Political polarization: Persistent hatred or issue-dependent sidings?

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Extended Abstract

Opinion polarization in the political domain can have benefits and disadvantages for the political system and society [1-5]. To understand if and when polarization is constructive or harmful, first one needs to verify if it exists in the system and in what form. Affective and ideological polarizations [6-7], for example, are two forms of this phenomenon, each of which may have different consequences for the political system. On the other hand, the complex structure of social and political interactions brings about various forms of opinion composition and hence different forms of polarization [8].

Amidst these considerations, affective polarization raises special concern due to its deleterious effect on political debates and policies and consequently economic and social issues [9]. Affective polarization essentially signifies that the dislike towards the antagonistic group determines sidings towards issues of policymaking irrespective of issue domain and necessities. This notion is analogous to polarization alignment observed when comparing the pattern of polarization of one domain (i.e., policy area such as economics, or agriculture, immigration, etc.) of political discourse to another, where i) the composition of groups of partisanship is consistent across different domains (domain or issue have negligible effect on which individuals remain like-minded) [10] or equivalently ii) the polarization intensity between antagonistic groups is consistent from one domain to other.

To shed light on these two aspects of consistency in polarization, we design two approaches to investigate if and by what extent the polarization pattern is insensitive to domains and issues. In our first approach, we calculate the distance between the opinions of each pair of parties on all the roll-call votes in each domain D and define the average of this distance as a measure of polarization $0 \leq p \leq 1$ in domain D. Then our first measure of consistency across any given set of domains $\{D\}$ is defined as to what extent the values of polarization in that set deviate from a maximally diverse distribution of polarization values, i.e., a uniform distribution with maximal range [0,1]. We call this measure rigidity r. We actually make this comparison in two ways, we either compare the given set of polarization values $\{p\}$ which gives us type-1 rigidity r_1; or compare them after a transformation that changes their mean to $\frac{1}{2}$ (which is the mean of the maximally diverse uniform distribution) and their range as close as possible to [0,1]. This way we measure how diverse this set could be if it had a mean at $\frac{1}{2}$ and its diversity wasn't restricted by closeness of its mean to the poles 0 or 1. This second way of comparison gives us the net rigidity r_2, and its main benefit is that, despite r_1, it is independent of the polarization of the given set.

In our second approach, on the other hand, for each domain D we build a network of members of parliament (MPs) where interaction between each pair of MPs is modeled by a link weighted proportional to the similarity of their voting behavior in domain D. Then we use clustering algorithms to find communities of strongly collaborating members in each network D. We consider each network as a layer D of a multilayer network and obtain mutual clusters each composed of nodes that are in the same opinion community in all the layers of the given set

$\{D\}$ of domains. Our second measure, which we call it alignment a (as it is a generalization of the measure designed in [10]), is a score of how consistent the mutual clusters (and hence the strongly co-voting individuals) are across all domains of $\{D\}$.

Using these two approaches, we analyze the polarization configuration of voting behavior, in terms of the rigidity and alignment, in the parliamentary systems of the US, Germany, and Finland, as examples, across political policy domains over a range of election periods. We first look into the polarization that each party had towards one another and the relationship between the polarization and the rigidity between that pair for every pair of parties and over a duration of more than two decades for each country. In Fig. 1(a)-(b), as expected, we observe that r_1 is influenced by polarization and highly or minimally polarized cases tend to be highly rigid because of their extreme polarization. Moreover, in Fig. 1(a)-(b) we compare the rigidity of parties towards each other with a null model in which polarization values of each pair of parties at each year of the data are randomly shuffled across all the pairs of parties and years. We see that there are much more cases with rigidity higher than the mean of the null model than the cases with lower rigidity. This observation holds for all the three countries showing the bias toward a rigid interaction of parties.

Alignment is in some cases highly correlated with rigidity, for example (Fig. 1(c)), the changes of alignment and rigidity in Finland and Germany are strongly correlated, while in the US, the two measures are not always correlated (not shown). We can also observe that both measures of consistency in antagonism (or similarly in partisanship) can vary largely independent of the system polarization (Fig. 1(c)). This implies that periods of highly aligned/rigid and highly polarized political systems can exist, where there is strong antagonism and partisanship, independent of the issue at hand, which in turn can harm responsible and constructive policy making and social discourse.

