

ARTICLE

## Irredentism and Institutions

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### Abstract

Why do states engage in irredentism? Expanding on previous scholarship, this article advances a new theory with rationalist microfoundations that accounts for the incentives of both elites and citizens to support irredentism in democracies and dictatorships. Our model suggests irredentism is more likely when it enables political elites to provide a specific mix of private goods, public goods, and welfare transfers to citizens who desire them at the lowest tax rate. This leads to the prediction that irredentism is most likely in majoritarian democratic electoral systems and military dictatorships, and least likely in proportional electoral systems and single-party dictatorships. We test and find supportive evidence for these expectations using a comprehensive dataset covering all observed and potential irredentist cases from 1946 to 2014.

**Keywords:** irredentism; public goods; institutions; computational model; conflict

Russia's seizure of Crimea in 2014 (along with its subsequent attacks on Ukraine's Donbas region, leading to the 2022 invasion), Serbia's expansion in the early 1990s, and Nazi Germany's occupation of the Sudetenland in Czechoslovakia from 1938 to 1945 are all well-known instances of irredentism: state territorial expansion on the basis of shared ethnicity. The *potential* for countries with ethnic majorities to unify with cross-border kin through territorial annexation exists any time ethnic groups are spread across political borders in a majority–minority configuration. Given its myriad potential across the globe, why do more states *not* pursue territorial expansion when the opportunity exists? More than two-thirds of the groups in the Minorities at Risk Project (Gurr 2000) and about half of the groups in the Ethnic Power Relations data (Cederman et al. 2013) constitute prospective targets for irredentism. In a purely nationalist world, all ethnic majorities would seek unification with their kin in neighboring countries and the earth would be replete with such conflicts until most nations were sorted into their respective homogeneous nation-states.

This has not happened, however, because there are clearly significant constraints on irredentist action. Less than 4 per cent of all potential cases from 1946 to 2014 actually produced irredentist conflicts (Siroky and Hale 2017).<sup>1</sup> In most cases, unification efforts never surpass the rhetorical level and irredentism is nothing more than the proverbial dog that does not bite. At the same time, and much more important politically, many irredentist conflicts remain active and unresolved today, for example: Armenia's claim on Nagorno-Karabakh; Ireland's claim to Northern Ireland; Serbia's claim to Republika Srpska; China's claim to Taiwan; India's claim to Kashmir and Gilgit-Baltistan, as well as Pakistan's reciprocal claim to Jammu and Kashmir in India; and Somalia's claims to parts of Kenya and Ethiopia. Irredentism is a critical problem in world politics and merits more sustained theoretical attention and comparative analysis than it has thus far received.

<sup>1</sup>Data from the “irredentism” variable in “Replication Dataset.tab,” available at: <http://dx.doi.org/10.7910/DVN/X88LYH>

Most previous research on irredentist conflict has focused on single case studies (Andreopoulos 1981; Borsody 1988; Gagnon 1995; Gavrilis 2003; Gutman 1991; Haines 1937; Kitromilides 1990; Kolstø, Edemsky, and Kalashnikova 1993; Landau 1991; Munck 1999; Petacco 1998; Plaut 1999; Siroky 2016; Suhrke 1975) comparative case studies (Chazan 1991; Horowitz 1991; Saideman and Ayres 2000), and, more recently, statistical analysis of global data (Cederman, Girardin, and Gleditsch 2009; Cederman, Rügger, and Schvitz 2021; Cederman et al. 2013; Siroky and Hale 2017). Theoretically, these studies are also diverse.

This article expands on this scholarship and complements it by proposing new rationalist microfoundations for elites and masses based on institutional constraints and incentives for irredentism. We created a computational model to generate a state system with endogenously developed borders (Cederman 2001), where ethnic kin may or may not find themselves within the confines of the same state. Our model then draws on “selectorate theory” (Bueno de Mesquita et al. 2003), extends it to the problem of irredentism, and expands on it in two crucial ways: first, by incorporating and examining a new type of redistributive spending—welfare transfers—in addition to the public and private goods emphasized in selectorate theory; and, secondly, by integrating ethnic heterogeneity and its implications for public goods provision (Alesina and Spolaore 2003, Milesi-Ferretti, Perotti, and Rostagno 2002).<sup>2</sup> Our proposed theory shows how these factors shape incentives both for and against irredentism, which enables us to account for the significant variation in irredentism not only between, but also among, dictatorships and democracies. Our framework generates clear predictions: irredentism should be more likely in majoritarian democratic institutions and in military dictatorships, and less likely in proportional democracies and single-party dictatorships. After developing the theoretical logic behind these expectations and exploring them through a new computational model, we then assess them empirically utilizing a comprehensive dataset of irredentism (Siroky and Hale 2017).

The article makes three main contributions: (1) it develops stronger microfoundations that link the incentives of both leaders and masses to pursue irredentism with institutional constraints; (2) it analyzes irredentism as an emergent, domestic-level decision-making process by exploiting the power of computational modeling; and (3) it validates the theory’s predictions using global data on irredentism. A key advantage of exploring this model computationally is that actors can be imbued with heterogeneous preferences, which formal models have had difficulty accommodating, while being subjected to diverse institutional constraints. These features permit us to perturb, manipulate, and analyze actors in theoretically useful ways that would be difficult to accomplish with observational data and historical analyses alone. In short, such models afford an ideal platform for modeling a phenomenon such as irredentism, an international macrolevel outcome resulting from the microinteractions of leaders and citizens with heterogeneous preferences (Cederman 2001; de Marchi and Page 2014; Lansing 2002; Lustick, Miodownik, and Eidelson 2004; Miller and Page 2007).<sup>3</sup>

Our framework complements and extends previous studies by explicitly theorizing and then precisely testing how domestic institutions influence international behavior, specifically, irredentism. Leaders have been presumed to deploy the ethnic card as a dominant strategy, and ethnic majorities have been assumed to be either easily hoodwinked or predisposed to nationalist rhetoric. Particularly in situations where one ethnic group constitutes a majority of the population, the argument goes, politicians may make (primordial) ethnic appeals to the majority in order to ingratiate themselves to voters while diverting attention away from domestic issues by promising to redeem ethnic kin in a neighboring territory. Such behavior is far from universal, but it is

<sup>2</sup>Selectorate theory only deals with preference heterogeneity peripherally through “affinity,” a catchall category including ethnicity, ideology, party, etc. (Bueno de Mesquita et al. 2003, 60–8).

<sup>3</sup>To keep the main text accessible to a general readership, we reserve the technical model discussion for the Online Appendix (Sections 1 through 5) (see Lustick, Miodownik, and Eidelson 2004, 212; Miller and Page 2007, 69).

much more common in majoritarian systems, where the demographically dominant ethnic group is significantly larger than other groups, and when the dominant group suffers perceptions of “status inconsistency” as a result of economic parity with other, smaller ethnic groups in the country (Siroky and Hale 2017). Although these explanations account for the political incentives of elites to annex ethnic kin in neighboring territory, they fail to clarify the incentives and costs that the masses consider when deciding whether to support irredentism. Our framework identifies the incentives to support irredentist initiatives not only of elites, but also of the masses, rather than simply assuming elites always dupe the public when it is expedient to do so.

We expand the scope of institutional influence on irredentism while relaxing the restrictive assumptions behind ethnic outbidding and mass support for nationalism. In doing so, the theory provides stronger microfoundations for the study of irredentism. After specifying the preferences of the central actors in our model, we explain how political institutions compel elites to translate those preferences into particular national tax and redistributive policies. These policies, we argue, influence the appeal of irredentism to citizens and to leaders. We formally derive actor utilities, and our model offers precise predictions about the conditions and configurations under which we should expect to observe irredentist behavior. To assess these expectations, we deploy global data covering all observed and potential irredentist events from 1946 to 2014 (Siroky and Hale 2017), matched to institutional data across the world for the same time period (Bormann and Golder 2013; Geddes, Wright, and Frantz 2014). The next section develops the argument and then introduces the model.

## The Argument

Irredentism represents a continuum and has been discussed as everything from “soft” rhetorical territorial claims all the way up to military action. Here, we define it precisely as a state’s use of *military force* against a neighboring state to annex ethnic kin and capture territory. Irredentism is a central government decision to add a region to its current state on the basis of ethnic similarity using military force and to simultaneously remove that region from the proprietorship of another country (Ambrosio 2001, 7; Gellner 1983, 1, 57; Horowitz 1991, 10; Neuberger 1991, 103; Petacco 1998; Siroky and Hale 2017, 117). This emphasis on military action, as opposed to rhetorical claims, allows for a more replicable, discernible measure of irredentism.

