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The effects of redistricting on party polarization in the U.S. House of Representatives

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Abstract

Party polarization in the U.S. Congress is at its highest levels. This research examines whether ideological extremism in the U.S. House of Representatives is the consequence of redistricting. By distinguishing between states who are subject to redistricting and those who are not I observe that redistricting does not have a causal effect on Representatives' extremism, measured by DW-NOMINATE scores. The effect varies across regions and is stronger for Democrats, albeit statistically insignificant. Existing rules and strategic tradeoffs in redistricting limit its impact on Representatives' ideology, thus additional regulation would not solve the issue of party polarization.

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1. Introduction

“Republicans Are On Track To Take Back The House In 2022”, announces an article on the 12th of November, 2020 even though multiple states have not confirmed the outcomes of the general House elections yet (Skelley, 2020). Once the results are in, Cook Political Report’s editor David Wasserman (2021) calculates that “[Republicans] could gain all six seats they need for House control from reapportionment and redistricting alone”. These predictions rest on the fact that Republicans won state legislature races that will allow them to control redistricting for 43% of all House seats (while Democrats only control 17%), and that this access to redistricting allows the party to engage in gerrymandering (Rakich, 2020). Gerrymandering is a process through which congressional district lines are drawn in such a way that benefits one party in an election. By “cracking” – spreading ideologically homogenous voters across districts– and “packing” voters of certain type into one district, a party can change the swing ratio, which measures how votes are turned into seats. For instance, packing most registered Democrats into few districts makes the rest of the districts less competitive for the Republican nominees and increases their chances of electoral success. On the other hand, spreading the Democratic voters equally across the state dilutes the democratic support in each district, which again, helps the Republican candidates.

Gerrymandering is not new and both parties have been known to manipulate the congressional maps for a few decades. After the decennial population count (commonly referred to as census) was completed in 1980, the House elections in 1982 were the first ones to be held in the newly apportioned districts based on each state’s population. Democrats gained 26 seats in the House which constitutes a gain of 6%. Their popular vote gain relative to the previous election, however, was only 4.5%, and the difference between the two was even larger in states where Democrats held control over redistricting (Abramowitz, 1983). More recently, in the 2012 elections that were the first held based on the 2010 census, Democrats won the popular vote by 1.4 million, but lost the House to Republicans by a 33 seat margin (Wang, 2013). This is not purely consequence of the Democrats’ “geographical problem” that most of their supporters are densely populated around the cities while the republicans are more equally spread out across the country. In North Carolina, where the two-party House vote was split 51-49 favoring the Democrats, they only won four seats while the Republicans occupied nine of them. Wang’s computer simulations that predict the seat distribution with “normal” districts, show that Democrats and Republicans would have received seven and six seats respectively, had the districts not been manipulated. Thus, over the years, both parties have successfully engaged in gerrymandering and thereby affected election results.

Simultaneously, the animosity between Democrats and Republicans, as well as their supporters, seems to be stronger than ever before. In spring of 2021, Senate minority leader Mitch McConnell (R – KY) said “one hundred percent of our focus is on stopping this new administration” (Smith, 2021). This remark came after a tumultuous week for the Republican party, as Rep. Liz Cheney (R–WY) was kicked out of the party leadership for the reason that she did not support former President Trump’s stance about the election having been stolen. The Republican party has become unified around the Trump persona, and any outliers are not welcome. Democrats, on their part, are unified against Trump, with multiple Representatives publicly declaring they will not collaborate with Republicans who question the legitimacy of President Biden’s electoral success (Caldwell, 2021). McConnell’s rhetoric is an echo of the Republican strategy initiated by Rep. Newt Gingrich (R–GA) in 1983. Gingrich is given credit for bringing the party together by insisting that Republicans in Congress refuse to work with the majority Democrats and instead oppose them in every step of the way (McCarty, Poole & Rosenthal, 2016; Roberts & Smith, 2003). He also took initiative in recruiting and supporting new up-and-coming Republican candidates in state races. Gingrich was seen as a radical, a revolutionary. Before his rise to the party leadership, Republicans and Democrats alike were mostly concerned with representing their districts and fulfilling their committee duties, not actively hindering policy making (Coppins, 2018). “Gradually, it went from legislating, to the weaponization of legislating, to the permanent campaign, to the permanent war,” says congressional scholar Thomas Mann (as quoted in Coppins [2018]).

The parties would not choose war if they did not expect to benefit from it when election time comes. The apparent divisions amongst the public seem to ensure that party polarization in Congress will be an electorally successful strategy. Ideological differences between democratic and republican voters are bigger than differences between racial or religious groups. And while the ideological gap between men and women or whites and people of color has stayed relatively constant since 1994, the partisan differences have more than doubled (Pew Research Center, 2019). In a poll conducted a month before the 2020 presidential election, 90% of Biden’s supporters said Trump’s victory would cause lasting damage to the country. 89% of Trump’s supporters said so about Biden’s victory (Pew Research Center, 2020). Partisan behavior even manifests itself in the face of the COVID-19 pandemic. 82% of Biden’s supporters identified the pandemic as a “very important” issue, while only 24% of Trump voters did so (Deane & Gramlich, 2020).

In this research, I attempt to connect these two characteristics of American politics: party polarization and partisan redistricting. I investigate whether redistricting has a causal effect on party polarization in the U.S. House of Representatives. If the practice of gerrymandering allows the parties to create districts that isolate their supporters, politicians have no incentive to mediate their ideological positions to capture the moderate, median American voter. Rather, they are inclined to occupy a more extremist position to pander to their own base. By comparing Representatives from multi-district states whose district boundaries are subject to change with Representatives elected in single-district states, I isolate the causal effect of redistricting. I find that over the years 1983-2021, redistricting had a negligible effect on polarization. Although polarization levels do vary by the proximity to the next redistricting cycle, the imminent election held in newly constructed districts does not result in significantly more extreme Representatives when compared to their colleagues from single-district states. This result generally holds also when using the states who have had a stable number of districts as a control group. However, I do find that the effect of redistricting is different across the regions of the U.S. and may have a stronger effect on the extremism of the Democratic rather than the Republican party. Nevertheless, most coefficients lack statistical significance and are relatively small in magnitude. These findings indicate that if party polarization in the U.S. House is perceived as a threat, increasing regulation on redistricting will not provide a solution. Instead, the current process of mapmaking already comes with binding restrictions and crucial tradeoffs which may in fact limit polarization. To the extent that polarization of the party elites is present, the divisions among the electorate may be to blame.

The paper is set up as follows. In the next section I will present theoretical literature on political economy, and empirical research on party polarization and redistricting. The third section will contain an explanation of the data and methodology used in the analysis. Regression results will be presented in section four. In section five I elaborate on the implications of the results, how they relate to existing literature and possible limitations of the empirical strategy. The paper ends with a brief conclusion in part six.

2. Literature review

2.1. Candidate positioning and voter behavior

Most of the academic analysis of political economy and election studies is based on the median voter theorem. Its origins can be found in Hotelling's (1929) model of spatial competition initially constructed to describe firm positioning in the market. Downs (1957) applied the model to a political

setting and developed the story that was in the background of most political research that followed. The essence of the model is that each voter has an ideal (policy) point in some one-dimensional space, as does every politician. In an election, a voter chooses a candidate whose ideal point is closest to their own. Politicians have a goal of (re)election and, taking into account voter behavior, position themselves such that their ideal point coincides with that of the median voter. Thus, equilibrium is achieved when both candidates converge in the middle of the policy spectrum.

Anyone who has paid any attention to the American politics in the last decade would feel inclined to question the theory's applicability. Besides the general critique that politics is usually not one-dimensional, one would be troubled to find an issue on which Democrats and Republicans have deliberately taken the same position in an effort to amass more votes. Rather, it seems that the parties work their hardest to distinguish themselves from the competition and position themselves closer to the extreme ends of the ideology spectrum.

Wittman (1977) provides a simple solution to this inconsistency: candidates have their own policy preferences. However, in Wittman's model of spatial competition the aim of (re)election still makes the candidates adjust their positions towards the median voter's, albeit to a lesser extent than predicted by Downs (1957). Groseclose (2001) further expanded Wittman's model by considering another observed, but difficult to measure aspect of politics: candidate valence. Valence may include all the other aspects, besides the candidate's policy views, that contribute to their success in an election. Examples include incumbency status, name recognition, campaign financing, charisma, etc. Groseclose's predictions are not necessarily intuitive at first sight: a candidate with a marginal valence advantage will adopt a more moderate policy position. The reason for such behavior is that this de-emphasizes the importance of policy and thereby emphasizes the valence advantage. Conversely, candidates without name recognition or big campaign funds will lean towards more extreme policy positions, seeking to distract voters from their valence disadvantage.

Another valuable extension to the median voter theorem is one proposed by Palfrey (1984). He incorporates a threat of entry into the two-party competition. Entry deterrence motives make the two dominant parties take up distinct, opposing positions, although not extreme ones. Callander and Steven (2004) develop the model further to account for the fact that parties compete in multiple heterogeneous districts, as is the case in the elections to the U.S. House of Representatives. Solution to this model predicts the incumbents will take up extreme positions positioning themselves even

farther apart from each other than the median voters of the two most extreme districts. An important implication of the results is that district heterogeneity is a driver for party divergence.

