The Effects of Individual Ideology on US Congressional Productivity

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Multiple sources claim that ideologically extreme members of the U.S. Federal Congress cause that legislature to be less productive. I evaluate that claim. The literature on congressional productivity and the factors affecting it is reviewed. The difficulties of empirically measuring and studying congressional productivity are discussed. Causal inference within the realm of legislative politics is shown to be difficult due to data constraints; an example of an attempted causal model is given. Simple statistical analysis, however, is used in collaboration with the extant literature to demonstrate that the ideological extremity of individual congresspeople has less effect on legislative output than does overall agreement in policy preferences. Thus, similarity in policy preferences across the legislature is concluded to be more important in determining congressional productivity than whether or not those preferences are ideologically extreme.

I. Introduction

The US Federal Congress has garnered some notoriety amongst the citizenry for being flagrantly slow and inefficient, with many Americans finding themselves frustrated by political gridlock taking the place of productive policy-making (Pew Research Center, 2020). This is not to be wholly unexpected, of course—it is in the nature of large, deliberative bodies to be thorough and careful in their approach to policy-making, and this is by design, as the framers of the US Constitution sought to ensure that policies passed for the American public were subjected to rigorous deliberative treatment. Still, incessant gridlock leaves many Americans feeling that they ought to expect more out of their Congressional representatives. Especially in recent decades, Americans have begun to witness an increasing divide in Congressional politics, with the two dominant parties becoming more ideologically polar and less likely to compromise (Persily et. al, 2015).

Multiple writers have suggested that this ideological divide is a primary driver of the political paralysis evident in modern Congressional politics (Gehl & Porter 2020, Wheelan, 2013). More especially, these writers claim that ideologically extreme Congresspeople, who operate at the fringes of the political spectrum, are the primary culprits for Congressional unproductivity (Wheelan, 2013). They suggest that these ideological extremists are less willing to compromise and find bipartisan solutions to difficult issues, preferring instead to take an un-budging ideological stance. But is it actually the case that a Congress with more ideological extremists will be less productive than one with fewer extremists? Due to the plethora of variable factors that affect Congressional productivity and the lack of convincing data on these, a rigorous empirical answer is surprisingly difficult to produce. The present study seeks to demonstrate that difficulty, while still making an earnest effort to produce such an answer. In what follows, I use an instrumental variable approach, using detailed data from five years of Congressional activity, in an attempt to elicit an estimate of the causal effect of ideologically extreme legislators on Congressional productivity. This method fails to produce such an answer, and provides a useful illustration of just how difficult empirical work pertaining to the US Congress can be. Following this demonstration, I utilize data on every US Congress from the legislature's inception in 1789 to the 108th Congress in 2003 to make a statistical analysis of the various factors influencing Congressional productivity. Particularly, I use empirical measures of ideological polarization and individual extremity within each Congress to study the relationship between these and legislative

productivity generally. This analysis, though unable to determine causality, provides useful insights into the effect that ideological extremists might have on the legislature's productivity.

A swathe of possible solutions have been put forward to resolving the issue of Congressional gridlock, but not all are based in empirical research. Ideological extremity, though possibly off-putting to more moderate Americans, does not immediately answer the question of what causes some Congresses to be more or less productive than others. This article provides a rigorous and thorough addition to the conversation on improving American legislative politics. Foremost among the insights I provide is that the ideological polarity of a given Congress, more than its extremity, has a meaningful impact on legislative output. Thus, I argue that ideological extremists in Congress are only a problem insofar as they are extreme relative to other members of Congress. If all members of the legislature were to share similar political preferences, regardless of how far left or right these preferences were, we could reasonably expect a high level of productivity from this Congress.

This study proceeds in the following manner: Section II exposits the existing literature on the subject of measuring Congressional productivity and the factors that affect it; Section III details the difficulties inherent to empirical studies of the US Congress, and includes a demonstration of how methods of causal inference break down given those difficulties; Section IV provides a unique statistical analysis of Congressional productivity and the factors that affect it; Section V concludes.

II. Literature Review/Theoretical Background

Measuring Congressional Productivity

In order for a rigorous discussion of Congressional productivity to be held, a valid means of measuring that productivity has needed development. This is no simple task, as a plethora of various considerations factor into what can meaningfully be considered legislative "productivity". The subject has thus garnered much attention in the literature of political science.

One simple, though possibly naive, approach to measuring Congressional productivity considers productivity in terms of raw policy output: Squire (1998) measures legislative productivity as the percentage of bills that are enacted out of the total number of bills presented to a congress. While this does work as an effective "batting average" for a given congress, Squire himself admits to it only giving a crude handle on overall legislative productivity. This is largely because not all bills (or proposed bills) are created equally; some bills are introduced with less of an eye towards generating actual policy than towards fulfilling a political favor or demonstrating some ideological grandstanding. Bills such as these are often not meant to pass, but their failure to be enacted does not make them wholly without merit or effect. Additionally, the sheer volume of bills processed itself cannot speak to the relative importance of those bills. As noted in Grant and Kelly (2008), it may not be useful to consider a congress that passes a high volume of trivial legislation as being more productive than one that passes only a handful of major, historic legislation.

Attempting to characterize the relationship between the number of bills presented and the number of bills passed, both Rogers (2005) and Hicks (2015) measure raw enactments as a dependent variable, and control for the number of bills presented on the right-hand side of their equations. Though perhaps an improvement on Squire's approach, this raw-enactments based approach still falls prey to the aforementioned weaknesses, being unable to account for the content and quality of the bills produced. Evidently, accounting for this quality is essential to any truly meaningful measure of Congressional productivity.

Attempting to do this, Mayhew (1991) developed a new approach. In his seminal *Divided We Govern,* Mayhew seeks to account for the relative importance of legislation passed by utilizing both contemporaneous and retrospective evaluations of that legislation. He approaches this process in two stages: in Stage One, Mayhew uses annual end-of-session wrap-up articles from the New York Times and Washington Post to survey contemporary judgements about the significance of Congress's work each session. In Stage Two, Mayhew relies on current-day policy specialists' retrospective judgements to gauge the importance of the legislation passed by each congress. Using the results of Stage One to inform his selection of laws during Stage Two, he generates a comprehensive list of landmark laws of congress between 1946 and 1990. Productivity is measured as the absolute number of these laws enacted in a given congress.