We theorize that political elites must balance their desire to maximize state revenue against the need to provide their political support base with some combination of private goods, welfare transfers, and public goods (hereafter, referred to collectively as “PTP goods”). While the annexation of foreign territory may offer an attractive option to increase revenue, it is equally clear that this benefit must be balanced against the expense of supplying PTP goods to any newly incorporated citizens, not to mention the risks and costs associated with war itself.

In our stylized framework, “private goods” consist of direct reallocations of excludable, rival resources from a political leader (or from the state coffers) directly to key supporters. These private goods are generally consumed by a very narrow cadre of beneficiaries and typically provide little value to the public at large. “Transfers,” which we add to selectorate theory’s framework with insights from Milesi-Ferretti, Perotti, and Rostagno (2002), are reallocations of rival, excludable resources that are targeted far more broadly than private goods toward individuals who are eligible on the basis of some shared, generally nonethnic characteristic (and irrespective of their location); examples include unemployment benefits, elderly medical benefits, and income-based welfare transfers. Finally, “public goods” are reallocations of nonrivalrous, nonexcludable resources toward particular geographic localities intended for consumption by the general public. Public goods include schools, fire departments, or road signs that benefit only a particular district and whose usefulness decreases as an individual is located farther from the public good’s locus of distribution (Milesi-Ferretti, Perotti, and Rostagno 2002, 612–13).

Selectorate theory deploys only a single distinction between public goods and private goods. While this classification, as discussed later, can help us understand irredentist variation within dictatorships—that is, between military and single-party dictatorships—it is not well equipped to account for the differences between majoritarian and proportional democracies. Both possess large selectorates and large winning coalitions, rendering them observationally equivalent in terms of irredentism.<sup>4</sup> We argue that majoritarian and proportional systems incentivize different types of redistributive policies, with critical implications for irredentism. Distinguishing among these different types of redistributive policies (public goods from transfers) is thus essential to developing a comprehensive theory of irredentism that is equally predictive across *and* within both democratic and autocratic regime types.

Like political elites, citizens seek to enhance their own utility, which increases with the state's provision of PTP goods and decreases with the tax rate. This limits the PTP goods that a state can provide. Citizens also possess heterogeneous preferences for the provision of public goods, which are often exacerbated by ethnic and cultural differences (Alesina and Spolaore 1997; Desmet et al. 2011; Dzutsati 2021, 2022; Hentschel 2019). All else equal, a higher degree of ethnic differentiation implies more heterogeneous preferences for public goods and makes it more costly for the state to provide them to citizens efficiently, requiring a higher tax rate. Crucially, political institutions shape how political elites implement such preferences in national policy, determining the equilibrium bundle of PTP goods for citizens. In this way, we suggest, institutions influence the cost–benefit calculus of pursuing irredentism.

Our framework distinguishes four main “ideal types” of institutional structures.<sup>5</sup> Among democracies, we differentiate proportional democracies from majoritarian systems; and among dictatorships, we examine single-party and military regimes. In doing so, we build on previous work, particularly studies on varieties of democracy and interstate conflict initiation (Maoz and Russett 1993; Morgan and Campbell 1991; Morrow et al. 2006; Pickering and Mitchell 2017, 4–5), the relationship between dictatorship and conflict initiation (Geddes, Wright, and Frantz 2014; Lai and Slater 2006; Peceny and Butler 2004; Pickering and Kisangani 2010; Pickering and Mitchell 2017, 5–6), and the impact of proportional and majoritarian systems on redistributive outcomes and ethnic conflict (Lijphart 2004; McGillivray 2004; Siroky and Hale 2017).

Our model predicts irredentism is most likely in majoritarian electoral systems and military dictatorships, and that it is least likely in single-party dictatorships and proportional electoral systems. Majoritarian systems encourage state leadership to provide more public goods than transfers (Milesi-Ferretti, Perotti, and Rostagno 2002, 610). Since incorporating ethnic kin shifts the median preference for public goods further toward that of the ethnic majority, the state can provide public goods to citizens that are closer to the preferences of the ethnic majority at a lower cost, which encourages irredentism. Proportional systems, on the other hand, are associated with greater state expenditures on transfers rather than on public goods (Milesi-Ferretti, Perotti, and Rostagno 2002, 610). Incorporating ethnic kin means they will have to share more valuable transfer benefits with a larger number of individuals, providing a check on the desire to incorporate them into a unified polity through irredentism.

In single-party dictatorships, a small party elite covetously safeguards its positions and understands that the incorporation of ethnic kin through annexation could produce new competitors,

<sup>4</sup>Selectorate theory does not distinguish between majoritarian and proportional systems in detail beyond suggesting proportional systems may be predisposed to bloc voting, as well as smaller winning coalitions, in situations where there are strong patron–client relations (Bueno de Mesquita et al. 2003, 55, 64, 488, footnote 9).

<sup>5</sup>Geddes, Wright, and Frantz (2014, 315) categorize 9.37 per cent of the autocracies coded in their dataset as military, 12.96 per cent as monarchies, 1.44 per cent as oligarchies, 32.54 per cent as single-party dictatorships, 25.09 per cent as personalist dictatorships, and 8.6 per cent as a combination of party/personalist dictatorships. Although they find it meaningful for their purposes to disentangle military dictatorships, monarchies, and personalist dictatorships, Geddes and colleagues acknowledge that all are characterized by the small selectorates and small winning coalitions. As far as our theoretical framework is concerned, these types are interchangeable. We therefore include each within the “military” category.

for anyone could potentially be a member of the party. Annexation is thus threatening to the elite, which restrains irredentism. By comparison, in military dictatorships, where leadership consists of some proportion of the military officer corps (typically, a small part of the population), the threat of unwanted competition through annexation is substantially smaller, making irredentism more likely. In sum, utilizing this typology, we expect irredentism to be most likely in majoritarian democracies and military dictatorships, and less likely in single-party dictatorships and proportional democracies. The next section describes the full theoretical model and its core hypotheses.

## Describing the Model

Our model begins with a world where state borders emerge endogenously in distinct sizes and potentially separate different ethnic groups into a variety of majority–minority configurations (Cederman 2001). Since state borders do not match the geography of ethnic groups (“nations”) one to one, opportunities for irredentism arise.<sup>6</sup> In order to assess our theory about the effects of institutions on incentives for (and against) irredentism, we introduce and systematically vary political institutions (“regime types”) across states, which interact over time, yielding several testable implications that we subsequently evaluate using global data.

In our model, much like the world we observe today and historically, national borders include some ethnic kin but exclude others. In these situations, leaders must determine whether pursuing irredentism is in their interest. In developing the theory, we first focus on the incentives of leaders and citizens, and then introduce institutional constraints on irredentist action.

### Preferences: Leaders and Citizens

Our theoretical framework, building on “selectorate theory,” assumes leaders seek to remain in power and must provide the requisite goods and resources to a specific subset of citizens whose support is critical to remain in office. However, the particular mix of PTP goods provided to core supporters differs dramatically across different types of political institutions. The selectorate ( $S$ ) consists of the group of individuals in a country who have some degree of say in who becomes a leader. What is important about being in the selectorate is that it gives one an opportunity to be in the winning coalition ( $W$ ), which is defined as a subset of the selectorate whose support is essential for leadership to maintain office (Bueno de Mesquita et al. 2003, 51). Thus, when making decisions, state leaders focus on how such a decision will impact its core political support and, in our model, the median core supporter within  $W$  (Bueno de Mesquita et al. 2003, 51–5; Downs 1957; Levi 1989; Riker 1962). The reason is straightforward—political survival: if leaders fail to maximize the utility of median supporters in  $W$ , they risk being unseated by a political competitor. Citizens would prefer to receive lavish private goods from the state as a reward for loyalty to the regime. However, when citizens are not in a position to receive abundant private goods, or when private goods must be divided among too many supporters in  $W$  that they cease to be valuable (as in most consolidated democracies), then citizens prefer public goods (Bueno de Mesquita et al. 2003, 129–32; Milesi-Ferretti, Perotti, and Rostagno 2002).