Directional voting theory (Rabinowitz & Macdonald, 1989) is an alternative to the median voter theorem and may be a more accurate description of today's politics. Key component to the theory is the term "symbolic politics". Symbolic politics are at play when a policy issue is commonly associated with a symbol that provokes an emotional response in voters. Rabinowitz and Macdonald provide examples of race, health care and taxation. A voter's response to a symbol is defined by the direction – either positive or negative – and the intensity of the feeling. This model offers two results that differ from the median voter theorem. Firstly, assuming the voters are, on average, neutral to an issue and symmetrically distributed around that point, any position taken by a politician is as good as another one. There is no longer an electoral benefit of pandering to the median voter's preferences. Secondly, if the electorate has a "clear directional preference", in the sense that voters are symmetrically distributed around another point rather than the mean, the optimal position for a politician to take is at the extreme end of that direction. The only limiting factor is an imposed "region of acceptability", which reflects the fact that voters may be hesitant to elect too eccentric politicians. But the candidate who manages to use the symbol most efficiently and stays just within the region of acceptability will win the electorate's support. Thus, even without extensions to include threat of entry or competition in multiple districts, the directional voting theory gives an explanation to the success of extreme politicians.

In summary, there is vast theoretical literature on voters' behavior. Although the most prominent median voter theorem alone cannot explain party polarization, that may only be because the model is too simple and fails to account for other aspects besides the policy position that determine a candidate's success. Including the fact that some candidates have a valence advantage, parties compete in various districts, and voters usually react to symbols rather than specific policies is important and leads to different, and more realistic predictions.

2.2. Party polarization in the United States: the elite and the electorate

Literature on partisan polarization can be divided into two broad sub-topics: polarization of the party elite and polarization of the electorate. Elite polarization means that Democrats and Republicans in Congress and in the White House are becoming more distinct; members of each party are more homogenous, but all of them are farther away from the other party, who is also homogenous.

Electorate polarization implies that the American people vote strictly along party lines and do not alter this behavior in response to candidate or party performance. At first sight it may seem that elite polarization could not exist without polarized voters, and the other way around, but establishing the dynamics of the relationship appears to be more complicated.

Bartels (2000) finds an increase in polarization on both levels in the second half of the 20th century. The predictive power of a presidential vote on a vote in either of the congressional races increased by almost 80% from 1972 to 1996. However, based on survey data he finds voters to be more partisan compared to non-voters, thus this polarization may just indicate an increase in political involvement of the electorate. Jacobson (2000, 2012) also finds the public to be divided along party lines and the parties to be ideologically opposing, and he attributes this to sorting and “issue bundling”. Since the 1960’s when bills protecting civil and voter rights were passed, voting behavior in the House has essentially become one-dimensional, with a focus on economic policy agenda (McCarty, Poole & Rosenthal, 2016; Poole, 2007). However, attached to a politician’s conservative attitude on government spending, now are stances on issues such as gun laws and abortion. Issue bundling is evident amongst both, politicians and voters: Carmines and Woods (2002) find that the correlation between a voter’s opinion on abortion and their partisan affiliation increased in the period of 1984-2000, following the same polarization on the issue by party activists and the elite a decade earlier. Even if some ideological positions combined do not seem to make logical sense (less regulation on guns but more regulation on abortion), they present a core idea, a belief, which pulls a party and its supporters together (Poole, 2007). Each party then represents a stance on a bundle of issues to which voters react, without evaluating separate policies. This is in line with the directional voting theory presented earlier.

Klein (2020) calls this effect in the electorate “identity politics”. Similarly to symbolic politics defined by Rabinowitz & Macdonald (1989), existence of “identity politics” means that your party affiliation is an indicator of a broad spectrum of your other beliefs and characteristics. The caricatures Klein draws are recognizable, even if quite extreme: a liberal is more likely to “live in polyglot cities, hitchhike across Europe, to watch foreign-language films”. A conservative who is hesitant about change prefers “living in a small town nearer to family, going to a church deeply rooted in ritual”. Their political affiliation is just an expression of all these other traits (Klein, 2020). Furthermore, similarly minded voters also tend to cluster geographically (Chen & Cottrell, 2016; Rohla, Johnston, Jones & Manley, 2018), which would explain why 1) districting is necessary for a representative democracy, 2) it is reasonable for bordering districts to differ in political leanings. If the identity of a

Republican or Democratic voter has become a fixed one (though Rush (2000) suggests that may not be the case), then the electorates do not overlap. They are two separate subpopulations, living in two Americas, electing distinctly different representatives, and no median voter could bring the two parties to a consensus.

The observation that the electorate and the elite both are becoming more divided across party lines may in fact be a good thing, as far as democracy goes. It shows that the election system successfully ensures that the Representatives are responsive to their constituency. Ansolabehere, Snyder and Stewart (2001) use candidate self-reported information on their policy positions and district-level presidential vote to infer about the median voter's political leaning. They find that although Democrats and Republicans take up distinct positions even when controlling for district's conservatism, a more conservative district will have a more extremist Republican and a more moderate Democrat elected, compared to a liberal district. Thus, candidates react to voter preferences as spatial competition models predict, and the relationship between elite and electorate polarization is "inherently interactive" (Jacobson, 2000).

However, some scholars argue that majority of the electorate is still moderate and polarized America is a "myth" (Fiorina, Abrams & Pope, 2005). Fiorina et al interpret the close elections of 1996-2002 (measured by popular vote victory margin) as a proof that the public is undecided. Issacharoff (2004) supports the claim of a generally moderate electorate but claims that there is polarization in the political bodies, incentivized by the loud minority of party extremists. One must wonder, how large this minority has to be to have such a deciding effect on the parties. What Fiorina et al and Issacharoff may be missing, is the difference between partisan identification and partisan behavior. Abramowitz and Webster (2016) analyze American National Elections Study data and find that although an increasing number of people identify as independents (and they in fact outnumber both Democrats and Republicans), their voting behavior is now more partisan than ever. So even if survey respondents do not identify with either of the two big parties, their partisan loyalty at the voting booth has increased significantly.

While there is some disagreement on polarization amongst the public, the literature on the elite is more unanimous. This is likely due to the fact that there are only a few tools to measure party polarization. The most popular measures are ADA and NOMINATE scores, which are based on the roll-call votes in the House. The indices are developed by different scholars and rely on slightly different dataset: ADA includes only 20 "most significant" bills for each Congress, while NOMINATE is

based on all non-unanimous votes. These differences notwithstanding, ADA and NOMINATE scores are based on the same measure – Representative’s votes relative to the rest of the House - and are thus highly correlated (Theriault, 2006). However, Coleman (1997) employs another alternative strategy by using only budget-related votes in the House and still identifies significant party polarization in the 1970’s and 1980’s. Roberts and Smith (2003) and Theriault (2006) use NOMINATE scores and find that both parties became more polarized over the last three decades of the 20th century, and that majority of this change is driven by new, more extreme, representatives entering the Senate rather than an ideological shift of the incumbents. Such behavior is easily explained by the median voter theorem with valence: candidates without name recognition or big funds are more extremist to distract the voters from their lack in valence. Fleisher and Bond (2004) claim that the biggest jump in polarization happened only recently. While up until the mid-1980’s there were “cross-pressured” politicians whose ideal points were closer to the other party mean rather than their own, they have essentially disappeared in the 21st century. Fleisher and Bond (2004) point out that the previously diverse parties were reflecting the diverse policy preferences of the public. Now, with issue bundling and identity politics at play, the red and blue camps do not interact, and representatives have no incentives to cooperate with the other party. In support of this explanation is a study by Canen, Kendall and Trebbi (2021) who find that up to 70% of party polarization since the first World War can be attributed to party discipline and party leadership’s control over the Representatives’ voting behavior, rather than the Representatives having extreme ideological positions. Thus, it is not necessary for voters to be polarized and elect hard conservatives or liberals; the elected Representatives are simply pulled away from moderate politics by their party.

It is also worth to mention that there are some historical reasons that explain part of the polarization. After the consequential 1982 redistricting, which will be discussed in more detail in the next section, the few moderate Southern Democrats were quickly replaced by Republicans. The Republican party was unified by Rep. Gingrich and became more conservative in both the South and the North (Roberts & Smith, 2003). The Northern Democrats have also become more liberal on their behalf (McCarty et al 2016; Roberts et al 2003; Theriault, 2006). The increased homogeneity within each party thus contributed to the observed polarization of party elites.

Majority of the works on the topic indicate that the electorate, as well as the elite, has become more polarized over the years. Democratic has become synonymous with liberal; Republican usually means conservative. In this research, I stay away from further analyzing the American electorate. Instead, I will focus on whether the increasing ideological gap between the two parties in the U.S.

House of Representatives is purely a representation of voter preferences, or whether it is enhanced and encouraged by election rules. Thus, let's turn to redistricting.