This approach, which allows for a more qualitatively accurate estimate of Congressional productivity, is further improved upon in Binder (1999), who recognizes that, although Mayhew's measurement does a satisfactory job of accounting for the *supply* of federal legislation, it provides little information about the *demand* for that legislation. Though difficult to quantify, Binder suggests that demand might be measured as the "issues that are commonly perceived by members of the political community as meriting public attention." She similarly uses editorials from the New York Times to identify the legislative bills presented to each congress, but removes from her consideration any bill that was editorialized upon only four or fewer times, thus developing a list of "salient, high-demand policy issues". Interestingly, Binder chooses to measure Congressional gridlock, rather than productivity; this is the percentage of bills from the list of those proposed that did *not* reach enactment.[1]

These methods, because of their reliance on modern newspaper editorials, are limited in their historical reach (neither Binder nor Mayhew's work extends further back than 1946). Following a similar methodology, however, Grant and Kelly (2008) create a comprehensive measure of Congressional productivity with a greater reach. They combine data and measures from a wide variety of scholarly and historical sources tracing Congressional productivity back to the legislature's inception in 1789. Specifically, they gather multiple time series of indicators for Congressional productivity (as produced by other scholars) and combine them together using the W-CALC method of Simson (*Public opinion in America: Moods, cycles, and swings. 2nd ed.,* 1999), which is able to overcome differences in scale between the various time series. In this way, they combine several reputable measures of legislative productivity to create two indices--the "LPI", which measures the productivity of congress in terms of both major and general legislation, and the "MLI", which measures productivity exclusively in terms of major legislation. Grant and Kelly then demonstrate, quite rigorously, that these indices possess content, convergent, and construct validity. Because these indices have such demonstrable validity as measures of Congressional productivity, and because they are created from (and therefore build upon) the similarly rigorous work of other scholars (such as Binder), the LPI and MLI are among the most complete and effective measures of congressional productivity to date.

[1] The choice to study gridlock, rather than productivity, is of minor importance. When productivity and gridlock are measured as the percentage of total bills presented that were enacted or that failed to be enacted, respectively, they are essentially the inverse of one another.

For this reason, I rely heavily on the LPI in my statistical analysis of Congressional productivity in Section IV.

Factors Affecting Congressional Productivity

An extremely broad array of different factors play into Congress's ability to produce legislation, and much of the difficulty in studying Congressional productivity is due to this nigh unmanageable breadth. Despite this, various researchers have approached the subject of what factors influence Congressional productivity and have begun to illuminate a generally cohesive picture. Foremost on the list of factors to consider is conflict within congress: "So long as men have different views," writes Robert Dahl (1967), "conflicts will arise." Mayhew (1991) addresses very thoroughly the claim that "divided government"--i.e., a US government wherein the Executive and Legislative branches are controlled by opposing parties--slows policy production. This claim makes intuitive sense, as competing parties would, in theory, be more likely to engage in the sort of political back-and-forth that would generate gridlock; Mayhew finds, however, that such "divided government" has no real effect on Congress's policy output. Subsequent revisitations of his work, however, have not been so conclusive. Kelly (1993) and Howell et. al (2000) both find that divided government negatively affects the production of "landmark" laws.

But mere partisanship in government may not be enough to account for variation in Congressional productivity. Jones (2001) suggests that it is important also to account for differences in policy preferences between the parties. Following this line of argument, he measures partisan polarity as the difference between the percentage of Democrats voting yea on a given measure and the percentage of Republicans who do the same. Measuring ideological polarity in this way allows for a more nuanced analysis of the effects of partisanship on Congressional productivity, and he finds that an increase in this polarization also increases the likelihood of a Congress encountering gridlock. Similar efforts to account for inter-party and even intra-party ideological polarity have been undertaken using item-response models of policy preferences (Binder 1999; Hicks 2015), each with similar results. Importantly, however, the magnitude of the influence of ideological polarity is demonstrated in each of these studies to be

proportional to the extent that one party has a majority; when the difference in the number of voting seats that the two major parties hold is small, the likelihood of gridlock is increased dramatically. This is intuitive--the tighter the competition, the more difficult it is for a congress to be productive.

In addition to the closeness of partisan competition, researchers have identified other institutional factors that affect Congressional productivity. Binder (1999) demonstrates that bicameralism is an important consideration. The difference in policy preferences between the two chambers of Congress has a significant impact on the congress's productivity; the greater the difference, the less productive they are likely to be. Another important institutional factor is the filibuster and the means to thwart it. Jones (2001) shows that when one party has enough Senate seats to thwart an attempted filibuster, productivity increases.

Though debate still exists in the literature, the general consensus appears to be that divided partisan control of government, in and of itself, has little effect on Congressional productivity, but when considered more intricately with regards to actual policy preferences, and in tandem with variables at the institutional level, it can impact legislative output. When the setting is right for competition to be fierce (i.e., the partisan seat margin is small and difference in policy preferences between parties is high), decreased productivity is likely. These results have been demonstrated to be robust even in other legislative settings, such as at the state level (Hicks 2015) and in legislatures outside the U.S. (Baumgartner et al, 2013 performs a comparative analysis using data from the French National Legislature).

Most of this analysis, however, has been done at the party level. Less work has been done evaluating the effects of ideological polarity at the level of individual congresspeople, and even that work has not been able to explore this variable with much nuance. The contribution of this paper is to explore how ideological preferences of individual Congresspeople affects the legislative output of the US Federal Congress.