We expand upon this well-established framework by incorporating preference heterogeneity among ethnic groups in the same country and by integrating welfare transfers into selectorate theory’s distinction between public and private goods in order to investigate institutional

<sup>6</sup>It is beyond the theoretical ambitions of this project to precisely model the mechanisms through which ethnic kin find themselves outside of national borders. We recognize, with much of the constructivist literature, that such identities are fluid and that ethnic identities themselves are often a byproduct of iterative interactions between individuals, groups, and the state. Our objective here is to establish a model world wherein individuals identifying with the dominant ethnic identity of a particular nation find themselves outside of their respective nation-state’s borders—without reference to specific processes creating such a situation.

incentives for and against irredentism. Our theory suggests that disparate preferences for transfers and public goods across institutional types play a significant role in explaining irredentism. Also critical to our model, individuals are members of ethnically defined nations, which are “relatively large and territorially concentrated ethnic group[s] with a sense of common history and putative homeland” (Hechter 2000, 14). Within the same nation, we assume there is more “commonality of tastes” among individuals for public goods than there is across distinct nations. Consistent with this notion, scholars have found that ethnically heterogeneous settings often encounter substantial difficulty effectively providing public goods (see, for example, Alesina and Spolaore 2003; Alesina, Baqir, and Easterly 1999; Dinesen, Schaeffer, and Sønderskov 2020; Habyarimana et al. 2007; Hechter 2000, 23; Horowitz 1985, 134; Miguel 2004; Miller and Page 2007, 256).<sup>7</sup>

To stay in power and effectively provide the PTP goods desired by  $W$ , leaders seek to maximize state revenue, mostly through taxation but sometimes by foreign conquest (Alesina and Spolaore 2003, 71–2; Bolton, Roland, and Spolaore 1996; Wittman 1991). Although leaders can raise revenue by increasing taxes,<sup>8</sup> additional taxation generally decreases citizen productivity and displays diminishing returns. Moreover, if leaders fail to orient taxes to a rate that satisfies their core median supporter in  $W$ , they may be ousted through an election or a coup. Since citizens would like to receive generous PTP goods while paying as little as possible in taxes, leaders are left with the constrained optimization problem of providing these goods and services at an efficient tax rate.

However, ethnic heterogeneity makes efficient public goods provision more elusive. In order to placate the median member of the winning coalition in a diverse setting, public goods delivery from leadership often ends up at an “unhappy position in the middle” (Alesina, Baqir, and Easterly 1999, 1251–2), where no group feels it is receiving public goods in its preferred format. This can increase grievances, frustration, and polarization. For instance, ethnic groups often have disparate preferences over language issues, especially when they relate to educational and employment opportunities that shape the life chances of the group’s members.<sup>9</sup> Incongruent preferences over the status of minority languages can set the stage for intense, intractable political disagreements that take on a conflictual and sometimes even violent form. In some settings (for example, recently in the Ukraine and Latvia), these kinds of disagreements and social cleavages have escalated to militarized disputes. Policing is another example of a public good over which different ethnic groups often have dissimilar preferences that has resulted in intense disagreements that sometimes lead to armed conflicts (for example, in Northern Kosovo and Ethiopia, [see Arriola 2013]).

How debates over such issues as the language of instruction in school and the language(s) used by the state bureaucracy are decided has an immense influence on people’s lives, for individuals must invest considerable time and resources to learn a new language to gain formal employment. Minority groups have often mobilized for the right to be taught in their own language, and

<sup>7</sup>In view of a large body of research that indicates individuals have both multiple and malleable ethnic identities (see, e.g., Hale 2004, 460–1; Lustick, Miodownik, and Eidelson 2004), we do not assume that either ethnic identities or preferences are permanently fixed, immutable, or even uniform within a particular ethnic group. Instead, we see these identities and preferences as malleable over the long term, though they tend to be quite “sticky,” in that “attributes associated, or believed to be associated, with descent are ... difficult to change in the short term” (Chandra 2006, 414). Attributes like language are particularly sticky (Chandra 2006, 414; Hale 2004, 468–9; Wucherpfennig et al. 2012, 85). However, we do not assume every member of an ethnic group responds to these constraints similarly. One of the great advantages of our computational model is that within ethnic groups, individuals internalize these constraints in different ways. Those with “thick” ethnic attributes will have stronger ethnic preferences. Although preferences vary systematically across ethnic groups, within groups, these impacts also vary. Furthermore, we assess the sensitivity of our model results by changing the degree to which preferences vary across groups systematically (see Table 11 and Figure 3 in the Online Appendix). In this way, the use of computational modeling allows us to incorporate both “primordialist” and “constructivist” assumptions into our analysis.

<sup>8</sup>In our model, leaders can choose to raise or lower tax rates by incremental amounts at each stage in the model’s evolution over time.

<sup>9</sup>Alesina, Baqir, and Easterly (1999, 1251–2) convincingly illustrate the contentious nature of the language of instruction in diverse areas of the United States.

majority ethnic groups have also engaged in collective action to prevent such changes to the status quo. Just as minorities perceive an injustice, majorities may resent paying for a public good from which they do not benefit.

These sorts of situations have the potential to increase the appeal of irredentism to political leaders for three primary reasons: (1) irredentism provides a mechanism for the state to increase the tax revenue of the country, particularly when the irredentist target is wealthy (described further later); (2) it results in more efficient public goods provision, as “the per capita costs for the taxpayer decline as the number of payers increases” (Alesina and La Ferrara 2005, 18); and, most important for our theory, (3) it shifts  $W$ 's median preference for public goods closer to the general preferences of the ethnic majority. In this way, the state can provide public goods that more closely match the preferences of the demographic majority, thereby conciliating the perceived status inconsistency and maximizing the individual utilities of those in the winning coalition by providing public goods that cost less to a more homogeneous winning coalition. Since majoritarian systems prioritize public goods spending over transfers (Milesi-Ferretti, Perotti, and Rostagno 2002, 610), they will be particularly drawn to irredentism.

Political leaders also assess the economic wealth of the enclave relative to the potential irredentist state. Although wealth does not automatically attract irredentism, and poverty does not necessarily repel it, leaders are far less likely, on average, to pursue annexation of a poor coethnic enclave than a wealthy one (Horowitz 1985, 286). Finally, all else equal, irredentism is less attractive when neighbors have a greater ability to defend themselves.

### *Institutions: Majoritarian, Proportional, Single Party, and Military*

Political institutions critically inform state leadership decisions by influencing the distribution of PTP goods to citizens and, in turn, by shaping the cost–benefit calculus of irredentism for leaders. Our theory and analysis focus on four “ideal-type” institutional arrangements: majoritarian democracy, proportional democracy, single-party dictatorship, and military dictatorship. This section explains the intuition connecting each institutional type to the provision of PTP goods and to the likelihood of irredentism.

In democracies,  $S$  is the total number of citizens with the right to vote, and  $W$  is the group of individuals whose support is necessary for the leader to stay in power. In an idealized majoritarian democracy with a single electoral district, the size of  $W$  is typically very large (51 per cent of the population—the size necessary to achieve an electoral majority). In a similarly idealized proportional democracy with one electoral district, individual legislators can be elected to office with less than an absolute majority but are powerless to enact policy without forming coalitions representing  $W$ , that is, a majority of the voting population. In both majoritarian and proportional democracies, then, the state is unlikely to supply private goods to  $W$ , as such resources would have to be divided up between far too many individuals for them to be valuable (Bueno de Mesquita et al. 2003, 91). Instead, the state is more likely to spend revenue on public goods and/or welfare transfers that provide greater value to individuals in  $W$ .

However, the particular citizen preferences to which leaders must be responsive depend on whether a democracy is majoritarian or proportional. In order to capture this distinction, we augment current theory, which focuses on public goods, by also considering welfare transfers. Whereas proportional systems incentivize politicians to channel government spending toward programs that increase the well-being of particular social constituencies across the country (welfare transfers), majoritarian systems tend to spend on programs and public goods that benefit specific localities (Milesi-Ferretti, Perotti, and Rostagno 2002, 609–10).<sup>10</sup>

<sup>10</sup>Milesi-Ferretti, Perotti, and Rostagno present a stylized model according to which national legislatures consist of three representatives, with the following four key features: (1) majoritarian systems consist of three electoral districts and elect one individual per district; (2) proportional systems consist of one national-level district and elect three individuals to that district;

Irredentism is particularly attractive in *majoritarian systems* because they prioritize public goods over transfers. Adding ethnic kin with similar preferences for public goods—via irredentism—significantly benefits the material welfare of individuals within the ethnic majority by moving the preferences of the median citizen for public goods closer to the general preferences of individuals in the ethnic majority. This larger and more homogeneous polity can more efficiently cater to its winning coalition’s preferences for public goods, as political leaders have greater incentives to disregard the preferences of minority ethnic groups. For their part, minority ethnic groups continue to pay taxes and thereby to underwrite the costs of public goods from which they derive progressively less benefit.<sup>11</sup>

While *proportional democratic* systems also have large  $S$  and  $W$ , like majoritarian systems, proportional representation prioritizes social spending on welfare transfers over public goods (Milesi-Ferretti, Perotti, and Rostagno 2002, 609–10). Moreover, the benefits of welfare transfers are more broadly distributed across the population and are not subject to the same kind of ethnic preferences as public goods.  $W$  is less likely to want goods and services that correspond to ethnic differences, and the benefit of irredentism in terms of more efficient public goods provision to the ethnic majority is less pronounced. In proportional democracies, increasing the number of ethnic kin through annexation may still move the preferences of the median citizen for public goods closer to the general preferences of individuals in the ethnic majority in  $W$ , but because transfers are prioritized over public goods, the gain is marginal compared to majoritarian systems. Furthermore, if ethnic kin are added, highly prized transfers must now be shared with a larger number of individuals. Since proportional systems in democratic regimes provide less benefit from irredentism to the demographic majority, the model predicts much less irredentism among *proportional democratic* systems than *majoritarian democracies*.