2.3. Redistricting

The U.S. House of Representatives is intended to be the federal institution closest to the electorate (Canes-Wrone, Brady & Cogan, 2002; Mayhew, 1974). State-wide elections to the U.S. Senate take place every six years, while Representatives compete within districts every two years. The higher election frequency and smaller direct constituency should allow for a better connection between the Representatives and the voters. However, the (re)districting process is a subject of discussion. Initially, it was included in the Constitution with the intention to keep the House representative of all people equally by the means of requiring all districts within a state to be equal in population. Since 1929 there are 435 seats in the House, which are apportioned to the 50 states (since 1959, with Alaska and Hawaii being the last ones admitted to the Union). The number of seats and thus districts a State receives is based on the population count during a decennial census. As of 2021, California and Texas are the biggest occupants, having 53 and 36 seats respectively. Once the 2020 census results are implemented, California will lose a seat for the first time in history, while Texas will gain another two.

While the number of districts is decided rather objectively based on the number of residents in the State, the precise shape of each district is left for either state legislatures or special committees to decide upon and is "always a bitterly partisan affair" (Brunell, 2006). There are some general court-enforced rules such as equal population requirement, compactness, contiguity, and a more subjective requirement to "preserve communities of interest" which usually translates into preserving municipality boundaries (Brunell, 2006). However, the state legislatures and the responsible commissions (both of which are usually politically motivated [Chen et al, 2016; McDonald, 2004]) are legally allowed to manipulate the district lines to benefit a political party, which is called gerrymandering. The extent to which parties actually engage in this behavior and whether it has any consequences are heavily debated empirical matters.

First, let's take a look at history and racial gerrymandering. Although Rush (2000) convincingly argues that partisan gerrymander is harder to achieve due to instability of political identity, it is worth to reflect on what happens when gerrymandering "works". One of the most consequential requirements for redistricting was implemented with an amendment to the Voting Rights Act in

1982. Congress then deemed that whether voting laws are racially discriminatory should be judged based on the *effect* rather than the *purpose* of the law. Thus, even if district lines were drawn without the intent to disenfranchise racial minorities, the map may still be challenged in court if it ends up being discriminatory. In combination with the reapportionment of 1990 which shifted 11 seats from North to South, these legal changes had a significant effect on partisan composition of the House. When African Americans were guaranteed the right to vote in 1965, they entered the electorate as a solid Democratic base which was rather equally spread out across the Southern districts (Hill, 1995). Meanwhile, the Republican party aligned themselves with the grievances of pro-confederacy white voters. Department of Justice in the late 1980's deemed that the spreading out of black voters constitutes a "minority vote dilution" which is a discriminatory effect of election laws, and required a creation of minority-majority districts to ensure fair representation. As a consequence, black voters were mostly packed into 12 districts in eight States which had a combined 107 seats in the House, while the rest of the districts were left more homogeneously white. This contributed to seven districts switching from Democratic to Republican, as well as an increase in the victory margin of Republican incumbents and decrease in the electoral safety of Democratic incumbents in the 1992 election (Hill, 1995). This was the start of the South turning red, while the North turned blue; a pattern which still holds today and is accounted for in most empirical research (e.g. Bartels, 2000; Jacobson, 2003; McCarty et al, 2009, 2016; Roberts et al 2003, etc.)

Some academics argue that redistricting ensures better responsiveness, in the sense that the representatives are better aligned with the preferences of their constituency. Stratmann (2000) and Leveaux-Sharpe (2001) confirm increased responsiveness after the 1992 redistricting by relating redistricting-induced change in district composition to change in House members' voting behavior. They use different indexes for ideology (Stratmann employs ADA scores while Leveaux-Sharpe uses NOMINATE), thus their agreement is not dependent on the use of measurement. Overby and Cosgrove (1996) also find that white incumbents become less concerned with minority issues when re-elected in more homogeneously white districts. This sensitivity to voter preferences can be explained by increased competition and uncertainty. A race may become more competitive after redistricting if party supporters get spread out across districts, as Ansolabehere, Snyder and Stewart (2000) prove by comparing victory margins before and after 2000 census. A new congressional map also increases uncertainty about the constituency's preferences, deprives incumbents of "personal votes" and makes a competitive challenger more likely (Hetherington, Larson & Globetti, 2003; Wrighton & Squire, 1997). However, there is a tradeoff parties must consider: in pursuit of winning marginal races, they must risk and give up the "wasted" votes they have in excess in safe districts

(Chen et al 2016; Gapoian & West, 1984; Gelman & King, 1994). Lyons & Galderisi (1995) found that the 1992 redistricting was intended to preserve incumbents, and Hirsch (2003) calls the 2002 election results “anomalous” due to their low turnover rate, supposedly due to redistricting. Artificial increase of incumbent safety goes against representativeness and may indicate that optimally states should aim to construct competitive districts, if a fair democratic election process is the goal. At this moment, however, only Arizona and Washington have a formal requirement to draw competitive districts when possible (McDonald, 2004).

There are, of course, other opinions. Buchler (2005) argues that the goal should be to draw districts that precisely capture voters of homogenous ideology. This way, the representatives are not only closer to the median voter of their district, but there is also less variance so *everyone* in the district is better represented than in the case with competition. Furthermore, voters who have voted for the winner are happier with the Representative and Congress in general, which implies that constructing competitive, heterogenous districts is detrimental to voter satisfaction (Brunell, 2006).

Even if redistricting may have the effect of increased responsiveness, the real threat is that parties may engage in gerrymandering and alter the “swing ratio” which indicates how votes are translated into House seats. Empirical research is divided on this. Abramowitz (1983) investigated the 1980 redistricting and found the swing ratio to be twice the size (to the Democrats’ benefit) of the national one in states where Democrats had control of the state legislature and governorship. However, repeating the research after the 1992 redistricting Abramowitz and Niemi (1994) find no such effect. However, the 1992 House elections were also heavily affected by the preceding bank overdraft scandal and the previously discussed racial gerrymandering so the effect of partisan gerrymandering might be muddled (Lyons & Galderisi, 1995). Nevertheless, Jacobson and Dimock (1994) find that incumbents involved in the scandal and running in significantly altered districts spent more in the 1992 campaign and were still more likely to lose in the primaries or retire, compared to those in relatively unaffected districts. The 2002 elections were also affected by partisan gerrymandering; in 85% of cases where a party had a control over the redistricting process, it drew a map favoring itself (McDonald, 2004).

While some scholars find no effect of redistricting on either competition (see Abramowitz, Alexander & Gunning, 2006), responsiveness (see Boatright, 2004) or the swing ratio (see Gelman & King, 1994), such studies constitute a minority. The broader consensus is that redistricting does matter,

and while it can bring Representatives and voters closer, it may also allow for a party to swing election results to their favor.

2.4. Relationship between redistricting and polarization

Although no theoretical model has been set up to explicitly investigate the link between redistricting and polarization, there are a few possible, mutually non-exclusive explanations to the relationship. To begin with, mapmakers can exploit the polarization of the electorate. By employing advanced methods of voter identification, they can create districts that are homogenous in their political leaning and whose median voter is, for example, more to the left of the ideological spectrum than the state median voter. This district would elect a more liberal Representative compared to the case where the district lines were drawn arbitrarily. Such “packing” of party supporters into few districts also increases electoral safety of the Representatives which is a tactic taken up in order to preserve seats in the House. This is especially common when parties share control over the redistricting process, as they can agree on bipartisan plans which ensure the reelection of the Representatives already in power (Lyons & Galderesi, 1995). A Representative who is not concerned with electoral safety can strictly follow the party agenda, even if his constituency is not as extreme as the party leaders. In other words, incumbent protection-focused maps would reduce Representative’s responsiveness and increase elite polarization, irrespective of electorate polarization. On the other hand, a party may wish to increase its power in the House and win in more races than in the previous election. With this goal in mind, district lines are drawn with the intention to spread out the party’s supporters across multiple districts, consequently reducing the electoral safety in other districts. In this case redistricting may even discourage extremist politicians, as the candidates have to compete in ideologically more heterogenous districts. Therefore, the effect of redistricting on polarization is constrained by the tradeoff a party faces between increasing incumbent safety and improving chances of victory in marginal races.

The process of redistricting is in the hands of state legislatures or special commissions. As local elections decide who has the majority in those institutions, there is no structural reason for one party to consistently benefit more from redistricting. Furthermore, as mentioned before, there are cases where both parties have to agree on the map, when, for example, a Democratic Governor has the veto power regarding the congressional districts drawn by Republican legislators. These power shifts and need for compromise may equalize the way in which the parties respond to redistricting. However, if it happened so that one party was always in a strong majority, while the other one was

in the position to strive for more seats in the House, this may result in the former party increasing incumbent safety (and therefore allowing for extremism), and the latter spreading out its supporters (and likely reducing polarization). Another difference in the effect of redistricting on polarization may emerge between the states who either gain or lose seats and those who maintain the same number of districts (Carson, Crespin, Finocchiaro & Rohde, 2007). Naturally, having to introduce a new district leads to a more significant change in district boundaries than when the lines are redrawn only to meet the equal population requirement. The same may hold for when a state loses a seat in the House and thus some districts must be expanded to encompass the newly “free” area. In a similar line of reasoning, densely populated states divided into many districts simply have more lines to manipulate and may more efficiently isolate ideologically homogenous voters, thereby resulting in redistricting having a larger effect on polarization. Lastly, as described in section 2.3., Southern states have historically had a more divided electorate and politicians than their neighbors in the North (Bartels, 2000; Roberts & Smith, 2003; Theriault, 2006). Although it is likely that the divisions of the electorate were exploited to their full potential in the second half of the 20th century, there may still remain some regional differences in the relationship between redistricting and elite polarization.