III. Challenges of a Causal Model of Congressional Productivity

The question of whether or not extreme individual legislators negatively influence congressional productivity is an inherently causal one, though causality is, in this instance, very difficult to prove. In an ideal world, researchers might hope to conduct a controlled experiment,

wherein they could empirically test the claim that more ideological extremists in the legislature cause it to become less productive. Perhaps these researchers would take two identical legislatures and, holding one fixed, replace some members of the other with more extreme legislators. In this idealized situation, the question of causality could be effectively and powerfully addressed, for any difference in outcomes would be necessarily attributable to the addition of those extreme legislators to the second legislature.

Such an experiment is obviously not possible in the real world. As is the case with many of the phenomena studied by the social sciences, the realm of congressional productivity is affected by so many diverse factors that it would be infeasible to control for all of them, if not ethically dubious as well. In settings like these, social scientists often employ quasi-experimental methods to exploit natural changes in non-experimental data as a means of testing some causal hypothesis. Much of the literature in econometrics and political science is devoted to this sort of quasi-experimental causal inference. Due to critical data constraints, however, such an approach to congressional productivity is extremely limited, and likely not possible. These constraints include the relatively small amount of data that exists on congressional productivity, the vast number of factors that affect these data, and the rapid pace at which those factors change and evolve. In this section, I propose a method of causal inference regarding ideological extremists and their effect on congressional productivity, and subsequently demonstrate how it is hampered by these constraints, as well as other empirical shortcomings. This is done to provide a conspicuous demonstration of the empirical difficulties inherent to studying this topic.

Data and Strategy

In this approach, I attempt to test directly the hypothesis that the addition of an ideologically extreme congressperson to the federal legislature will cause that legislature to become less productive. I utilize data on five years of US Senate activity to evaluate this hypothesis, using an instrumental variable method.[2] Occasionally, a federal congressperson's

[2] I use only five years of data on this topic due to the difficulty of collecting these data. As will be shown, my method requires a measurement of the quantity of legislation a given congress has passed that can be matched very precisely to the time period it was passed in. Compiling these data is labor-intensive, and given that the method I'm collecting them for fails on to meet certain necessary empirical criteria (as will be shown below), the effort required to collect further data for this model is not worthwhile.

seat becomes vacant midway through the legislative session. This may be due to the congressperson's death, appointment to another office, resignation, or some other unexpected event. In such cases, a new congressperson is usually chosen to replace them, either by appointment from their state's governor or by a special election.[3] Thus, when this new person assumes office, the Congress and the legislative environment which they become a part of is almost exactly the same as that of their predecessor--except for them. Any change in the Congress's ideological polarization will be due to the addition of this new legislator, and if this new legislator is more ideologically extreme than their predecessor, polarization is certain to increase. I exploit this almost random switch in Congresspeople as an instrument for changes in ideological polarization.

Explicitly, I estimate a 2-Stage Least Squares model, of the following form:

$$Polarization_{it} = \beta_{10} + \beta_{11} NewExtremist_{it} + \beta_{12} X_{it} + u_{it} \quad (1)$$

$$Productivity_{it} = \beta_{20} + \beta_{21} \widehat{Polarization}_{it} + \beta_{22} X_{it} + u_{it} \quad (2)$$

Where the first stage, equation (1), captures the variation in polarization due to a Congressperson being replaced by a more ideologically extreme Congressperson mid-term. *Polarization* is measured as the standard deviation of DW-NOMINATE[4] scores for an entire congress *i* at time *t*. *NewExtremist* is an indicator that assumes a value of 1 when a sitting Senator has been replaced by someone more ideologically extreme than him or her, and 0 otherwise.[5] The second stage, in

[3] Only senators may be replaced by a gubernatorial appointment. This special case is provided for in the 17th amendment to the US Constitution. If a gubernatorial appointment is not made, a special election may be held. Replacement representatives to the House are always decided by special election, if at all. If a seat becomes vacant reasonably close to the regularly scheduled election for that seat, a replacement may or may not be sought.

[4] To measure the political ideology of individual Congresspeople, I utilize a DW-NOMINATE score for each legislator in each US Congress in my dataset. These scores have been calculated by Lewis et. al (2020) and are publicly available at *voteview.com.* DW-NOMINATE (**D**ynamic **W**eighted **NOMINA**l **T**hree-step **E**stimation) scores are created via a multidimensional scaling procedure that uses a legislator's roll call votes to place them on a spatial "map" of policy preferences, where scores range between -1 and 1, with a score closer to -1 being more liberal, and a score nearer to 1 being more conservative. Interestingly, as demonstrated in Poole and Rosenthal (1985), this single liberal-to-conservative dimension is sufficient to explain most of Congressional roll call voting behavior in US history.

[5] I use exclusively Senators, not Representatives, in this model, to reduce heterogeneity between the occurrences of each mid-term "switch." Representatives may or may not be replaced, and this replacement, if made, is often done by a special election; replacement Senators are simply made by gubernatorial appointment.

equation (2), regresses productivity on the fitted values from equation (1), thus capturing the effect of a change in polarization due to a replacement legislator on overall legislative productivity. *Productivity* is measured as the percentage of bills passed out of those introduced in congress *i* during time *t*. In both equations, *X* is a vector of institutional, political, and demographic characteristics utilized as controls.[6]

My data are longitudinal and include a rough measure of legislative productivity over time for each Senate. As noted, productivity is here defined as the percentage of bills passed by the Senate out of the total introduced to it. As was discussed in Section II, measures of productivity that only consider policy output in terms of *quantity* (excluding considerations of *quality*) are crude proxies for actual productivity. For this instrumental variable approach, however, I utilize this particular measure of productivity because it allows the flexibility necessary to execute the approach. Mid-term "switches" in Senators happen at random intervals throughout a congressional session, and sometimes occur multiple times during the same session. More complete measures of legislative productivity, such as Grant and Kelly's LPI, have only ever been calculated on the session level, and so any mid-term changes in productivity would not be detectable using these metrics. By utilizing raw policy output, I am able to operate at a much more granular level, determining the precise quantity of bills passed between each mid-term "switch" in legislators.

