$. See Table A4 in the Appendix for raw population shifts. Results are largely consistent, with the exception of Blue-Collar workers—reflective of their relatively small population share in the net district population.
17. *Mississippi State Conference of the NAACP v State Board of Election Commissioners; Louisiana v Callais; Allen v Milligan* (2023).
18. Available via request to the corresponding author, sorellewg@virginia.edu.

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