In authoritarian systems,  $S$  and/or  $W$  are restricted much more substantially than they would typically be in any democratic electoral system. This makes it possible for members of  $W$  to be rewarded for their loyalty with considerable direct, private benefits from state largesse that are not made available to the rest of  $S$  and that are not typically viable in democratic electoral regimes. State leaders offer a mix of private and public goods that will solidify support and maximize the utility of  $W$ . As authoritarian leaders often tax citizens at a heavy rate to provide generous private payoffs to a small number of citizens, the state generally invests little in public goods or in transfers.

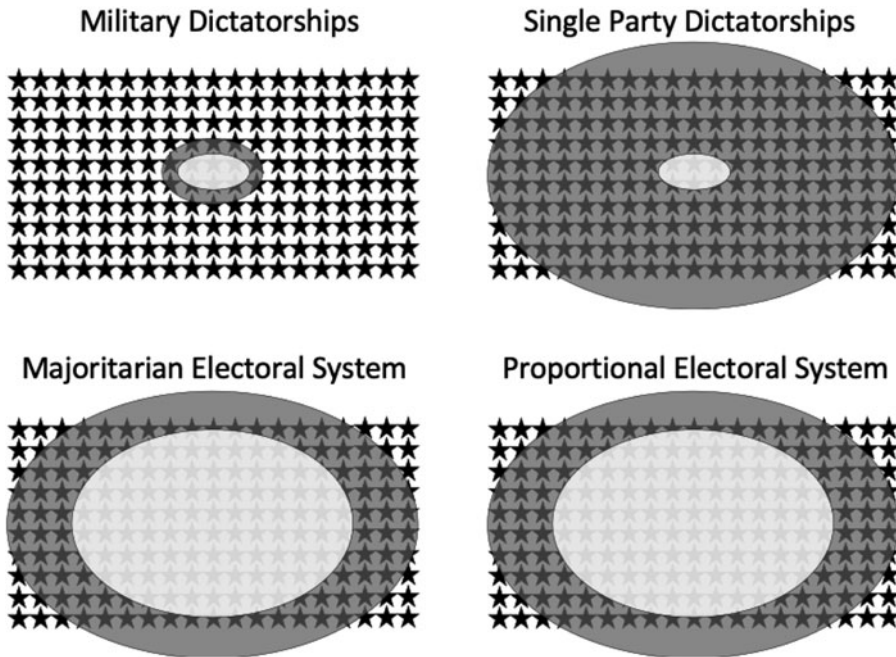
While most authoritarian regimes dole out private rewards generously to  $W$ , the size of  $W$  relative to  $S$  is extremely small in single-party dictatorships compared to military dictatorships. For example, it may be the case that all citizens have the right to vote but true decision-making power is wielded by a small number of people who are members of the party elite. In single-party dictatorships, individuals in  $W$  understand that there is a large pool of individuals that would readily take their place, as “practically anyone can be brought into the coalition and everyone is

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(3) citizens are members of one of three (nonethnic) social groups of unequal size, each of whom is eligible for a different type of transfer; and (4) the geographic (spatial) distribution of individuals belonging to these nonethnic social groups is assumed to be random across the country. Assuming the distribution of transfer groups is constant, all three representatives in majoritarian systems will advocate for the interests of the same largest transfer group. Since only one social transfer group is represented, transfers will not be politicized. Citizens vote for representatives who will advocate for public goods over transfers in order to direct government spending more toward their own district. The result is higher spending on public goods relative to transfers. In proportional systems, on the other hand, because more than one individual is elected in each district, more than one transfer social group is represented in the legislature. Transfers are politicized in this setting. Citizens vote for representatives who will increase their own individual share of transfer spending, which results in less spending on public goods relative to transfers. The authors test this theory with a time-series analysis spanning Organisation for Economic Co-operation and Development and Latin American countries and find supportive evidence. We offer interested readers a more detailed, technical discussion of this setup in Section 4b of the Online Appendix (pp. 9–12).

<sup>11</sup>Our theory is broadly compatible with the idea of “contingent prize allocation” (Smith, Bueno de Mesquita, and LaGatta 2016). Related work examines the relationship between “selectorate” institutions and war aims (Morrow et al. 2006). However, we focus on a small subset of the type of conflict examined by this previous work and emphasize domestic redistributive consequences.





**Fig. 1.** Selectorate (dark oval) and winning coalition (light oval), by institutional type with each star representing a citizen  
*Note:* Majoritarian electoral systems and proportional electoral systems have similarly sized selectorates and winning coalitions. What explains variation in propensities for irredentism in these institutional forms is rather the varying way interests get translated into different propensities by their electoral institutions for the state to provide public goods versus transfers.

replaceable” (Buono de Mesquita et al. 2003, 68). As a result, members of  $W$  covetously safeguard their positions. Since annexation is potentially threatening to  $W$ , irredentism should be much less likely in single-party authoritarian systems than in military dictatorships. By comparison, where the size of  $W$  relative to  $S$  is larger, such as in military dictatorships (where  $S$  is the officer corps of the military, a very small proportion of the population, but  $W$  is a majority of that officer corps), the threat of unwanted competition through annexation is substantially smaller. As a result, we predict, irredentism will be significantly more likely in *military dictatorships* than in *single-party dictatorships*.<sup>12</sup> In sum, the model predicts that two regime types—military dictatorships and majoritarian democracies—have a relatively high likelihood of irredentism, whereas proportional democracies and single-party dictatorships share relatively low odds of irredentism.

Figure 1 summarizes the difference between the size of  $S$  and  $W$  across these four ideal-type regimes: majoritarian democracies, proportional democracies, single-party dictatorships, and military dictatorships. Each star represents one person, the darker oval represents  $S$ , and the lighter oval represents  $W$ . Figure 2 illustrates and summarizes *the implications* that the size of  $S$  and  $W$  have for the state’s decisions to spend revenue on PTP goods and, in turn, for incentives to engage in irredentism. In military dictatorships and single-party dictatorships, relatively little revenue is delegated to public goods or transfers, for electoral considerations play little substantive role in policymaking decisions. Instead, the state invests heavily in providing private goods to core supporters. Irredentism is thus driven by the degree to which integrating new ethnic kin into the

<sup>12</sup>Political leadership aims to maximize the expected utility of the median member of its winning coalition and then weighs the likelihood of victory in a conflict by assessing its own resources against those of the host state. If it anticipates an acceptable likelihood of victory, political leadership attempts to annex the kin group militarily, with a probabilistic likelihood of victory based on the two countries’ relative power capabilities. If it wins the conflict, political leadership annexes the territory into its state.

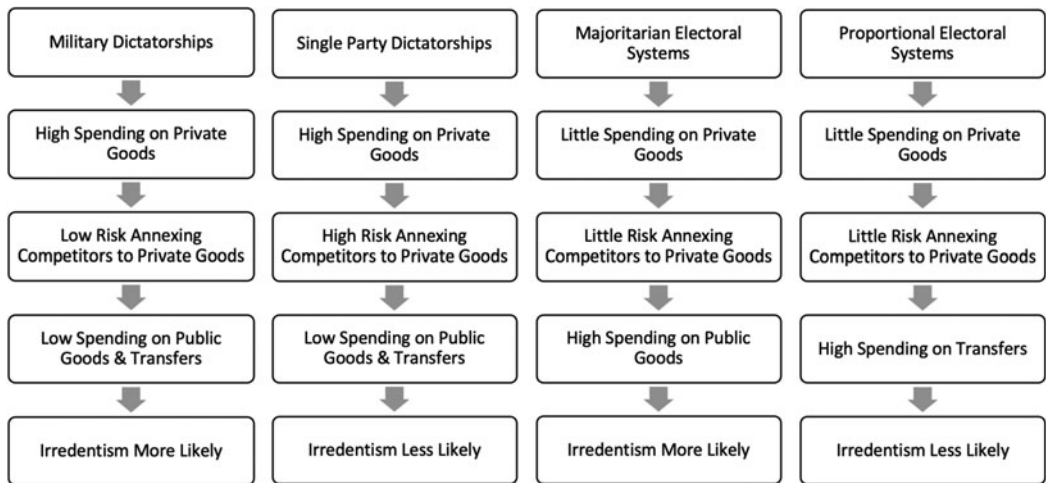


Fig. 2. Mechanisms linking regime type to irredentism.

state might potentially threaten core supporters' access to the private goods that the state provides them. As this threat is higher in single-party dictatorships, the likelihood of irredentism is lower in single-party dictatorships than in military dictatorships.