As noted, I include in these regressions a multitude of variables that might influence congressional productivity, including a measure of ideological polarization, the federal budgetary climate, the balance of power, and the salary of legislators, among other things. Even controlling for all these variables, a basic multiple linear regression of productivity on polarization would be insufficient to *truly* identify the causal effect at play. So many factors affect legislative productivity that some level of bias due to omitted variables is sure to be a factor. This instrumental variable method, however, should (at least in theory) be able to eliminate that bias.

The first stage of this model ensures that *only* that portion of the change in polarization which can be attributed to the addition of a new, more extreme legislator is considered in

[6] Specifically, these controls include many of those factors commonly cited in the literature on congressional productivity (see Section II). These are partisan seat margins, whether one party has bicameral control, whether the Congressional majority and the Executive branch both belong to the same party, the salary of congresspeople, the national mood, the national budgetary climate, and the national population.

equation (2). Because the addition of this new legislator is strictly uncorrelated with the error term *u*, the effect captured by $\beta_{21}$is absolved of endogeneity.

Analysis

I estimate this two-stage model using data on ten years of Congressional activity, encompassing the years 1989-1997. During this nearly decade-long period, mid-term Senatorial changes were made ten times. Of these changes, only three involved the addition of a Senator more extreme than their predecessor. Already, given the sparseness of these data, one has reason to be skeptical towards any results provided by this method. These data, though they span nearly a decade, provide a very meagre amount of information.

The results of estimating this two-stage model can be seen in Table 1 (Appendix). Importantly, I estimate the two-stage model in this instance without any control variables, which is necessary given the small amount of data used. More problematic than the small amount of data, however, is that the necessary conditions of an effective instrument are not met by *NewExtremist.* Specifically, the relevance assumption and exclusion restriction are both inarguable, which can be seen in the covariance matrix, Table 2, below:

Table 2: Covariance Matrix

	polarity	new_extremist	productivity
polarity	1	-0.011	0.042
new_extremist	-0.011	1	0.137
productivity	0.042	0.137	1

An effective instrument must be *relevant* to the regressor of interest. As there is only a small Pearson correlation coefficient between *NewExtremist* and *Polarity*, this is difficult to argue. Additionally, and of greater concern, is that *NewExtremist* is evidently correlated with *Productivity* via channels other than *Polarity*. This can be seen from the fact that the correlation coefficient between *NewExtremist* and *Productivity* is 0.137, while the correlation coefficient between *NewExtremist* and *Polarity* is only -0.011. Evidently, a mid-term switch in congresspeople affects the legislature's productivity via means other than increased polarity--it's probable that such factors as transition costs, temporary shifts in the number of voting members,

and the political embroilment that often accompanies replacing a Senator might each have their effects on legislative productivity. Thus, the exclusion restriction (that an instrument must not be correlated with the dependent variable *except* through the regressor of interest) is violated. Because of this, the instrumental variable approach I propose fails. No amount of data can remedy this--the conditions of causal inference simply are not met.

It is unlikely that a better instrument for detecting the effect of an extreme legislator on congressional productivity could be found. There is such a vast plethora of factors affecting legislative productivity that it is nigh impossible to control for them all, and this is *especially* true given the meagre amount of data that is available on federal US congresses. To date, there have only been 117 US federal congresses, meaning that even a dataset comprising information on all of them would be relatively sparse. Additionally, the political, social, and economic environments that these Congresses operate in evolve quickly and dramatically from year to year, introducing a host of *additional* variables that might influence productivity. These variables--including short-lived institutional rules or contemporaneous technological advances--may only exist in a fraction of the already small data set, and thus are likely impossible to meaningfully control for.

All of these hurdles combine to make attempts at controlled quasi-experiments in the realm of congressional productivity more or less intractable. Specifically, the relatively small number of Congresses that have been held since the legislature's inception, the quickly-changing political and institutional environments in which these Congresses find themselves, and the overwhelming number of variables that affect productivity all hamper my attempt at causal inference. My approach to evaluating the effects of extreme political views in Congress is therefore constrained to tools of correlation, rather than causation. These nevertheless manage to produce meaningful insights, and so I explore them in the following section.

IV. Statistical Analysis of Congressional Ideology and Productivity

In this section, I conduct a statistical analysis of congressional ideology and productivity, so as to better understand the relationship between the two. Despite being unable to make a rigorous causal inference, multivariate regression tools are still able to produce meaningful insights into this topic. In what follows, I detail the data I use for this method, outline my empirical strategy, and discuss my results.

Data

Dependent Variable

For my statistical analysis, I utilize the Legislative Productivity Index (LPI) as constructed by Grant and Kelly (2008) to measure legislative productivity. As discussed in Section II, this index is the most robust and comprehensive measure of legislative productivity available, and stretches from the 1st U.S. Congress in 1789 through the 108th in 2003. Comprising 214 years of legislative history, it is sufficient not only for an in-depth study of congressional productivity generally, but also for a more nuanced approach that allows me to investigate varying trends and factors over time.

Measuring Ideology

Using DW-NOMINATE scores, I am able to create several variables useful to exploring the effects of ideology at both an aggregate and an individual level. At the individual level, I classify each Congressperson as being either an ideological moderate, extremist, or neither. To identify political "moderates," I select the congresspeople with the median 10% of all DW-NOMINATE scores since 1789. To determine which congresspeople can be considered as having an "extreme" political ideology, I combine two separate measures: first, I look at those congresspeople with a DW-NOMINATE score either below the 1st percentile or above the 99th percentile of all DW-NOMINATE scores for all Congresspeople since 1789. I select these percentiles based on the distribution of all-time DW-NOMINATE (see fig. 1, appendix); this selection represents the extremes of the data. Second, I evaluate the local outlier factor (LOF) for each congressperson in my dataset, which compares their ideology score to that of their 20

nearest neighbors across the dimensions of time and ideology. A high LOF means the congressperson is notably different from the ideological scores of his or her contemporaries. In this way, I am able to account for changes in what is considered an "extreme" view over time. Those congresspeople with a LOF of greater than 1.2 are considered particularly extreme. Comparing these congresspeople with the congresspeople identified by looking at the extremes of the data, I find considerable overlap, indicating that these congresspeople can reasonably be identified as being "extreme."