My research will most resemble the paper by Carson et al (2007). They use one-district states as a control group and additionally identify significantly altered districts whose new boundaries covered a population that was at least 50% new relative to the previous area of the district. Although the effect is small in magnitude, they find, even when controlling for incumbency status and district characteristics, that redistricting allows parties to “gain partisan advantage *above and beyond* any national or statewide trends, thus contributing to polarization at the margins” (Carson et al, 2007). This finding holds for both redistricting plans: those intended to preserve incumbents and those created to win more seats. However, Carson et al (2007) and Brunell (2006) do not find support for the theory that Representatives who win by a bigger margin are more extreme, implying that electoral safety is not a crucial component in the relationship between redistricting and partisan division of the elite. Yet, they say that redistricting increases polarization by eliminating competition from the general election, where a Democrat nominee would face a Republican one. This is exactly the stage in which we could expect the parties to moderate themselves to capture the median voter. However, when the between-party competition is lessened or eliminated by a partisan gerrymander, candidates focus on the primary elections, in which they compete within their own party. Republican and Democratic primaries take place before any general election and it is the process through which the party - the elite, by publicly endorsing and providing campaign funds, and the electorate, by

voting – nominates a representative to compete in the general election against the nominee of the other party. Some states even have “closed” primaries so that only registered partisans can vote, which completely eliminates any incentives for a candidate to reach out to the independents, but only one third of the House seats are filled in such a process (McCarty et al, 2016). However, even without this rule, voters who participate in the primaries identify more strongly with the party and hold more extreme views than those who do not (Jacobson, 2012). Furthermore, party activists who are more extreme than the median voter have more influence on the parties in the primaries (Carson et al, 2007). Thus, when the competition of the general election is lessened or removed by partisan gerrymandering, candidates focus on the primaries which push them to adopt an extreme ideological position. This line of reasoning is also supported by Issacharoff (2004) who identified the increased relative importance of the primaries as the key channel through which redistricting induces elite polarization. In the view of Issacharoff and Carson et al, the real cost of polarization is the fact that political bodies become unrepresentative of and unresponsive to the general public, while pandering to the increasingly extremist party base.

Masket, Winburn and Wright (2012) find an increase in district competitiveness after a partisan redistricting plan. This indicates that parties may value winning marginal seats more than preserving incumbents. Additionally, Masket et al find an increase in the difference between the NOMINATE scores of Republican and Democratic Representatives in the states which engaged in incumbent protection-focused gerrymandering, but a decrease in states where voters were strategically spread out. Therefore, they confirm the theory that while gerrymandering can lead to unresponsive and extremist leaders, the party faces a tradeoff and often chooses to reduce incumbent safety in exchange for more seats in the House. Consequence of the latter strategy is reduced party polarization.

The same conclusion can be drawn from McCarty, Poole and Rosenthal (2009), who use matching and OLS estimates to find a general increase in polarization 1972-2004, based on NOMINATE scores, but say that 80% of this change is attributable to the fact that for given district characteristics, a representative is now more extreme than they would have been in the 1970’s. Additionally, they do find that elections immediately after redistricting were more competitive, which is in line with their finding of small redistricting effect on polarization. Thus, parties seem to focus on marginal races and thus not use redistricting to increase electoral security and allow for extremism. However, the apparent polarization of the Representatives, irrespective of constituency preferences, confirms the concern of Issacharoff (2004) that elite polarization has pulled the politicians farther away from the

electorate. On the other hand, Abramowitz, Alexander and Gunning (2006) find that after the 2000 census, redistricting did not have an effect on race competitiveness, irrespective of whether one party had control over the process or whether it was a bipartisan affair. Nevertheless, they indicate that compared to the 1970's or 1980's, Representatives are elected in increasingly ideologically homogenous and therefore less competitive districts, although this may be the consequence of electorate polarization and self-selection into like-minded districts. According to Abramowitz et al (2006), redistricting does not have a direct effect on the extremism of the elected officials nor on their challengers who lose the race. Instead, they say, the elite has simply realigned with increasingly polarized public.

In summary, the literature on polarization and redistricting is not unanimous. Even using highly correlated measures of elite polarization, scholars find different results regarding the impact of redistricting. I hope to contribute to this debate and extend the analysis into the 21st century which has seen a dramatic increase in animosity between the parties but is yet to be formally investigated.

3. Data and Methodology

3.1. Identification strategy

In order to establish a causal effect of redistricting on polarization I will employ the difference-in-difference method and explore two ways to define the control group. First, I will compare polarization levels in states who are subject to redistricting every ten years with the states who only have one district and thus are not affected by any new census. Thus, the first control group are the six one-seat states: Alaska, Delaware, North Dakota, South Dakota, Vermont and Wyoming. They have had one congressional district ever since 1980. Montana is dropped from the analysis as it had two districts in the 1980's but in 1990 they were merged into one. Having this state which switches from treatment to control group in the sample would invalidate the results. The rest of the states are included in the sample.

As the single-seat states are relatively small and thereby inherently different from the treatment states, I will explore an additional specification of the treatment group. As previous research has shown that gaining or losing seats makes a state more likely to be subject to gerrymandering (Crespin et al, 2007; Lyons et al, 1995), I will define the control group as states which have had the same number of seats throughout the whole period of investigation, since 1983 to 2021. Those states are: Alabama, Arkansas, Hawaii, Idaho, Maine, Maryland, Minnesota, New Hampshire, New

Mexico, Rhode Island and Tennessee. To reiterate, these states have been subject to redistricting, but presumably to a lesser extent than those who either gained or lost a seat due to an increase or a decrease in their population.

The census is conducted every ten years, on a year ending with a zero. However, the new reapportionment applies only to the election on a year ending with a two, and then the Congress elected in that year starts their work on a year ending with a three. Thus, the treatment of 1980, 1990, 2000 and 2010 census are set at the time of 98th (1983-1985), 103rd (1993-1995), 108th (2003-2005) and 113th (2013- 2015) congresses respectively.

The main identifying assumption of the difference-in-difference approach is the common trend assumption. If the treatment states had not been subject to treatment, they would follow the same trend as the control states. As there is no pre-treatment period where I could check whether this assumption is likely to hold, I will employ additional measures to ensure comparability between the states and better isolate the causal effect. First, I will include congress and region fixed effects. The congress fixed effect is essentially a time fixed effect and accounts for national trend towards polarization. There are three different ways to define a region (Bureau of Economic Analysis (BEA) divides the country into eight regions, while the U.S. Census Bureau discerns four regions, which can be further broken down into nine divisions), and I will explore them all. Table A1 in the Appendix provides an overview of how the states are sorted in the three specifications. Including a region fixed effect will account for regional differences in polarization which can be expected to exist as an artefact of the Civil war and racial segregation in the South. I will also investigate whether treatment effect varies depending on the region by including an interaction term. Secondly, I will add a control variable to account for racial diversity of a state. A racially homogenous state may be expected to also have less variation in ideology and therefore elect a more extremist politicians. Furthermore, household median income will be used as a proxy for the state's economic conditions. I expect that a poorly economically performing state may be a better environment for more radical politicians. In the fashion of Regression Discontinuity Design, I will also add an interaction term with the number of seats each state has to allow for the functional form to differ between treatment and control groups. Additionally, this may be interpreted as a proxy for the size of the state. Those divided into more districts naturally provide more opportunities for gerrymandering and also have a more diverse electorate. The only individual-level control variable I will include is their party identifier. The coefficient next to this variable will allow to discern whether Republicans or Democrats are more likely to react to redistricting and will account for the general ideological movement of a party. To

further investigate differences between the two parties, I will also run a regression with an interaction term between the treatment variable and the party identifier. This will show whether the redistricting effect on ideological extremism is different for Democrats and Republicans.

Therefore, to investigate the treatment effect I will estimate variations of the following model:

$$NOM_{ijt} = \alpha + \beta * Treatment_{it} + \beta_2 * Size_{it} + \beta_3 * Treatment_{it} * Size_{it} + \beta_4 * Party_{ijt} + \beta_5 * MedianInc_{it} + \beta_6 * Diversity_{it} + \gamma_i + \mu_t + \varepsilon_{ijt}$$

Where $Treatment_{it} = Census_{it} * TreatmentState_i$,

and NOM_{ijt} is the absolute value of representative's j of state i DW-NOMINATE score in time (Congress) t , based on their roll call voting record.

$TreatmentState_i$ is a dummy and takes value 1 in all t for all treatment states (either multi-district states or those whose number of districts changed in the investigated period).

$Census_{it}$ is a dummy and takes value 1 for treatment states but only in treatment years, e.g. when representatives are elected based on new districts for the first time.

$Size_{it}$ is an indicator of how many districts (seats) a state has.

$Party_{ijt}$ is a dummy variable that takes value 1 for Republicans and 0 for Democrats.

$MedianInc_{it}$ is a control for state's economic conditions, proxied by moving two-year average of state median household income, in thousands.