On the other hand, in democratic electoral systems, the size of  $S$  and  $W$  are large enough that the distribution of private goods is not politically beneficial to state leadership, and so leadership focuses on providing transfers and public goods to its population. On average, the electoral incentives of majoritarian electoral systems encourage the production of public goods relative to transfers, whereas proportional electoral systems encourage more transfers than public goods (Milesi-Ferretti, Perotti, and Rostagno 2002, 610). Since preferences for public goods are influenced by ethnicity (Alesina, Baqir, and Easterly 1999; Baldwin and Huber 2010, 645; Fernández and Levy 2008; Kimenyi 2006), incorporating ethnic kin into majoritarian electoral systems moves the median voter's preferences for public goods closer to the ethnic majority. This allows the state to provide public goods more efficiently at a lower tax rate and thus makes irredentism much more attractive. As proportional electoral systems invest less heavily in public goods, these incentives are not as pronounced, which leads to less irredentism compared to majoritarian systems.<sup>13</sup>

In sum, the model predicts the following systems as being from most to least likely to engage in irredentism: (1) military dictatorships and majoritarian electoral systems, followed by (2) proportional electoral systems and single-party dictatorships.<sup>14</sup> A major implication is that there is nothing intrinsic to democracies inhibiting irredentism, nor anything to dictatorships inclining states toward it.

### Empirical Validation

To assess our theoretical predictions, we utilized comprehensive data on each country's political institutions (Bormann and Golder 2013; Geddes, Wright, and Frantz 2014), focusing on four

<sup>13</sup>The focus of our theory is on decision-making processes within the potential irredentist state itself rather than on the condition of the kin group within the host state. This is consistent with our observation that there are many unrequited instances of irredentism. Examples include the Toubou in Northern Chad [who did not wish to be retrieved by Libya], the Pathans in Pakistan, and the Croats in Austria [who are uninterested in joining Croatia]. While it is more attractive in general to be retrieved by a rich state, rich neighbors do not always entice and poor ones do not always deter (on this, see Horowitz 1985, 286). Our models account for the economic condition of the group in the enclave.

<sup>14</sup>Full technical details of the computational model are in Sections 1 through 5 in the Online Appendix.

main (mutually exclusive) types<sup>15</sup>: (1) majoritarian electoral systems (*Majoritarian*); (2) proportional electoral systems (*Proportional*); (3) dominant, single-party dictatorships (*Single Party*); and (4) both military and personalist dictatorships (*Military*).<sup>16</sup> We then matched this with data on the entire universe of potential and actual irredentist cases from 1946 to 2014 (Siroky and Hale 2017).<sup>17</sup> Table 1 presents descriptive statistics illustrating the number of irredentist conflicts by institutional regime type, which aligns with our theoretical expectations. Majoritarian democracies and military dictatorships exhibit higher levels of irredentist conflicts than the others, with 5.8 per cent and 4.5 per cent of potential opportunities resulting in irredentism, respectively. Meanwhile, proportional democracies (1.2 per cent) and single-party dictatorships (3.1 per cent) display considerably lower rates of irredentism.

Now, we turn to the statistical models, which include additional factors that have been highlighted in the literature. The main model includes, first, the margin of the largest ethnic group in the irredentist state, as more homogeneous states are thought to be more likely to engage in irredentism (*Margin*) (Carment and James 1997; Horowitz 1985, 281–8; Lake and Rothschild 1998; Siroky and Hale 2017).<sup>18</sup> It also includes an indicator for whether the ethnic enclave is ethnically homogeneous or dispersed (heterogeneous) within the host state (*Dispersed*) (Horowitz 1985, 285; Moore and Davis 1998; Siroky and Hale 2017); whether the ethnic enclave is discriminated in the host state (*Discriminated*) (Davis, Jagers, and Moore 1997; Horowitz 1985, 291; Moore and Davis 1998, 93–4; Saideman and Ayres 2008; Siroky and Hale 2017); and the wealth ratio in the host state relative to the irredentist state (*Wealth Ratio*).<sup>19</sup>

Since dyadic regime characteristics have also often been emphasized in the literature, and because anocratic dyads appear particularly predisposed to interstate violence (Fearon and Laitin 2003; Gurr 2000; Mansfield and Snyder 2002a; Mansfield and Snyder 2002b; Muchlinski 2014; Salehyan and Gleditsch 2006; Siroky and Hale 2017), we include a set of indicators to capture whether the dyad is comprised of two anocratic regimes (*Anocracy/Anocracy*), an anocratic irredentist state and a nonanocratic host state (*Anocracy/No*), a nonanocratic irredentist state and an anocratic host state (*No/Anocracy*), or two nonanocratic states (*No/No*—the omitted reference category).<sup>20</sup> Finally, the main models include five further measures: (1) the population of the host state (*Host Population*); (2) the population of the irredentist state

<sup>15</sup>We model institutions as exogenous to the processes under study, while recognizing that unmodeled characteristics, particularly relating to ethnicity, might link the decision to adopt a particular electoral system to irredentism. The relatively rare nature of irredentism does not allow us to run fixed effects, as there is no variation on the dependent variable within some of our triads. Yet, we do employ regional variables in the Online Appendix (see Appendix Table 3), which account for many potentially confounding characteristics separating regions, such as Western Europe from Eastern Europe. We also explicitly model a variety of potentially relevant ethnic controls, such as the margin of the size of the largest ethnic group from the second-largest ethnic group, the degree to which a target ethnic group is dispersed in the host state, and so on.

<sup>16</sup>We combined (Geddes, Wright, and Frantz 2014) military and personalist categories into a single category, as both systems are characterized by small selectorates and small winning coalitions. Due to a small number of cases, we eliminated their monarchy category from our primary analyses. In Online Appendix Table 4, we include the disaggregated and omitted categories, and their inclusion has little substantive impact on our results.

<sup>17</sup>This dataset is organized using triads constituted by: (1) a potential irredentist state; (2) an enclave residing outside the irredentist state's borders whose ethnicity matches the group in power in the potential irredentist state; and (3) a host state in which that coethnic enclave resides. Each triad is observed on a yearly basis, making the unit of observation a triad-year.

<sup>18</sup>Margin is the difference between the proportion of the largest ethnic group in the potential irredentist state and the proportion of the second-largest ethnic group in the potential irredentist state.

<sup>19</sup>This is the annual ratio of the host state's gross domestic product (GDP) per capita divided by the GDP per capita of the potential irredentist state (Alesina and Spolaore 2003, 71–2; Alesina, Spolaore, and Wacziarg 2000; Bolton, Roland, and Spolaore 1996; Siroky and Hale 2017; Wittman 1991, 127).

<sup>20</sup>Online Appendix Table 6 reports the model without anocratic dyads. Online Appendix Table 5a displays a nondyadic specification in which we include mutually exclusive indicators of democracy, autocracy, and anocracy for the irredentist state. Neither robustness check impacts our substantive results. Online Appendix Tables 7A through 7D provide tabulations to illustrate how our anocracy dyads map onto our four institutional designations of *Majoritarian*, *Proportional*, *Single Party*, and *Military*.

**Table 1.** Irredentist conflicts by institution

Institution	No irredentism	Irredentism	Total
Majoritarian	970 94.17%	60 5.83%	1,030 100%
Proportional	936 98.84%	11 1.16%	947 100%
Party	1,198 96.93%	38 3.07%	1,236 100%
Military	898 95.53%	42 4.47%	940 100%

Note: Relative frequencies by row.

(*Irredentist Population*); (3) the disparity in military capabilities between the host and irredentist states (*Power Disparity*), which is the natural log of the host state's Composite Index of National Capabilities (CINC) divided by the potential irredentist state's CINC; and (4) whether or not the potential irredentist (*Irredentist Soviet*) or (5) host (*Host Soviet*) states were formerly part of the Soviet Union. The Online Appendix provides a range of additional specifications and tests.<sup>21</sup>

We estimated a logistic regression, with standard errors clustered by triad. To account for temporal dependence, we utilized cubic polynomial transformations from the number of peace years in each triad dating back to the previous irredentist conflict, if there was one, or, if not, to the first year of the dataset (Carter and Signorino 2010).<sup>22</sup> Table 2 displays the main results, and Figure 3 presents the predicted probabilities of irredentism for each of the four focal regime types, with 95 per cent confidence intervals.<sup>23</sup>

Both proportional electoral systems and single-party systems are associated with a lower predicted probability of irredentism compared to systems with majoritarian and military institutions. The predicted probability of irredentism for a state with a proportional electoral system is only 0.019. Similarly, single-party dictatorships have a low predicted probability of engaging in irredentism of 0.025. Meanwhile, states with majoritarian electoral systems possess a much higher predicated probability of engaging in irredentism (0.050), and so do military dictatorships (0.052).<sup>24</sup> While these two institutional forms cannot be statistically differentiated from each other, they are statistically distinct from single-party dictatorships and proportional electoral systems.