I also utilize DW-NOMINATE scores to produce relevant party- and congress-level variables. For each congress, I measure the congress's overall ideological extremity as the absolute mean DW-NOMINATE score of each of its individual members. I choose the absolute value of the mean here because I am interested in studying extremity generally; right-extremity versus left-extremity will be considered later on. I measure each congress's overall ideological polarity as the standard deviation in DW-NOMINATE scores for that congress.

Importantly, as noted in Binder (1999), the US Congress is a *bicameral* legislature, and this also ought to be considered in discussions of legislative productivity. I therefore create a measure of bicameral differences for each congress, represented by the difference between the mean DW-NOMINATE score in the Senate and the mean score in the House. The larger this bicameral difference variable is for a congress, the less ideological agreement exists between its two chambers. In addition to considering bicameral alignment, I create indicator variables for whether or not each chamber is controlled by the same party (a "unified" congress) and whether or not the Presidency is also controlled by that party (a tri-"unified" government).

Further Control Variables and Institutional Details

Also of interest to my analysis are variables concerning certain institutional details of Congress. I control for the number of seats in congress (as this has increased over time), the partisan seat margin, and how long the majority party in congress has been in power..

Other variables I am able to control for include data on the US population, the federal budgetary climate, and salary paid to members of Congress. One potential variable of interest that my analysis misses is information regarding the institutional arrangements that allow for filibusters in the Senate. It has been suggested that this mechanism could play a significant role in determining Congressional productivity, though Binder (1999) does not find evidence to

support this hypothesis. I have chosen not to include data on the threat of filibuster in my analysis for two reasons: first, because I am already controlling for super-majorities in the senate, as well as the ideological polarity of senators, and second, because the institutional arrangements allowing for filibusters have changed dramatically over time, and effectively capturing the historical nuance pertinent to this phenomenon is beyond the scope of this project.

Empirical Strategy

I use model 1 to estimate the effects of general ideological extremity and polarity in a congress on that congress's productivity:

$$Productivity = \beta_0 + \beta_1 Extremity + \beta_2 Left + \beta_3 Ex * Left + \beta_4 Polarity + \beta_5 X + U \quad (1)$$

Where the dependent variable is the overall productivity of a given congress (measured using Grant and Kelly's Legislative Productivity Index), *extremity* is the absolute mean DW-NOMINATE score for the congress[7], and *polarity* is the standard deviation in DW-NOMINATE scores for the congress. *Left* is an indicator variable that assumes a value of 1 when the congress's mean ideology score (not absolute value) is below zero. This is interacted with *extremity,* so as to allow me to explore the effect not only of extremity generally, but of differences in extremity depending on whether it is liberal or conservative. Finally, *X* is a vector of controls, including the federal budgetary climate, congressional salary, total seats in the congress, the partisan seat margin, how long the majority party has been in power, bicameral differences in ideological preference, and alignment with the executive branch. Holding each of these things constant, I am able to attain a reasonably good estimate of the effects of general ideological extremity and polarity in Congress.

I am also interested in individual extremists and moderates, and what effect they can have on legislative productivity. In particular, I investigate the hypothesis of Wheelan (2013), who suggests that a handful of moderates in the Senate should be able to greatly enhance productivity

[7] I use the absolute value of the mean DW-NOMINATE score here rather than just the mean value because I am interested in the effect of simply departing from a moderate ideological position (a score of zero), not in moving from the ideological left to the ideological right (going from -1 to 1).

(given that, in the present day, it would only take four or five moderate senators to deny either major party a supermajority). To estimate the effect of the marginal extremist and the marginal moderate on congressional productivity, I use model 2:

$$Productivity = \beta_0 + \beta_1 Extremists + \beta_2 Moderates + \beta_3 X + U \quad (2)$$

Where *extremists* is the actual number of ideological extremists in a given congress, and *moderates* is the actual number of moderates (extremist and moderate congresspeople have been identified using the statistical method outlined above). Here again, *X* is a vector of the same controls used in Model 1, but with the addition of the *extremity, left, ex*left,* and *polarity* variables from model 1. Thus, Model 2 is an extension of Model 1, able to control for a broad array of factors that might affect congressional productivity.

Results

This simple statistical strategy, though unable to identify causality, nevertheless reveals some useful insights regarding the effects of ideological extremity on legislative productivity. Table 3 shows the estimates obtained using Model 1, where the first column are estimates from a naive model (omitting controls), and the second from the full model (including controls).

These results show a clear positive relationship between a congress's overall ideological extremity and its productivity. Note that the extremely large magnitude of this estimate is due to the fact that the absolute mean nominate score varies along a continuous range between 0 and 1. Thus, we would only ever expect it to increase or decrease in very small decimal increments. Nevertheless, the clear and statistically significant positive relationship between aggregate extremity and productivity suggest that a more ideologically extreme congress would actually be *more* productive than one which is, on average, less ideologically extreme. This makes sense, considering that in order for the congress's mean nominate score to be very extreme in either direction, a large number of its members would have to have similarly extreme ideologies. A mean nominate score close to zero may indicate a large number of moderates, or may indicate increased polarity--that some congress members are far left, and some far right.

This result suggests that ideological extremity is not so important to congressional productivity as is political *agreement,* and this suggestion is supported by the large and

statistically significant coefficient on *polarization*. Evidently, as we might intuitively suppose, a congress that is highly polarized, meaning that there exists a high level of disagreement in policy preferences, will likely be less productive than one in which the legislators' preferences are congruent.

Interestingly, Model 1 suggests that congresses which are extreme in the liberal (or "left") direction have a higher baseline productivity than do conservative congresses, as indicated by the positive coefficient on *Left*. Corollary to this, however, is the large negative coefficient on the interaction term, which indicates that despite their higher baseline productivity, more liberal congresses cannot expect to become more productive as they become more extreme in the liberal direction. This is in contrast to conservative congresses, in which β_2 and β_3 are zero, indicating that increased extremity (in the conservative direction) correlates with higher productivity. Thus, liberal congresses have a higher baseline productivity, but do not necessarily become more productive as they become more liberal; conservative congresses have a lower baseline productivity, but can expect to be more productive as they become more conservative.