$Diversity_{it}$ is a control for state's racial composition, proxied by a diversity index.

γ_i is a region fixed effect.

μ_t is a congress fixed effect.

ε_{ijt} is an error term.

The coefficient β next to $Treatment_{it}$ is the variable of interest while all the controls simply hold the other state and Representative characteristics constant. I will also estimate models with interaction terms between $Treatment_{it}$, region identifier dummies and party identifier $Party_{it}$ in order to establish whether the treatment effect varies across regions and between parties.

Furthermore, I will add up to four lags of the $Treatment_{it}$ variable, each interacting with $Size_{it}$, to investigate long term effects of redistricting. Standard errors will be clustered at the state level in all specifications, as treatment is applied at state level and variance in NOM_{ijt} can be expected to vary by state.

3.2. Data

The core of the data for this research comes from Poole and Rosenthal's system of evaluating the ideology of members of Congress (Lewis et al, 2021). Each member (who casts at least 25 votes in one term) receives a DW-NOMINATE score from -1 to 1 for each two-year term he or she serves. All non-unanimous votes are included in the measurement. The DW-NOMINATE variable is continuous, its negative values indicate liberal views, positive values indicate conservative views, and a higher absolute value corresponds to more extremism. As the score is based on their roll-call votes in the House, it is an ex-post evaluation. I use these scores as they are based on all votes that took place on the House floor and thus do not discriminate towards more senior Representatives or those involved in influential committees, as would be the case if, for example, bill cosponsorship was used as an indicator of decreased bipartisanship. The dataset includes each member that has served in the House, identification in which Congress they served, their party affiliation, the district and state he or she represents and their ideology score. Rep. Sanders (Vermont) is an Independent but caucuses with Democrats and thus is considered one for this research. Rep. Amash (Michigan) is considered a Republican although he left the party while serving in the 166th House and registered as a Libertarian in July 2019. In the cases where Representatives were replaced through a special election due to death or early retirement, I keep both observations (if both had cast enough votes to be assigned a DW-NOMINATE score). That is the reason why the number of observations is not always divisible by 433 or 434 (there are 435 seats, but as mentioned before, Montana is excluded). I use data from 1983 to 2021 March, so while the 117th House is included in the sample, its scores may be less precise as they are based on fewer observations.

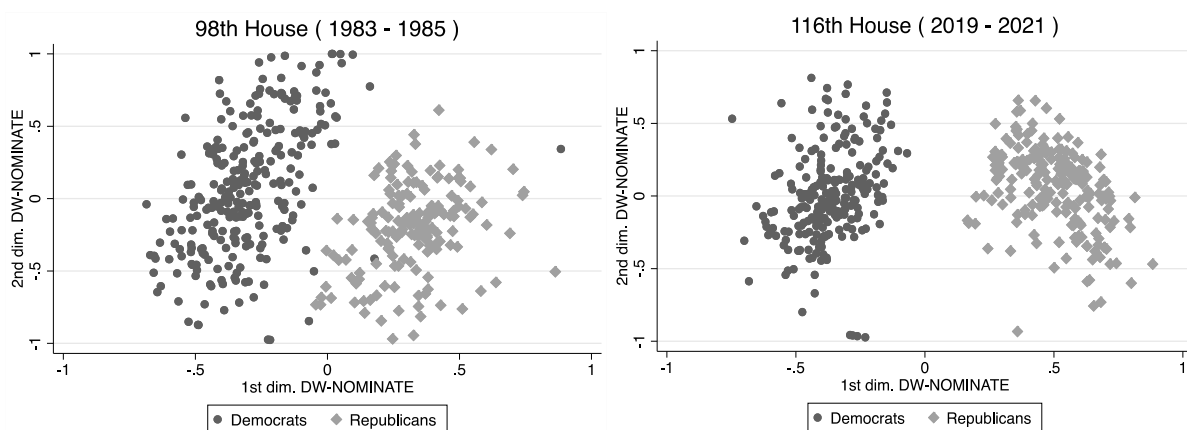
The historical apportionment data (how many seats each state was assigned after every census) comes from the Office of the Historian of the U.S. House of Representatives. State median incomes throughout the years 1984-2019 are obtained from the U.S. Census Bureau (2020a, 2020b). Median household incomes in 2020 are from Current Population Survey (DQYDJ, n.d.), and from American Community Survey (World Population Review, n.d.) for 2021. Lee, Martin, Matthews, and Farrell's (2017) state panethnic diversity scores are used as an indicator for racial diversity. Value 0 means complete racial homogeneity, while value 1 indicates that each of five racial groups constitutes an equal share of state residents. The five racial groups are Hispanics, non-Hispanic whites, blacks, Asians, and others which include Native Americans and multiracial individuals. The index is based on American Community Survey and is thus self-reported identification. The diversity index is calculated separately for each state in the years 1980, 1990, 2000, 2010 and 2015. For the purpose of my

research, I assign those values to the surrounding years as well, such that the same values are applied within the time intervals 1983-1987, 1987-1995, 1995-2005, 2005-2013, and 2013-2021. Although admittedly not perfect, this index provides some idea about each state's racial composition.

4. Results

4.1. Single-district states as a control group

To begin with, Figure 1 clearly shows that the two parties have become more homogenous and are further apart ideologically now than they were in the 1980's. The horizontal axis measures the first dimension DW-NOMINATE scores which are based on Representatives' redistributive and economic preferences; that is the ideology identifier in the remainder of this paper. On the vertical axis is the second dimension DW-NOMINATE score which captures partisan differences on topics such as slavery and civil rights, including questions on reproductive rights and gun laws. However, in the 21st century this dimension does not provide much additional insight as votes on the mentioned social issues are usually divided in the same liberal-conservative scale measured by the first dimension (Poole, 2017). As can be seen from the figures 1A and 1B a clear ideological gap has appeared between Republicans and Democrats in the House. In 1983, the average score for Democrats was -0.302 (standard deviation 0.182) and 0.325 (0.157) for Republicans, with the mean difference being 0.627. In the 107th House in 2001 the difference in means increased to 0.783 and was even higher at 0.873 in the 116th House. Notably, Republicans contributed more to the increasing ideological gap as their mean score in 2019 was 0.503 (0.142), while Democrats remained relatively stable at -0.370 (0.121).



Figures 1A and 1B. DW-NOMINATE scores for Democrats and Republicans in the 98th (1A) and 116th (1B) House of Representatives. Vertical axis is the second dimension DW-NOMINATE, horizontal axis is the first dimension DW-NOMINATE score.

As a starting point of the formal analysis, I run an OLS regression including congress and region fixed effects. Results can be found in Table 1; columns 1, 3, and 5 only include a control variable for the size of the state and Representative's party affiliation, while columns 2, 4 and 6 also include economic and demographic controls. Several things to note here. First, under no specification is the treatment effect significant, and its magnitude which varies slightly from 0.027 to 0.033, is small relative to the scale. Second, using a different definition of a region does not change the results drastically. The division into only four Census Regions gives the highest coefficient of the treatment effect. Breakdown of the fixed effects into dummies for each region (not shown) indicates that relative to the West, all regions have lower treatment effects although only for Northeast is the coefficient statistically significant. Another important observation is that effect of the party is significant and at around 0.06, which indicates that Republicans are generally more extreme than Democrats. And lastly, the coefficients next to economic and demographic control variables are miniscule and statistically insignificant, while the number of districts in a state is statistically significant in most specifications albeit this effect is small in magnitude. The positive effect of state size indicates that larger states with more districts have higher levels of polarization than smaller states. It can also be that this size variable indirectly captures the ideological heterogeneity of voters within a state, which is inevitably higher for larger communities and is not necessarily reflected in the index for racial composition or the median income. For consistency, I will present all the regression results for each of the three region specifications as an indicator that in most cases the results do not depend on this classification. Furthermore, I will include the economic and racial heterogeneity controls in the regressions but will not discuss their coefficients as they remain approximately 0 in all specifications. Next, I explore the state size, region, and party effects more in depth.

In an attempt to make the treatment and control groups as comparable as possible and minimize the impact of state size on the treatment effect, I restrict the sample to small states only. States are, rather arbitrarily, considered small if they have less than 10 seats. Coefficients of the treatment effect fall by more than a half and the smaller sample size increases the standard errors, further reducing statistical significance (see Table A2 in the Appendix, also including quantitatively similar results for states with less than 15 seats). Interestingly, the party indicator gains significance and increases up to 0.11 when investigating small states only.

Table 1. Effect of redistricting on polarization, controlling for different region specifications.