This statistical evidence validates the computational model's main predictions that majoritarian democracies and military dictatorships are the most prone to irredentism, whereas single-party dictatorships and proportional democracies are the least, underscoring the importance of

<sup>21</sup>These additional tests include regional controls and a control for crosscutting ethnic cleavages (linguistic and religious [see Online Appendix Table 8a]) that may be associated with moves toward both proportional representation and reduced propensities for irredentism (Selway 2011). We further account for a variety of ethnic characteristics in both the host state and enclave for a variety of reasons (see Online Appendix Table 9), including that the potential irredentist state may possibly annex other ethnic groups with its own ethnic kin during irredentism (Cederman, Weidmann, and Gleditsch 2011). We also provide robustness tests, such as rare events logistic regression (see Online Appendix Table 2), removing the anocracy and former Soviet controls (see Online Appendix Table 6), assessing a potential interaction effect between proportional systems and ethnic characteristics (see Online Appendix Table 8b), and adding a parliamentary/presidential system distinction (see Online Appendix Table 5b). As discussed and presented in the Online Appendix, none of these robustness tests have a significant impact on our main model results. In addition, we assess the performance of our model against the model presented in Siroky and Hale (2017) in Online Appendix Table 10.

<sup>22</sup>In all cases, we begin counting the number of peace years from a triad's entry into the dataset. In most cases, this is either immediately after the Second World War or following national independence.

<sup>23</sup>The full model results when excluding each of our four institutional types as a reference variable are in Online Appendix Table 1.

<sup>24</sup>We note that Putin's Russia is coded as a personalistic dictatorship by Geddes, Wright, and Frantz (2014), which falls within our broader category of military dictatorships (see footnotes 5 and 16).

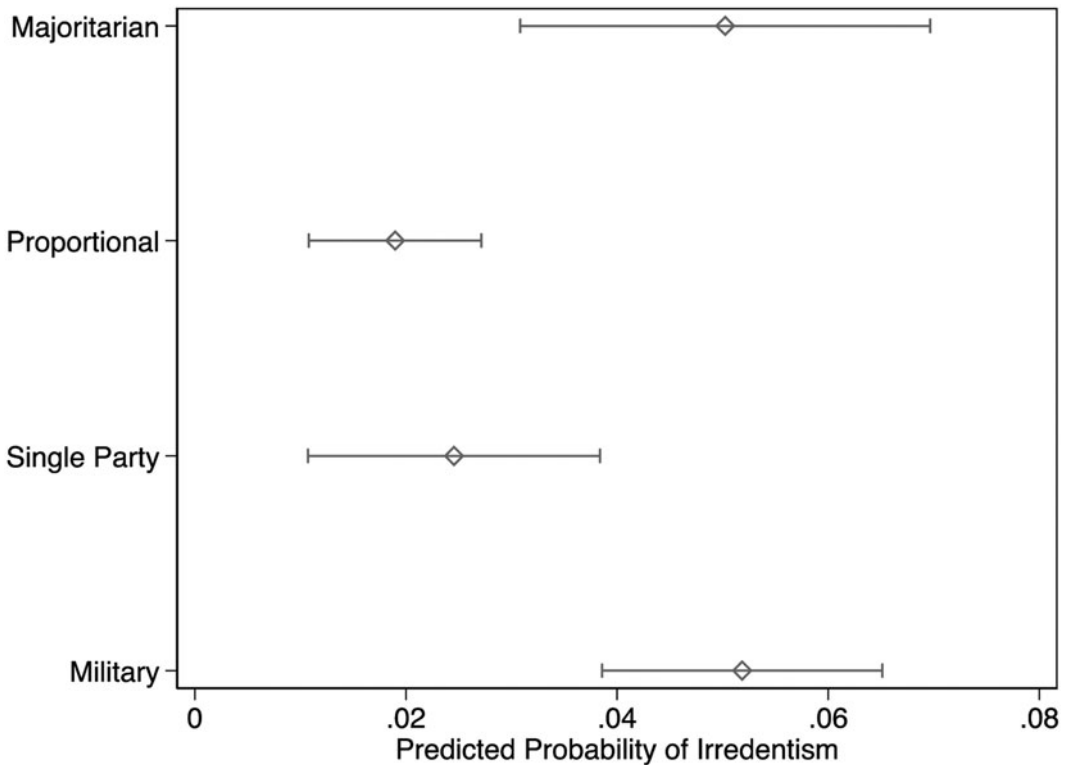


Fig. 3. Empirical results: predicted probability of irredentism by political institution  
 Note: 95% Confidence Intervals.

focusing on specific institutions over the broader distinction between democracies and dictatorships.

Most of the control variables are not statistically significant, but anocratic dyads are worth noting. When both the irredentist and host states are anocratic, the probability of irredentism is dramatically increased relative to dyads where neither of the regimes is anocratic. We also see that irredentism is more likely when *either* the irredentist *or* the host state is anocratic, which is consistent with the finding in the literature that anocratic dyads are in general much more likely to engage in interstate conflict.

These results have crucial implications for our understanding of irredentism. Whereas much of the literature has posited that democracies are less likely to go to war for various reasons than autocracies, the current analysis suggests, at least with regard to irredentism, that this may not be accurate. Our results clearly demonstrate that majoritarian democracies are among the regimes *most* likely to engage in military conflict to annex ethnic kin. Similarly, while autocracies are often seen as being particularly likely to initiate interstate conflict, our theoretical model and accompanying empirical tests suggest single-party dictatorships are far *less* likely to initiate irredentist conflict than majoritarian democracies. Rather than simply assuming that dictatorships pursue irredentism more than democracies, or that citizens blindly allow themselves to be whipped into a nationalistic frenzy by political leaders, we specify the incentives of citizens to follow the ethnopopulist appeals of leaders and the incentives of leaders to pursue such policies. This reveals distinct institutional effects and establishes that the observed variation *within* democratic regime types and *within* autocratic regime types is just as noteworthy and consequential as disparity *between* regime types.

**Table 2.** Logistic regression results

Variables	(1) Beta (SE)
1. Majoritarian	
2. Proportional	−1.73** (0.50)
3. Party	−1.34* (0.58)
4. Military	0.07 (0.55)
Anocracy/Anocracy	2.02** (0.47)
Anocracy/No	0.88* (0.45)
No/Anocracy	0.73** (0.24)
Margin	0.30 (0.50)
Dispersed	−1.55 (1.14)
Discriminated	−0.18 (0.53)
Wealth Ratio	−0.28 (0.31)
Host Population	0.00 (0.00)
Irredentist Population	−0.00 (0.00)
Power Disparity	0.07 (0.10)
Irredentist Soviet	−0.77 (0.70)
Host Soviet	0.32 (0.49)
Peace Years	−1.47** (0.23)
Peace Years 2	0.09** (0.02)
Peace Years 3	−0.00** (0.00)
Constant	0.22 (0.64)
Observations	3,527
BIC	604.00
AIC	486.80
Log likelihood	−224.40

Notes: Robust standard errors in parentheses. \*\*  $p < 0.01$ ; \*  $p < 0.05$ .  
BIC = Bayesian Information Criteria; AIC = Akaike's Information Criteria

## Conclusion

This article proposes a new institutional theory of irredentism to shed light on a fundamental problem of international security that has rarely been studied in a systematic and global manner. It endeavors to make three primary contributions. First, it provides stronger microfoundations for the political calculus of leaders and the economic interests of citizens across four distinct institutional regimes. Second, it develops a new computational model of irredentism that generates observable, empirical implications and enables us to model preference heterogeneity in a manner that is often intractable for formal mathematical models. This permits us to model irredentism as an emergent systemic process resulting from the microinteractions of citizens and leaders at

the domestic level. Third, our study validates the computational model's predictions using global data.

The theory argues that state leaders are motivated by staying in power and maximizing revenue but are constrained in this endeavor by the need to provide social welfare and public goods to their constituents. Political leaders interested in maximizing the utility of their core constituents can provide more transfers and public goods by raising the tax rate, but this extraction lowers overall productivity and reduces the potential source of tax revenue, diminishing individual wealth and generally reducing the leadership's popularity. This can cause—and has caused—leaders to be ousted from power. On the other hand, leaders can lower taxes to help citizens retain their personal wealth, but doing so ultimately lessens the amount of revenue that they have to spend in the short term on PTP goods. Political leaders are wary of disrupting the optimal relationship between taxation and the provision of PTP goods for citizens. Any decision to annex territory and incorporate ethnic kin must therefore carefully consider the implications for their political survival. Leaders are more likely to engage in irredentism when doing so clearly increases the utility of the median core political supporter, which in our framework, depends upon the country's institutions.