A simple comparison of two similar regression models confirms this story. I run Model 1 (excluding the variables *Left* and *Ex*Left*) on only those congresses which are conservative (meaning *Left* is equal to zero), and then only on those congresses which are liberal (*Left* equals 1). The estimates of these regressions are shown in table 4. As anticipated, the coefficient on *Extremity* is significant and positive for conservative congresses, whereas it is completely insignificant for liberal ones.

Table 5 shows the estimates for Model 2, which analyzes the relationship between the absolute number of extreme legislators in a given congress and its productivity (again, the first column is a naive model, and the second is the full model). Once again, these estimates, though unable to demonstrate causality, do provide some useful insights.

From Table 5, it can be seen that both the absolute number of extremists in a given congress *and* the absolute number of moderates are significantly positively related to that congress's productivity. These estimates further corroborate the suggestion made above that *agreement* in preferences is much more influential on legislative output than is the *extremity* of those preferences.

Despite the fact that my sample size includes only 108 observations, these estimates are still quite reliable, given that these 108 observations account for every single Congress from

1789 to 2003. Rather than being a mere sample of US federal Congresses, this is essentially the entire population. Thus, any information that these methods *could* derive from data on Congress *is* being derived (except, of course, for those years from 2004-present).

V. Conclusion

The issue of Congressional productivity is a salient one to millions of Americans, as the legislature's ability to respond to issues and produce effective legislation has tangible effects on the lives of these citizens. Thus, we do well to concern ourselves with what can be done to enhance the Congress's productivity, and to be aware of the factors which hinder it. In this article, I have responded to the claim that ideologically extreme congress members fall into that latter category--that they hinder legislative productivity. I have demonstrated that this claim, while attractive at face-value, is in fact difficult to evaluate, due to the empirical difficulty inherent to studying cause and effect in the US Congress. This difficulty is the result of the broad array of factors--for many of which, it is difficult to gather reliable data on--that influence the workings and output of Congress. Additionally, the Congress is just a single deliberative body, meaning that a study of this sort must necessarily be narrow in scope.

My attempt to empirically analyze the question of whether individually extreme congress members have a negative effect on productivity is the most thorough to date on this subject, and yet fails to produce a meaningful answer. The relatively small data pool that exists on US Congressional productivity, as well as the overwhelming number of variables that affect that productivity both combine to render methods of causal inference (in my case, an instrumental variable method) ineffective.

Nevertheless, I corroborate existing literature in showing that a simpler statistical analysis can yet produce meaningful insights into this matter. Much of the literature has demonstrated the various institutional and partisan factors that affect Congressional productivity--among them, the partisan seat margin and differences in policy preferences. While the literature has largely only been able to demonstrate this at the party level, my analysis further establishes these findings by evaluating the effects of policy preferences at the individual level. Similar to the literature at large, I find that large disagreements in policy preferences across members of Congress

(meaning a greater overall level of ideological polarization) is associated with a decline in legislative productivity. I additionally show that it is unimportant whether the Congress as a whole is relatively moderate or extreme; what appears to have the greatest effect on productivity is whether or not its members have similar policy preferences. Thus, my analysis empirically supports the notion that polarization in Congress is a hindrance to productivity.