	(1)	(2)	(3)	(4)	(5)	(6)
	BEA Regions	BEA Regions	Census Regions	Census Regions	Census Divisions	Census Divisions
Redistricting	0.028 (0.027)	0.027 (0.028)	0.033 (0.039)	0.032 (0.040)	0.030 (0.031)	0.030 (0.031)
State size	0.001*** (0.000)	0.001** (0.001)	0.001** (0.000)	0.001 (0.001)	0.002*** (0.000)	0.002** (0.001)
Party	0.058** (0.026)	0.058** (0.026)	0.058** (0.026)	0.058** (0.026)	0.059** (0.026)	0.059** (0.026)
Median income	-	-0.000 (0.001)	-	-0.000 (0.001)	-	-0.000 (0.001)
Diversity	-	0.001 (0.001)	-	0.000 (0.001)	-	0.000 (0.001)
Region fe	+	+	+	+	+	+
Congress fe	+	+	+	+	+	+
Constant	0.328***	0.314***	0.334***	0.331***	0.321***	0.343***
R-squared	0.159	0.160	0.148	0.148	0.160	0.161
N	8823	8823	8823	8823	8823	8823

Notes: Representative's DW-NOMINATE score's absolute value is the outcome variable. Party indicator takes value 1 for Republicans, 0 for Democrats. All regressions include region and congress fixed effects, and an interaction between Redistricting and State size. Standard errors in parentheses. *** - significance at 1%, ** - 5%, * - 10%.

Turning to the differences between regions, I include an interaction term between treatment and region to the original specification. Table 2 shows the marginal effects of redistricting on party polarization in each region. There appears to be no difference between the Census Regions and the region indicators are jointly significant only at 5% level. However, regressions with Census Divisions and BEA Regions each reveal a statistically significant treatment effect in the Pacific or Far West areas respectively. The regions although named differently by the two institutions comprise five of the same states: Alaska (one-seat state), Washington, Oregon, California and Hawaii. BEA's Far West also includes Nevada. Thus, these results show that in those states Representatives' ideology becomes 5-6% more extreme after each redistricting cycle (increase of 0.05 in the scale of [0;1]). The coefficient for the Mideast region identified by BEA which covers New York, New Jersey, Pennsylvania, Maryland and Delaware (one-seat state) is also statistically significant at 10% and has a value of 0.05. Party and state size indicators both preserve their significance, and their magnitudes also remain unchanged from the initial specification without the interaction term with region indicators. Winning Republican candidates in large states are less likely to be moderate after redistricting relative to smaller states and Democratic Representatives.

Table 2. Effect of redistricting on polarization, dependent on region.

	Census Regions	Census Divisions	BEA Regions
Redistricting, marginal effect per region	1. 0.047 (0.041)	1. 0.043 (0.030)	1. 0.040 (0.027)
	2. 0.047 (0.038)	2. 0.026 (0.032)	2. 0.025 (0.034)
	3. 0.044 (0.039)	3. 0.041 (0.029)	3. 0.007 (0.027)
	4. 0.024 (0.039)	4. 0.013 (0.030)	4. 0.039 (0.027)
		5. 0.056* (0.031)	5. 0.050* (0.029)
		6. 0.014 (0.029)	6. 0.027 (0.029)
		7. 0.047 (0.029)	7. 0.045* (0.027)
		8. 0.029 (0.031)	8. 0.019 (0.027)
		9. 0.029 (0.030)	
State size	0.001 (0.001)	0.002** (0.001)	0.001** (0.001)
Party	0.058** (0.026)	0.058** (0.026)	0.058** (0.026)
Median income	+	+	+
Diversity	+	+	+
Congress fe	+	+	+
Constant	0.356***	0.353***	0.326***
R-squared	0.149	0.162	0.161
F statistic	3.90**	22.64***	19.55***
N	8 823	8 823	8 823

Notes: Representative's DW-NOMINATE score's absolute value is the outcome variable. Party indicator takes value 1 for Republicans, 0 for Democrats. All regressions include region and congress fixed effects, and an interaction between Redistricting and State size. F statistic is for the joint significance of the region identifiers. Standard errors in parentheses. *** - significance at 1%, ** - 5%, * - 10%.

Keeping in mind the previously discussed highly significant and large party effect, I explore whether the effect of treatment varies between the parties by including an interaction term between redistricting and Republican identifier. As I want to allow for regional differences in ideology in this case, the regression does not contain region fixed effect, hence there is only one specification. Results in Table 3 reveal that the differences between parties are not straight forward. The Republican identifier alone remains highly significant at 0.06, confirming the fact that Republicans have shifted more to the right than Democrats to the left (Figures 1A and 1B). However, the interaction term is negative, meaning that Republican ideology is less responsive to redistricting than

Democrats'. However, this coefficient lacks statistical significance, signifying that there is no systematic difference in how the two parties respond to redistricting.

Table 3. Effect of redistricting on polarization, dependent on party.

Redistricting	0.027 (0.030)
Party	0.063*** (0.003)
Redistricting*Party	-0.011 (0.008)
State size	0.001*** (0.000)
Median income	+
Diversity	+
Congress fe	+
Constant	0.326***
R-squared	0.134
N	8 823

*Notes: Representative's DW-NOMINATE score's absolute value is the outcome variable. Party indicator takes value 1 for Republicans, 0 for Democrats. All regressions include congress fixed effects, and an interaction between Redistricting and State size. Standard errors in parentheses. *** - significance at 1%, ** - 5%, * - 10%.*

In order to assess the long-term effects of redistricting, I add up to four lags of the treatment variable. Table 4 contains the results of this investigation. In the second row is the effect of redistricting in the second election after the new district lines were drawn, e.g. 1984 elections based on the 1980 census. Third, fourth and fifth rows each show the effect in subsequent elections, e.g. 1986, 1988 and 1990. What is most noteworthy here, is that the coefficients seem to show an inverse U shape. They increase for the first three election cycles, but then fall as the new census is approaching. This same pattern appears in all three columns with different region specifications, although only the smaller divisions in columns 2 and 3 show some significant results. The significant coefficient 0.05 (at either 10%) is in fact the peak of the curve at the time of a third election after a census.

Table 4. Long term effects of redistricting.

	(1)	(2)	(3)
	Census Regions	Census Divisions	BEA Regions
Redistricting	0.038 (0.040)	0.036 (0.031)	0.033 (0.029)
Redistricting +1	0.041 (0.042)	0.041 (0.033)	0.037 (0.031)
Redistricting +2	0.050 (0.035)	0.050* (0.026)	0.046* (0.023)
Redistricting +3	0.028 (0.041)	0.029 (0.032)	0.025 (0.029)
Redistricting +4	0.022 (0.047)	0.022 (0.036)	0.018 (0.036)
State size	0.001 (0.001)	0.002** (0.001)	0.001** (0.001)
Party	0.058** (0.026)	0.059** (0.026)	0.058** (0.026)
Median income	+	+	+
Diversity	+	+	+
Region fe	+	+	+
Congress fe	+	+	+
Constant	0.303***	0.316***	0.290***
R-squared	0.148	0.161	0.160
N	8 823	8 823	8 823

Notes: Representative's DW-NOMINATE score's absolute value is the outcome variable. Party indicator takes value 1 for Republicans, 0 for Democrats. "Redistricting +1" is the effect in the second election after redistricting, +2 in the third, and so on. All regressions include region and congress fixed effects, and an interaction term between each (lagged) Redistricting and State size. Standard errors in parentheses. *** - significance at 1%, ** - 5%, * - 10%.

4.2. States with a stable number of districts as control group

As an alternative identification strategy, in addition to the one-district states I also consider states that have had a stable number of districts between 1983 and 2021 to be the control group. Once again, I run an OLS regression with the DW-NOMINATE score as an outcome variable. Results for the different definitions of a region are presented in Table 5. There appear to be no qualitative differences in the outcomes when using the two different control groups. Like in the previous specification, redistricting does not have a statistically significant effect in none of the regressions. However, the coefficient of the treatment effect is now even smaller, varying from 0.004 to 0.014. State size and Republican identifier variables are positive and highly significant in most specifications, while the economic and demographic controls are not.

Table 5. Effect of redistricting on polarization, controlling for different region specifications.

	(1)	(2)	(3)	(4)	(5)	(6)
	BEA Regions	BEA Regions	Census Regions	Census Regions	Census Divisions	Census Divisions
Redistricting	0.005 (0.016)	0.004 (0.016)	0.014 (0.014)	0.013 (0.014)	0.009 (0.013)	0.008 (0.013)
State size	0.001*** (0.000)	0.001** (0.001)	0.001** (0.000)	0.001 (0.001)	0.002*** (0.000)	0.002** (0.001)
Party	0.058** (0.026)	0.058** (0.026)	0.058** (0.026)	0.058** (0.026)	0.059** (0.026)	0.059** (0.026)
Median income	-	-0.000 (0.000)	-	-0.000 (0.001)	-	-0.000 (0.001)
Diversity	-	0.001 (0.001)	-	0.000 (0.001)	-	0.000 (0.001)
Region fe	+	+	+	+	+	+
Congress fe	+	+	+	+	+	+
Constant	0.333***	0.318***	0.338***	0.335***	0.325***	0.347***
R-squared	0.159	0.160	0.148	0.148	0.160	0.161
N	8823	8823	8823	8823	8823	8823

Notes: Representative's DW-NOMINATE score's absolute value is the outcome variable. Party indicator takes value 1 for Republicans, 0 for Democrats. All regressions include region and congress fixed effects, and an interaction between Redistricting and State size. Standard errors in parentheses. *** - significance at 1%, ** - 5%, * - 10%.