We can use the measures designed here to investigate the role of factors which were suspected to impact the polarization pattern, for example, the interplay between the majority and the minority parties (Fig. 1(d)-(i)), differences between parties in how they affect polarization, or the differences between policy domains according to how they are affected by polarization [11-12]. This study can also find application in studying other social and political systems; while rigidity measurement can employ the information about party memberships or sidings, alignment can be used in systems where this information is not available or is difficult to deduct.

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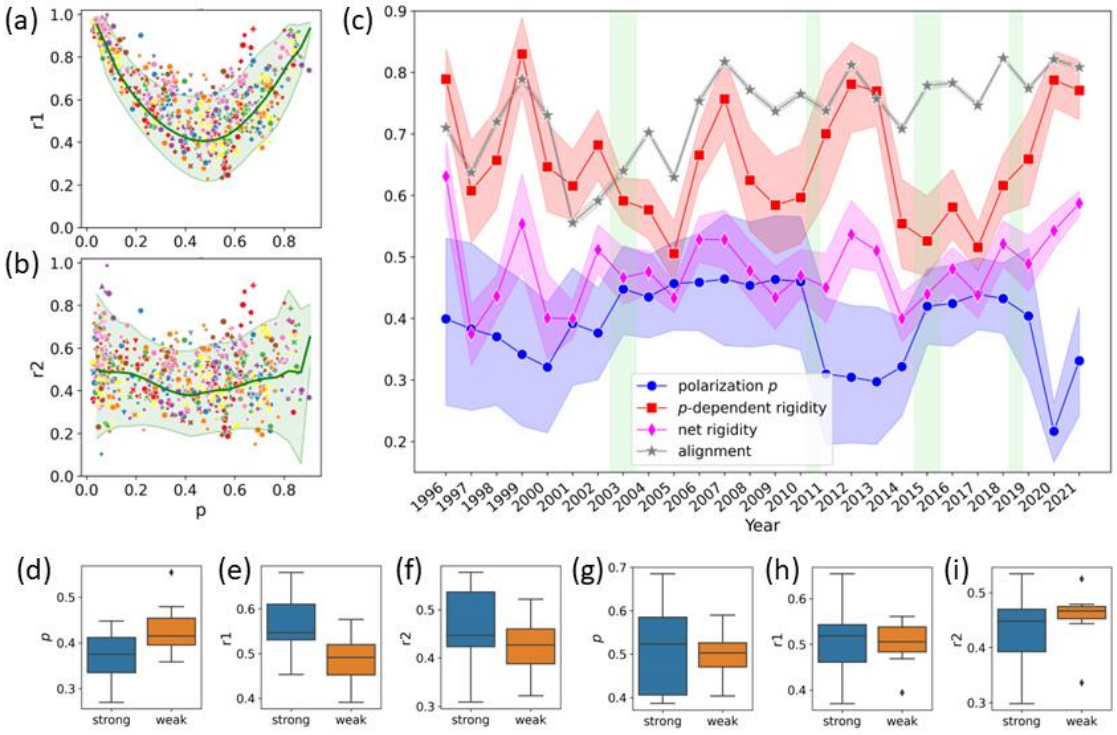

Figure 1. (a)-(b) Rigidity measures versus polarization p. Each marker represents a pair of parties in a specific year. The bold line and the shaded area are, respectively, the mean and the 95% confidence interval for the null model.. (c) Almost for all years as the alignment increases or decreases, r_1 and r_2 increase or decrease with it. The only exceptions, expectedly, coincide with four of the years of the change of the parliament (highlighted by shaded vertical lines). Only one out of these four correspond to the net rigidity (r_2). (d)-(i) Comparing the years that a strong party majority (more than 59% of the seats for the House and more than 54% for the Senate) existed and when the share of the majority was rather weaker (less than 55% for the House and less than 53% for the Senate). The p-values of the independent t-test for (d)-(i) are, respectively, 0.024, 0.004, 0.18, 0.74, 0.93, and 0.51. (e)-(f) represent the results for the House: while stronger majority in the House is accompanied with lower polarization in the results of the roll-call votes, it increased rigidity r_1 ; however, the net rigidity r_2 is not significantly different. (g)-(i) The Senate: the stronger majority in the senate is not accompanied with any significant change in polarization or rigidity.