Appendix

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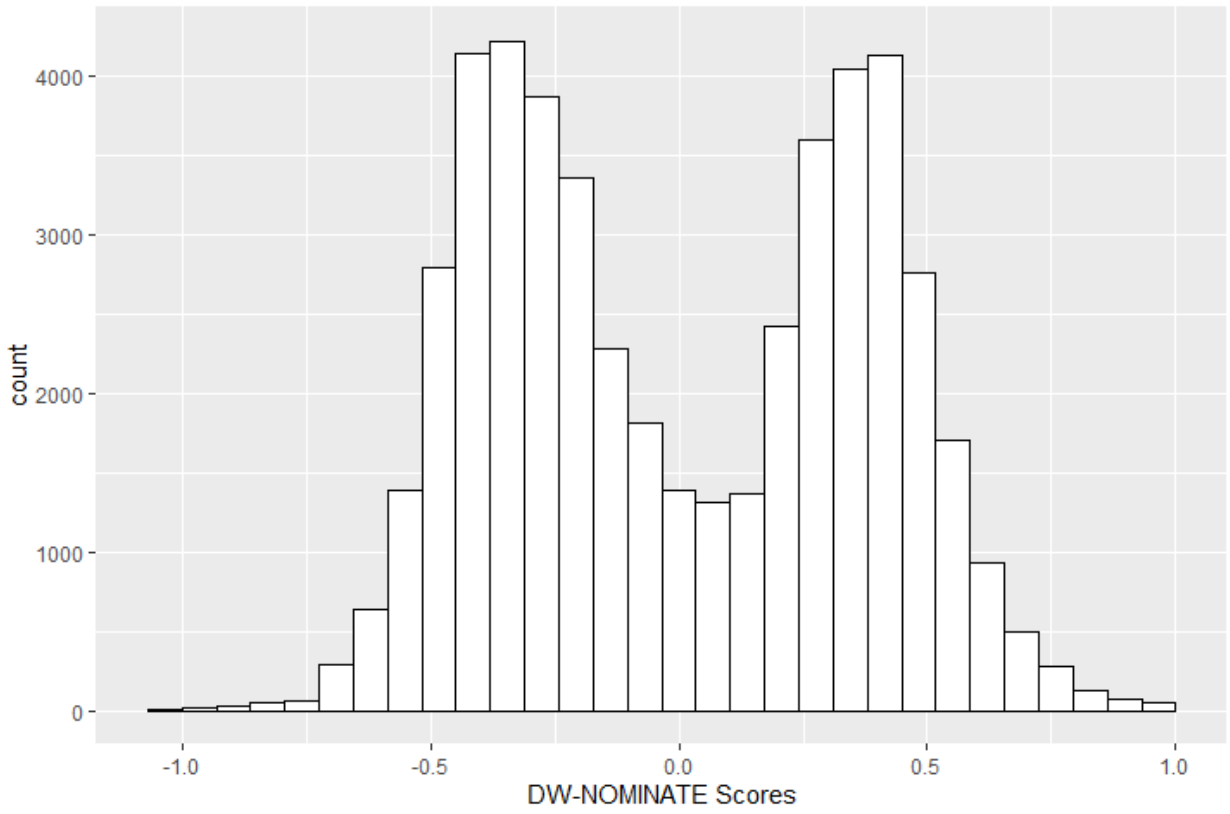
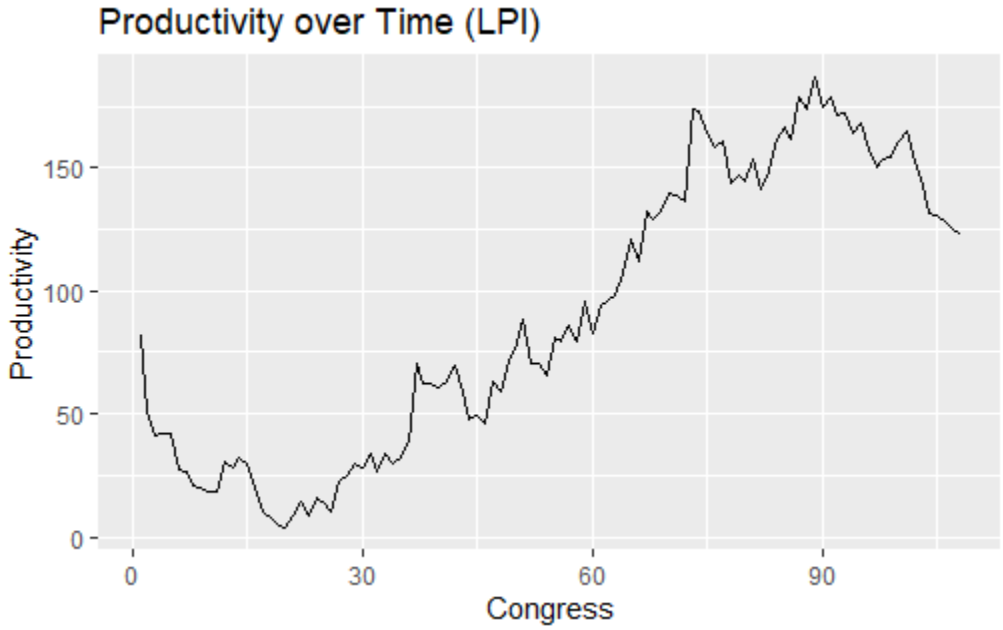
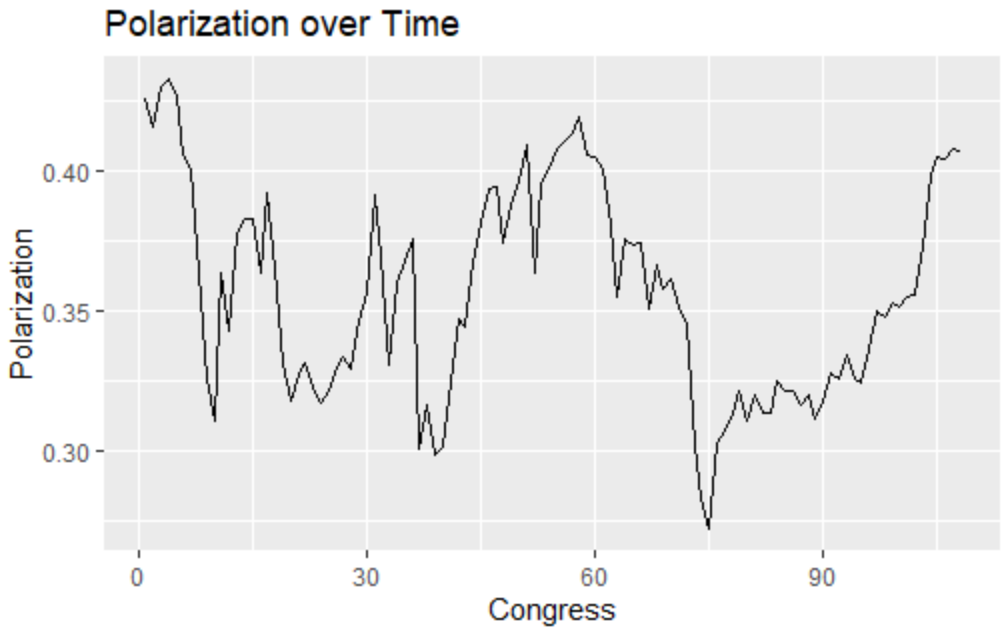
Figures & Tables