Table 6 is a replication of Table 2 with the different control group. Here a few notable differences are worth mentioning. First, results of the regressions with and interaction term show significant coefficients for marginal treatment effects in the Western, Midwestern and Northeastern Census Regions, while the coefficient for South lacks significance and is smaller by more than a half. In the Northeast, redistricting increases polarization levels by 0.03 and this effect is significant at 5% level. Notably, the size of the state loses significance in this specification. Furthermore, the previously found significant treatment effect in the Pacific (Census Divisions) or South West (BEA Regions) is confirmed here as well, although the effect is now smaller, at 0.03 compared to its previous value of 0.05. Some negative coefficients emerge in columns 2 and 3 as well, albeit all insignificant.

Table 6. Effect of redistricting on polarization, dependent on region.

	(1)	(2)	(3)
	Census Regions	Census Divisions	BEA Regions
Redistricting, marginal effect per region	1. 0.029*	1. 0.021	1. 0.018
	(0.015)	(0.013)	(0.014)
	2. 0.024*	2. 0.012	2. -0.009
	(0.014)	(0.021)	(0.018)
	3. 0.027**	3. 0.005	3. -0.017
	(0.013)	(0.019)	(0.016)
	4. 0.007	4. -0.009	4. 0.003
	(0.013)	(0.012)	(0.018)
		5. 0.033**	5. 0.029*
	(0.015)	(0.017)	
	6. -0.017	6. 0.031	
	(0.014)	(0.023)	
	7. 0.025**	7. 0.018	
	(0.012)	(0.016)	
	8. 0.034	8. 0.001	
	(0.023)	(0.013)	
	9. 0.005		
	(0.012)		
State size	0.001	0.002**	0.001**
	(0.001)	(0.001)	(0.000)
Party	0.058**	0.058**	0.058**
	(0.026)	(0.026)	(0.026)
Median income	+	+	+
Diversity	+	+	+
Congress fe	+	+	+
Constant	0.360***	0.358***	0.329***
R-squared	0.148	0.162	0.161
F statistic	4.11**	21.96***	16.22***
N	8 823	8 823	8 823

Notes: Representative's DW-NOMINATE score's absolute value is the outcome variable. Party indicator takes value 1 for Republicans, 0 for Democrats. All regressions include region and congress fixed effects. F statistic is for the joint significance of the region identifiers. Standard errors in parentheses. *** - significance at 1%, ** - 5%, * - 10%.

Turning to the difference in treatment effects between the parties, Table 7 provides even stronger evidence that the ideological extremism of the Democratic party is more sensitive to redistricting compared to Republicans. In this specification, the coefficient next to the interaction term between redistricting and Republican identifier is greater in absolute value at 0.015 compared to previous 0.011, negative, and statistically significant at 10%. Thus, these results indicate that the effect of redistricting is systematically different between the two parties and affect the Democrats more than Republicans.

Table 7. Effect of redistricting on polarization, dependent on party.

Redistricting	0.016 (0.012)
Party	0.063*** (0.003)
Redistricting*Party	-0.015* (0.008)
State size	0.001*** (0.000)
Median income	+
Diversity	+
Congress fe	+
Constant	0.328***
R-squared	0.134
N	8 823

*Notes: Representative's DW-NOMINATE score's absolute value is the outcome variable. Party indicator takes value 1 for Republicans, 0 for Democrats. All regressions include congress fixed effects, and an interaction between Redistricting and State size. Standard errors in parentheses. *** - significance at 1%, ** - 5%, * - 10%.*

Lastly, I replicate the investigation for the long term effects of redistricting using the second definition of a control group. The previously found inverse U shape does not reappear here. There seems to be a small dip in polarization in the second election after a census as seen by comparing the coefficients in first and second rows of Table 8. After that, however, coefficients increase and reach a high at the third lag at approximately 0.03, although significant at 10% only in column (1). The third lag coefficients are also relatively close in value to those reported in Table 4, further indicating the peak in polarization level in the election that is in greatest proximity from redistricting. The effect of previous redistricting in the election that is just before a new census is the smallest, at around 0.02.

Table 8. Long term effects of redistricting.

	(1)	(2)	(3)
	Census Regions	Census Divisions	BEA Regions
Redistricting	0.021 (0.015)	0.017 (0.016)	0.011 (0.016)
Redistricting +1	0.019 (0.014)	0.014 (0.015)	0.009 (0.015)
Redistricting +2	0.022 (0.014)	0.018 (0.015)	0.012 (0.013)
Redistricting +3	0.026* (0.015)	0.022 (0.016)	0.017 (0.014)
Redistricting +4	0.015 (0.013)	0.011 (0.015)	0.006 (0.013)
State size	0.001 (0.001)	0.002** (0.001)	0.001** (0.001)
Party	0.058** (0.026)	0.058** (0.026)	0.058** (0.026)
Median income	+	+	+
Diversity	+	+	+
Region fe	+	+	+
Congress fe	+	+	+
Constant	0.320***	0.330***	0.311***
R-squared	0.149	0.162	0.160
N	8 823	8 823	8 823

Notes: Representative's DW-NOMINATE score's absolute value is the outcome variable. Party indicator takes value 1 for Republicans, 0 for Democrats. "Redistricting +1" is the effect in the second election after redistricting, +2 in the third, and so on. All regressions include region and congress fixed effects, and an interaction term between each (lagged) Redistricting and State size. Standard errors in parentheses. *** - significance at 1%, ** - 5%, * - 10%.

5. Discussion and Limitations

5.1. Discussion

My findings indicate that there is no strong link between redistricting and party polarization in the U.S. House of Representatives. Although different identification strategies lead to quantitatively different results, generally redistricting does not seem to be the main cause of polarization. Controlling for time and regional trends I find that Representatives are, on average, 0.03 points more extreme in states that are subject to redistricting than in those which are not, although this coefficient lacks statistical significance. Defining control group as the states which have had a stable number of districts during the investigated period decreases the coefficient to approximately 0.01. This difference in the results obtained by two identification strategies shows that the single-district states may be a distinct subsample of small, unpolarized states, even if they are located in various regions across the country. When the control group is expanded to include bigger states, the effect

of redistricting appears to be even smaller. It is important to notice that even though the coefficients are small in magnitude, absolute majority of them are above zero, thus indicating that while redistricting may not be the main cause of polarization, the direct and immediate effect of the procedure is an increase in extremism. However, the investigation of long term consequences reveals that polarization is greatest when the temporal distance between the decennial redistricting is maximized. Therefore, it may be the case that redistricting and reapportionment in fact contain polarization levels by introducing uncertainty in the elections held in newly drawn districts.

I also find that although over the years 1983-2021 Republicans have shifted more to the right than Democrats to the left, it was in fact the Democrats whose ideological shifts were influenced more heavily by redistricting. The investigated period includes four redistricting cycles. In the 1983 election, Democrats added 17 seats to their already large majority held since 1955 and had 269 members in the 98th House (with 166 Republican Representatives). The 1990 redistricting infamous for racial gerrymandering culminated in 1992 elections in which Republicans gained 9 seats, although that was not enough to challenge majority Democrats who still occupied 258 seats (Republicans succeeded soon in 1994 by gaining staggering 54 seats). After the 2000 and 2010 census, Republicans were in the position to defend their majority in the House and succeeded both times, adding eight seats in 2002 and losing eight in 2010. This historical overview shows that the circumstances of the post-redistricting elections were not systematically different between the two parties in the investigated period. Both had to fight to win the majority, and both were in the position to defend it. Of the 20 Houses investigated, nine were controlled by Democrats, 11 by Republicans. Therefore, political landscape at the federal level does not explain why Democrats would become more polarized in the elections immediately following redistricting than Republicans, as it is not the case that one party always had to pursue winning marginal seats while the other only needed to defend their ground. Investigations of the swing ratio reveal that Republicans have been better able to manipulate election outcomes by having control in more state legislatures than Democrats (Associated Press, 2017; Wasserman, 2021). It may be that as Democrats were unable to affect the redistricting process itself, the party focused on differentiating themselves from the competition as would be predicted by the directional voting theory or even the median voter theorem with valence. What is clear is that while the divergence of the two parties is evident, it was not a direct consequence of redistricting.

My findings differ from those of Carson et al (2007), as they find redistricting to increase polarization above national trends. The value of the coefficients they find for redistricting ranges from 0.015 to

0.124, depending on the decade, albeit the effect is only significant at the 5% level. The reason for the diverging results may lie in the fact that Carson et al identify significantly altered districts while I only differentiate between states subject to redistricting and not. In fact, they find the effect of “modest redistricting” to be at around 0.02 (significant at 5% for the whole period 1968-2002), which is close to my findings. However, as I do not obtain statistically significant results in most specifications, I do not agree with their general conclusion that redistricting increases polarization. Nevertheless, my findings are in line with their other observations that large states are more likely to be polarized and that Representatives from the whole country, not only the South, have become increasingly more extreme.

Masket et al (2012) who also find a negligible redistricting effect on competition or polarization identify the different circumstances under which the new maps are drawn. They use NOMINATE scores as well and find that while they increased in states who created bipartisan plans, they actually fell when one party had full control over redistricting. This may explain why on average, the impact of redistricting on polarization is almost nil. Bipartisan plans tend to preserve incumbents and thus allow for increasingly extreme positions. But partisan gerrymandering aims to spread out the voters to win more seats and thereby encourages moderate positions. On a national level, over a long period time, these effects cancel out.