Instead of assuming irredentist conflict should be less likely in democracies or democratic dyads, we theorize that different types of democracies and dictatorships possess distinct implications for irredentism. Our results demonstrate that there is as much heterogeneity *within* institutional types as there is across them; specifically, we show that majoritarian democracies and military dictatorships are most likely to engage in irredentism, whereas proportional democracies and single-party dictatorships are least likely. These results clearly challenge some of the conventional wisdom about how regime type is thought to shape international conflict behavior and show that both democracies and dictatorships have variants that are much more *and* much less predisposed to irredentism.

Our framework situates leaders and masses within these institutional settings, and imbues them with well-defined microfoundational incentives. Theories emphasizing the role of elites in driving ethnic conflicts can help scholars better understand the incentives of political leaders to mobilize masses for irredentist conflict, but “the insistent question of why the masses follow” (Horowitz 1985, 104) has yet to be directly connected to the calculus of leaders or to the constraints imposed by institutions. Most of the literature emphasizing the importance of ethnic out-bidding has assumed leaders behave rationally but that the masses are mobilized based on emotional considerations, such as fear, dignity, resentment, or anger. Without denigrating the role of such emotions in helping leaders mobilize nationalist support, this study proposes a new set of microfoundations for both the elite and the masses. It affords an explanation for why, in some institutional contexts but not in others, the masses may find such ethnonationalist appeals particularly agreeable and why leaders may see it as in their interest to promote them. This approach advances the study of irredentism and opens new directions for future research by explicitly connecting microincentives and institutions to international political behavior.

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## **Computational Model Summary:**

The world undergoes an initial period of endogenous state formation (“Prehistory”)<sup>1</sup> during which countries expand, contract, and develop boundaries through war. Within this initial phase, states seek to incorporate as much territory as they can, while also fending off advances from neighboring states. The result is a state system of borders whose configuration looks different with each model run owing to the unique and random placement of individuals and capitols on the grid. Once the state system has been established, individuals of particular nations may or may not find themselves within the borders of their corresponding nation-states, and this creates future opportunities for irredentism. States further develop political institutions to govern their territories.<sup>2</sup> The government in these states sets a tax rate and particular mix of PTP goods to maximize the median utility of its  $W$ . It then evaluates whether irredentism would increase the utility of that median core supporter.

### **1. Model Setup:**

In the prehistory, each capitol only consists of one patch of territory, and most of the world is not yet administered by any state-like authority. We use Lars-Erik Cederman’s computational model of endogenous international state formation as a starting point (Cederman

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<sup>1</sup> There is no set period of time for the Prehistory. The Prehistory is in effect until all units of territory have been incorporated into a state.

<sup>2</sup> Each stylized state is divided into three subnational districts that are represented in the national legislature and that are responsible for supplying public goods to citizens. We build on the model provided by Milesi-Ferretti, Perotti, and Rostagno (2002), which also assumes three stylized districts in each nation-state.

1997; 2001). Each capitol calculates whether it will attack neighboring territories (some of which remain unclaimed and accordingly defenseless) by assessing its own power and resources relative to its neighbors. Each acquired unit of territory pays a uniform tribute to the capitol, and in exchange the capitol provides welfare and defense for that territory.

This prehistory simulates a period of endogenous international state formation in which centers expand and consolidate their territory, engage in conflict against one another, and form defensible state boundaries. As this process develops, most individuals of a nation - but not all - will find themselves within the borders of a corresponding nation-state, where the majority of the population shares their nation. Other individuals of nation A will find themselves enclosed within the borders of a state where nation B is the majority. Since borders emerge endogenously, so do opportunities for irredentism, just like in the real world.

We note here it is beyond the scope of our theory to elaborate the mechanisms of why individuals in one national territory share a sense of perceived ethnic kinship with individuals across national boundaries, and it is also beyond our theoretical ambitions to model the iterative relationship between nation-state development and ethnic self-identification. Instead, we simply create interacting states where individuals within them, for whatever contingent reasons, identify as one particular national group and may find themselves outside the boundary of the same nation-state.<sup>3</sup>

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<sup>3</sup> We certainly do not claim that such ethnic, or national, identities are immutably fixed or that they cannot be changed. We also recognize individuals may take on multiple identities, the implications of which are at least partially captured within our model by individuals sharing heterogeneous preferences (as described below) even within their particular national groups.

### *1a: World Description*

The model starts with  $T$  patches of territory. In our case, we utilize the default 33x33 unit grid used in the NetLogo software which yields 1,089 individual patches.<sup>4</sup>

### *1b: Setup Nations*

On our blank grid of  $T$  individual territorial units, we randomly place one capitol for each of ( $N$ ) nations. The capitol represents political leadership in our model and it takes on the administrative taxation and redistributive functions typically associated with the state. The capitol calculates the optimal mix of tax rates and PTP goods to redistribute to individuals residing within its borders to keep itself in power, as described below. Each nation is constituted by  $I$  individuals who are scattered around the capitol at a user-defined rate of dispersion.<sup>5</sup> This setup ensures sufficient diffusion of individuals to provide opportunities for irredentism while also guaranteeing that many nation-states will possess a majority from one nation. The capitol along with its captured territories represents a state. The capitol, its territories, and the individuals residing on those territories represent a nation-state.

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<sup>4</sup> The world is “closed,” which means agents located on the boundaries do not interact with agents on the other side of the world.

<sup>5</sup> Dispersion is constrained by being within 10 patches of the capitol. The simulation places 10 capitols randomly across the 1,089 patches of territory. Each nation initially consists of approximately 50 individuals. Across 10 nations that means the model includes approximately 500 individuals.

### *1c: Setup Capitols*

To create states within an international system, we drew from Lars-Erik Cederman's (1997, 2001) computational model. When the model begins, no patches of territory belong to any state beyond the capitol. The single political capital of each nation-state is endowed with a user-defined number of mobile resources that can be utilized for expansive conquest ( $m_t$ ), while the remaining individuals in each nation are not endowed with these resources. Per Cederman, this is to create an uneven world allowing for geopolitical competition. Each territorial unit also consists of a user-defined and uniform number of fixed resources that cannot be utilized for territorial expansion ( $f_t$ ).<sup>6</sup>

## **2. Prehistory**

### *2a: Front Resource Allocation*

As our interests are not in modeling the dynamics of balancing behavior in the international system, as were Cederman's, we use a simplified version of his resource mobilization model.<sup>7</sup> At model initialization, the capital possesses only its own mobile resources

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<sup>6</sup> Of course, in reality geographic territories likely possess substantially different resource endowments and populations with important implications for the political development of states. Our aim here is to create a system of interacting states where individuals who identify with one nation find themselves within another nation-state's borders. Modeling every factor that would contribute to the relative strength and political development of nation states is (far) beyond our goals.

<sup>7</sup> As in Cederman's model, the capitol of each state has both fixed and mobile resources. "A preset share of each actors' resources is considered to be fixed and has to be evenly spread to all



to engage in foreign expansion. As the capital expands and annexes territory, each territory pays tribute ( $t_t$ ) to the capital, with tribute equaling each territory's fixed territorial resources ( $f_t$ ) multiplied by a user-defined discount rate ( $g_t$ ) raised to the distance of the territory from the capital ( $d_t$ ):

$$t_t = f_t * (g_t)^{d_t} \quad (1)$$

Each capitol's available resources ( $a_s$ ), then, is the sum of the total tribute paid by all of its annexed territories plus its own resource units. Per Cederman, some proportion ( $p_s$ ) of the resources available to the capitol are fixed ( $f_s$ ) and cannot be allocated to fronts for the purpose of warfare, while some proportion of those resources are mobile ( $m_s$ ) and can be allocated to fronts for the purpose of warfare. Fronts, in this case, are defined as those territorial units that are bordered at least on one of four sides by a territory that is not part of the contiguous capitol. Of the fixed resources, the capitol must divide its fixed resources evenly among its territories. Territories on the front receive these fixed resources, and then each territory on the front also receives additional mobile resources. The capitol spreads its mobile resources evenly among all territories on the front.

### *2b: Decide Expansion*

A capitol's decision to expand during the prehistory is based on the resources available in its annexing border territory relative to an immediately adjacent territory outside the capitol, which constitutes a target province. At each round, each territory on the capitol's border randomly selects a potential target. The capitol decides a probability it will attack in an attempt

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external fronts.” Unlike Cederman's model, resources are not sent to fronts based on the opponent's strength or previous activity on the front.

to annex that territory. The probability is based on the resources available in its own territory ( $r_i$ ) relative to the territories in the target territory ( $r_j$ ) that can be used to defend itself from attack.