Fig. 1: All-time DW-NOMINATE Scores






Polarization over Time
Polarization
0.40
0.35
0.30
0
30
60
90
Congress

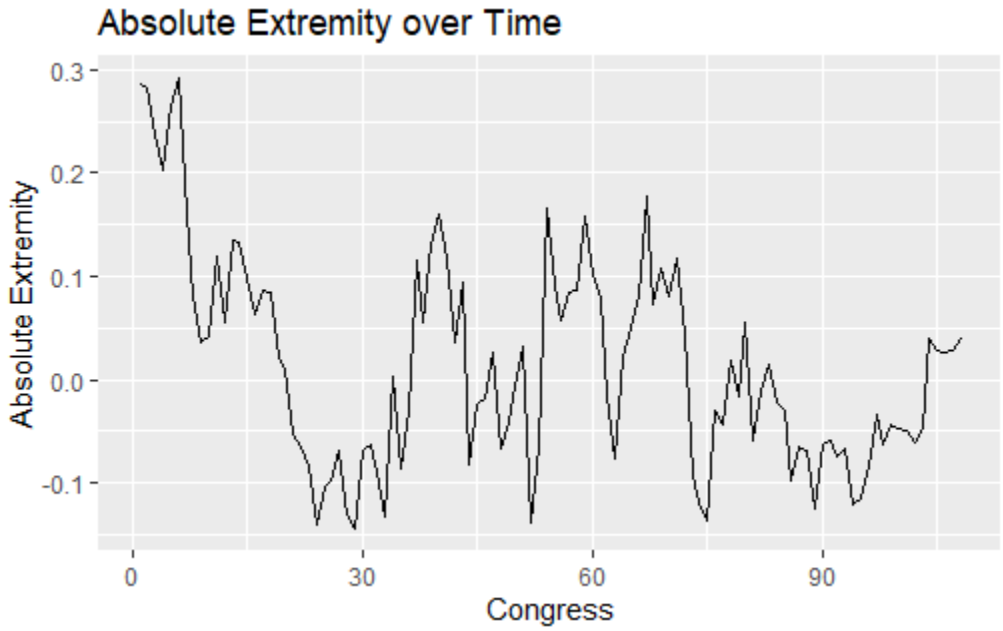

Absolute Extremity over Time
Absolute Extremity
0.3
0.2
0.1
0.0
-0.1
0
30
60
90
Congress

Table 1: Instrumented Effect of Ideological Polarity on Congressional Productivity

	Dependent variable:
	Productivity
Polarity	-111.797
	(3,325.103)
Constant	38.642
	(1,132.961)
Observations	11
R^2	-149.520
Adjusted R^2	-166.245
Residual Std. Error	1.066 (df = 9)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 2: Covariance Matrix

	polarity	new_extremist	productivity
polarity	1	-0.011	0.042
new_extremist	-0.011	1	0.137
productivity	0.042	0.137	1

Table 3: Effects of Aggregate Ideological Extremity and Polarity on Productivity

	Dependent variable:	
	Productivity (LPI)	
	(1)	(2)
Extremity (Abs. Mean Nominate Score)	-102.280	348.008***
	(112.480)	(58.965)
Left of Center	40.328**	24.903**
	(20.140)	(10.026)
Extremity*Left	-358.068	-437.150***
	(237.105)	(109.862)
Polarization	-354.880**	-364.247***
	(162.739)	(80.461)
Budgetary Climate		-10.275
		(7.677)
Total Number of Seats		0.372***
		(0.028)
Partisan seat Margin–Senate		17.757
		(19.924)
Partisan Seat Margin–House		-26.495
		(21.261)
Yrs in Power–Senate Majority		0.057
		(0.985)
Yrs in Power–House Majority		1.197*
		(0.658)
Yrs since last in Power–Senate Majority		-0.399
		(1.154)
Yrs since last in Power–House Majority		0.774
		(1.048)
Cross-Chamber Ideological Difference		-12.086
		(57.378)
Unified Government		-3.772
		(5.258)
Constant	216.913***	54.436
	(58.520)	(35.682)
Observations	108	108
R^2	0.157	0.861
Adjusted R^2	0.124	0.840
Residual Std. Error	53.813 (df = 103)	23.032 (df = 93)
F Statistic	4.795*** (df = 4; 103)	40.997*** (df = 14; 93)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 4: Comparison between liberal and conservative congresses

	Dependent variable:	
	Productivity (LPI)	
	Liberal	Conservative
	(1)	(2)
Extremity (Abs. Mean Nominate Score)	80.171	238.500***
	(80.864)	(56.417)
Polarization	-319.853***	-275.401***
	(81.785)	(76.821)
Budgetary Climate	-2.882	-8.587
	(7.254)	(8.266)
Total Number of Seats	0.558***	0.366***
	(0.031)	(0.030)
Partisan seat Margin–Senate	18.727	31.920
	(20.766)	(20.301)
Partisan Seat Margin–House	-39.578*	-45.673**
	(19.867)	(22.404)
Yrs in Power–Senate Majority	0.638	-0.625
	(0.636)	(1.044)
Yrs in Power–House Majority	0.389	1.610**
	(0.409)	(0.683)
Yrs since last in Power–Senate Majority	-1.146	-0.075
	(0.743)	(1.241)
Yrs since last in Power–House Majority	0.648	0.252
	(2.256)	(1.092)
Cross-Chamber Ideological Difference	26.564	5.682
	(52.208)	(60.774)
Unified Government	-8.575**	-2.979
	(3.938)	(5.668)
Constant	-30.862	30.446
	(37.551)	(34.209)
Observations	53	108
R^2	0.974	0.834
Adjusted R^2	0.967	0.813
Residual Std. Error	11.932 (df = 40)	24.852 (df = 95)
F Statistic	127.070*** (df = 12; 40)	39.820*** (df = 12; 95)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 5: Effects of Individual Extremists on Productivity

	Dependent variable:	
	Productivity (LPI)	
	(1)	(2)
Extremist Count	-4.765	4.263**
	(4.100)	(2.075)
Moderate Count	1.326***	0.994***
	(0.428)	(0.209)
Budgetary Climate		-11.607
		(8.222)
Total Number of Seats		0.326***
		(0.027)
Partisan seat Margin–Senate		28.034
		(20.388)
Partisan Seat Margin–House		-26.795
		(21.430)
Yrs in Power–Senate Majority		0.370
		(1.063)
Yrs in Power–House Majority		1.310*
		(0.679)
Yrs since last in Power–Senate Majority		0.126
		(1.270)
Yrs since last in Power–House Majority		-0.527
		(1.097)
Cross-Chamber Ideological Difference		-7.567
		(60.898)
Unified Government		1.996
		(5.388)
Constant	68.536***	-60.585***
	(12.718)	(19.675)
Observations	108	108
R^2	0.138	0.832
Adjusted R^2	0.121	0.811
Residual Std. Error	53.907 (df = 105)	25.017 (df = 95)
F Statistic	8.376*** (df = 2; 105)	39.196*** (df = 12; 95)
Note:		*p<0.1; **p<0.05; ***p<0.01