Results of my analysis point to regional differences in the effect of redistricting on polarization. McCarty et al (2006) claim that as the seats have been continuously shifted from North to South since the 1980's, the gerrymandered districts are more likely to be found in the South, which is already more polarized since the Civil War. Other scholars also employ measures to account for regional differences, and for example, Theriault (2006) finds the greatest ideological shift since the second World War to have happened in the South. However, the regional variations I find using three different ways to define a region never point to more polarization in the South. Instead, Eastern and Northeastern parts of the U.S. exhibit higher marginal effects. A possible reason why my findings differ from Theriault (2006) may be that he investigates the period of 1972-2002 and the tumultuous 1992 election may weigh heavier in his investigation than in mine, which includes two more decades. In a later paper McCarty et al (2009) also claim that redistricting may only explain 10-15% of the polarization, which is in line with the small effect uncovered by my research.

Investigating long-term effects of redistricting I find that Representatives do react to the proximity to the next redistricting cycle, and their ideological extremism follows an inverse U shape within a

cycle. Other expressions of such responsiveness have previously been observed by Hetherington et al (2003) who found that incumbents are more likely to retire as the redistricting cycle progresses. Hirsch (2003) also claimed that the first elections after redistricting usually result in higher turnover and lower victory margins, with the exception of the 2002 election. Combined with my results, it seems that redistricting creates uncertainty for incumbents which incentivizes them to reevaluate their reelection chances and subsequently either occupy a “safer” moderate position, or retire.

However, even if redistricting does not cause polarization in the House, this does not mean that redistricting is inconsequential and should be ignored. It may still hold that parties engage in gerrymandering and affect the swing ratio to their benefit. This would make the House unrepresentative of the population and over-responsive to a select group of voters in gerrymandered districts. Yet, it seems that the nature of the redistricting process limits the extent to which it can lead to polarization. First, as discussed before, parties must choose between seat safety and seat gains. This trade-off prevents them from creating permanently safe districts with large amounts of wasted votes which would theoretically allow the Representative to stray away from the median voter. Rather, parties choose to use redistricting to increase their chances in marginal races, which may, in fact, encourage moderate positions. Second, in order to strategically draw new district lines a party must have authority over the responsible institution, either the state legislature or some special committee. The power shifts in those institutions, brought about by local elections, prevent partisan gains from continuously being one-sided. Lastly, the constitutional requirements of compactness, contiguity and equal population greatly restrict the freedom of the mapmakers. These may be the possible reasons why redistricting has a negligible effect on polarization.

5.2. Limitations of the research

There are several limitations to my empirical strategy. To begin with, as mentioned in section 3.1, I cannot confirm the presence of a common trend between treatment and control states as there is no pre-treatment period. However, I believe that the fixed effects and control variables included accounted sufficiently for the differences between the states. Furthermore, I make an implicit assumption that all states that are subject to redistricting do adjust their district boundaries and I do not differentiate between significantly altered districts and those whose shape changed only slightly. Another limitation to the credibility of my results is the fact that due to lack of data I do not include any district-level control variables. Ideally, one would control for district’s median income or racial heterogeneity rather than the state’s, as they may be more correlated to a Representative’s ideology

than the state characteristics. Another data-based limitation is the lack of individual level-controls. At the very least, one would like to account for the Representative's seniority in the House or, alternatively, their freshman status. Additionally, personal traits such as gender or race may also contribute to their ideology (Bratton & Hayne, 1999; Vega & Firestone, 1995). However, compilation of such micro data is outside of the scope of this study.

The use of DW-NOMINATE scores as the depended variable should also be addressed. While the scores allow for a nice interpretation, they are not perfect. The model from which they are derived is linear in nature. This prevents drastic jumps in ideology over a Representative's career, thus likely failing to capture Congress-to-Congress changes (Carson et al 2007; Theriault, 2006; Vega et al 1995). Therefore, although I do not explicitly differentiate between incumbents and freshmen, it could be that most of the observed change is brought by new members. However, DW-NOMINATE is arguably the most popular index amongst political scientists, and studies that employed multiple measures find that their results were qualitatively not dependent on the index used (Boatright, 2004; Theriault, 2006). It is important, though, to keep in mind that by using DW-NOMINATE scores I only investigate the elected Representatives, and do not account for those who lost the race. Furthermore, as it is an ex-post evaluation, I implicitly assume that the candidate's campaign platform which garnered the voters' support is highly correlated with their subsequent voting behavior in the House.

6. Conclusion

The stark opposition between Democrats and Republicans has become the norm in American politics in recent decades. For the party in the opposition, refusing to work with the majority is seen as the only strategy to win the support of the electorate and regain power in the next election. Therefore, parties have become more homogenous and strayed farther away from moderate politics; core Democrats are liberal, most prominent Republicans are conservative. This, however, may just be the reflection of the divisions in the electorate and generally changing party strategies, rather than the consequence of some structural flaws of the American democracy.

In this research I find that congressional redistricting does not cause party polarization in the U.S. House of Representatives. Parties in control of the redistricting process across the country face various obstacles and strategic tradeoffs. It is not in their best interest to create overtly safe districts; they also have the incentive to win in the neighboring areas to win more seats. As bipartisan behavior in the House has become rare, having the majority in Congress is vital to achieve party

objectives. Therefore, although investigating the period of 1983-2021 I find a mostly positive relationship between redistricting and polarization (although miniscule and insignificant), this trend may reverse in the near future.

Academics and political pundits concerned with the negative consequences of polarization, however, face a difficult challenge. Partisan division seems to stem from the electorate who is now more divided along party lines than ever before. Most democratic voters despise Republicans, and consequently, look down upon any Democrats who ideologically approach Republicans. This encourages Representatives to obtain more extreme positions and abandon the median voter. There are no amendments to the Constitution or to the election laws that could change this voter behavior and, subsequently, the partisan division of the House. While partisan gerrymandering may affect Congressional elections in multiple ways, increasing polarization is not one of them. The animosity between red and blue is the state of the Union, and at this moment, there is no quick solution to it.

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Appendix

Table A1. Region specifications.

Census Regions	Census Divisions	BEA Regions
1. West – Pacific (5) & Mountain (2).	1. East North Central – IL, IN, MI, OH, WI.	1. Great Lakes – IL, IN, MI, OH, WI.
2. Midwest – East North Central (1) & West North Central (3).	2. Mountain – <i>ID</i> , (MT), <i>NM</i> , NV, UT, <u>WY</u> .	2. Rocky Mountains – <i>ID</i> , CO, (MT), UT, <u>WY</u> .
3. Northeast – Middle Atlantic (7) & New England (8).	3. West North Central – <u>ND</u> , <u>SD</u> , IL, IN, <i>MN</i> , OH, WI.	3. Southwest – AZ, <i>NM</i> , OK, TX.
4. South – West South Central (4), East South Central (6) & South Atlantic (9).	4. West South Central - <i>AR</i> , LO, OK, TX.	4. Plains – IA, KS, <i>MN</i> , MO, <u>ND</u> , NE, <u>SD</u> .
	5. Pacific – <u>AK</u> , CA <i>HI</i> , OR, WA.	5. Far West - <u>AK</u> , CA, <i>HI</i> , NV, OR, WA.
	6. East South Central – <i>AL</i> , KY, MS, <i>TN</i> .	6. New England – CT, <i>MA</i> , <i>ME</i> , <i>NH</i> , RI, <u>VT</u> .
	7. Middle Atlantic – NJ, NY, PA.	7. Mideast – <u>DE</u> , MD, NJ, NY, PA.
	8. New England – CT, <i>MA</i> , <i>ME</i> , <i>NH</i> , RI, <u>VT</u> .	8. Southeast – <i>AL</i> , <i>AR</i> , FL, GA, KY, LO, MI, NC, SC, <i>TN</i> , VA, VW.
	9. South Atlantic - <u>DE</u> , FL, GA, MD, NC, SC, VA, VW.	

Note: Montana (MT) is excluded from the analysis. Underlined are one-district states. States in italics had a stable number of districts during the investigated period.

Table A2. Effect of redistricting on extremism in small states.

	(1)	(2)	(3)	(4)
	<15 seats		<10 seats	
Redistricting	0.016 (0.039)	0.011 (0.033)	0.008 (0.042)	0.008 (0.032)
State size	0.005* (0.003)	0.007** (0.003)	0.006* (0.003)	0.006* (0.003)
Party	0.094** (0.025)	0.094** (0.025)	0.111*** (0.022)	0.110*** (0.022)
Median income	-	-0.001 (0.001)	-	-0.000 (0.001)
Diversity	-	-0.001 (0.001)	-	-0.000 (0.001)
Census Region fe	+	+	+	+
Congress fe	+	+	+	+
Constant	0.290***	0.358***	0.283***	0.302***
R-squared	0.244	0.249	0.270	0.271
N	4690	4690	3368	3368

Notes: Representative's DW-NOMINATE score's absolute value is the outcome variable. Party indicator takes value 1 for Republicans, 0 for Democrats. All regressions include region and congress fixed effects. Standard errors in parentheses. *** - significance at 1%, ** - 5%, * - 10%.