This is the balance of territorial resources ( $b_i$ ).

$$b_i = \frac{r_i}{r_j} \quad (2)$$

The probability of attack ( $p_i$ ) is then predicated on a logistic function based on user-defined parameters controlling for a threshold of balance disparity for attack ( $supt$ ) and the slope of the logistic curve ( $supc$ ).

$$p_i = \frac{1}{1 + \left(\frac{supt}{b_i}\right)^{supc}} \quad (3)$$

The computer program randomly chooses a number between 0 and 1. If the number chosen is less than  $p_i$ , the targeted territory is attacked. The probability of victory ( $v_i$ ) is the same as the probability of attack ( $p_i$ ). The program again chooses a random number between 0 and 1, and if that number is less than  $v_i$ , the territory is successfully annexed into the capital.

#### *2c: Update Resources*

With this procedure, the capital now reassesses its total number of resources and territories available whether it annexed or lost territory (or maintained the status quo) as a result of the previous round.

#### *2d: Structural Change*

This procedure accounts for situations where the capital of a nation is annexed by another state. In these situations, a random territory from the nation in which the capital was annexed is chosen to be the new capital.

### **3. Prehistory Over (Setup Governments and Districts)**

Once all territories in the world have been annexed, and no territories remain that have not been incorporated into one of the states, the prehistory is over. At this point, each state is

divided into three districts, and each district is responsible for distributing public goods to individuals residing within that district. The capital now serves as the distribution center of public goods for one of the districts. The program calculates the mean distance of all individuals from the capital. A randomly chosen inhabited territory whose own distance from the capital is greater than the mean distance of all individuals from the capital serves as the public goods distribution center for a second district. Finally, a second randomly chosen inhabited territory whose own distance is greater than the mean distance of all individuals from both the capital and the public goods distribution center for the second district serves as the public goods distribution center for the third district. Individuals are then sorted into the district that contains the closest public goods distribution center to them.

#### **4. Taxation and Irredentism (Democracies)**

##### *4a: Front Resource Allocation*

Resource allocation to the fronts proceeds in the same way as during the prehistory phase of the model. See the discussion presented in Section 2a for further details.

##### *4b: Public Goods and Transfers in Majoritarian vs. Proportional Systems*

In majoritarian systems, each district sends one representative to a national legislature. In proportional systems, there are three representatives elected on a proportional basis who represent one national district (there are still three public goods-providing districts). Per Milesi-Ferretti et al. (2002), all three winning representatives in the national legislature represent the largest transfer group (even though only two representatives are necessary) in a majoritarian electoral system, since transfer preferences are evenly distributed across the country. As a result, the largest transfer group's interests are represented and implemented into national policy, while the other two transfer groups' interests are not. Since this stylized majoritarian system

encourages all representatives to advocate on behalf of the same transfers, these can be put into national policy in a politically uncontroversial manner.

Preferences for public goods, on the other hand, are more local in character. Gaining the support of an elected representative who will advocate on behalf of a citizen's desired public goods is critical. Voters therefore devote their energies to electing representatives who will actively advocate on directing particular public goods to their districts. Politicians benefit politically by promising to bias spending towards a particular district more than they do by diverting expenditures toward a single national transfer group.

Majoritarian systems thus tend to be characterized by higher public goods spending than spending on transfers. A majority (two of three) of the national representatives agree to direct public goods spending to their own districts, while a third district gets no spending (Milesi-Ferretti, Perotti, and Rostagno 2002). The winning coalition for political leaders to retain national office then consists only of citizens in the two districts receiving public goods and members of the largest transfer group. Politicians will be most attuned to the median voter within this subset of the population. The interests of citizens in the third district not receiving public goods, and members of the two smaller transfer groups, are not part of the winning coalition and thus not considered when setting national policy.<sup>8</sup>

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<sup>8</sup> Some may find this to be a gross oversimplification of the policy-making process. Clearly some degree of public goods is provided by national states to peripheral regions even if they are not influential in setting national policy. This is intended as a stylized and simplified version of the allocation of public goods and transfers. Whether marginalized districts receive some smaller share of public goods is immaterial to the model's results.

In proportional democracies, “ the median voter tries to bias the decision of the government toward his or her own transfer by electing an individual with a preference for high spending on transfers relative to public goods ... the result is just high spending on the two types of transfers that get funded” (Milesi-Ferretti, Perotti, and Rostagno 2002, 619). The winning coalition necessary for politicians to maintain power in proportional democracies is thus broader than under majoritarian systems.

Subsequently, the capitol makes different decisions on what to spend on public goods and welfare transfer payments depending on whether the capitol employs majoritarian or proportional electoral systems.<sup>9</sup> Each individual has preferences for how they would like to see the capitol spend on transfers or public goods as a percentage of GDP. The exogenous median citizen preference for spending on transfers as a proportion of capital spending can be represented by  $\alpha_m$ , while the exogenous median citizen preference for spending on public goods as a proportion of capitol spending can be represented by  $\beta_m$ . These preferences are directly relational to each other. The higher the preference for public goods spending, the lower the preference for spending on transfers, and vice versa. These preferences get translated into capitol policy in different ways depending on whether an electoral system is majoritarian or proportional. Majoritarian systems incentive voters to prioritize spending on public goods over transfers, while proportional systems incentive voters to prioritize spending on transfers over public goods (see the discussion in the main text of the paper). Milesi-Ferretti et al. have

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<sup>9</sup> The capitol makes similar calculations of public goods, transfers, and the tax rate during the prehistory. However, the implications of those decisions only become relevant to the model once the prehistory is over.

formalized how these preferences are translated into the median voter preferences for public goods and transfers in both proportional and majoritarian electoral systems. Based on those median preferences, the capitol calculates the proportion of its tax revenue it will spend on expenditures on transfers ( $s^M$ ), and expenditures on public goods ( $c^m$ ) in majoritarian systems, as well as the amount it will spend on transfers ( $\bar{s}^P$ ) and public goods ( $c^P$ ) in proportional systems.<sup>10</sup>

*Total Expenditure on Transfers (Majoritarian)*

$$\bar{s}^M = \frac{\alpha_m(1-\beta_m)}{2-\alpha_m} \quad (4a)$$

*Total Expenditure on Public Goods (Majoritarian)*

$$c^m = \frac{2(1-\alpha_m)}{2-\alpha_m} \quad (4b)$$

*Total Expenditure on Transfers (Proportional)*

$$\bar{s}^P = \frac{2\alpha_m(1-\beta_m)}{1+\alpha_m(1-\beta_m)} \quad (4c)$$

*Total Expenditure on Public Goods (Proportional)*

$$c^P = \frac{1-\alpha_m}{1+\alpha_m(1-\beta_m)} \quad (4d)$$

#### *4c: Decide Tax Rate*

When deciding the tax rate, the capitol takes two interests into consideration: First, it is interested in maximizing revenue extraction so as to provide itself with greater resources. During the prehistory, in fact, the capitol is solely preoccupied with maximizing its own resources. However, once the prehistory is over, the capitol system is established, and institutional

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<sup>10</sup> See Milesi-Ferretti et al. (2002) for how the capitol arrives at these different calculations for majoritarian and proportional systems.

distinctions have taken root, the capitol is now preoccupied with placating the interests of its median core supporter. We present first the capitol's procedure for allocating resources during the prehistory (4c(i)) and during the main model period of analytical interest once the prehistory is over (4c(ii)).

*4c(i): Capitol Revenue Maximization (Prehistory Period)*

The capitol calculates the expected utility for itself of either raising or lowering taxes with regard to maximizing revenue, and here we draw from *The Logic of Political Survival* (Bueno de Mesquita et al. 2003) in examining the utility of rulers. The higher the tax rate, the more time citizens devote to leisure ( $l_i$ ), or time not devoted to productive and taxable activity. When making a decision to set the tax rate, the capitol first predicts the productivity of its citizens if it institutes either a unit ( $i_s$ ) increase ( $Il_i$ ) or decrease ( $Dl_i$ ) in the existing tax rate ( $r_s$ ).

$$l_i = \frac{1}{(2-r_s)^2} \quad (5a)$$

$$Il_i = \frac{1}{(2-r_s+i_s)^2} \quad (5b)$$

$$Dl_i = \frac{1}{(2-r_s-i_s)^2} \quad (5c)$$

The capitol then assesses its total revenue ( $v_s$ ) given the current tax rate and levels of leisure activity, which is the average of all productive activity taxed at the current tax rate (where 1 represents maximum productivity. This is a measure of total revenue as a proportion of its maximum potential if the capitol were capable of taxing everyone completely at peak productivity). It then predicts total revenue if it raises ( $Iv_s$ ) or lowers ( $Dv_s$ ) the current tax rate.

$$v_s = r_s * \left( \frac{1}{n} \sum_{i=1}^n (1 - l_i) \right) \quad (6)$$

$$Iv_s = (r_s + i_s) \left( \frac{1}{n} \sum_{i=1}^n (1 - Il_i) \right) \quad (6a)$$

$$Dv_s = (r_s - i_s) \left( \frac{1}{n} \sum_{i=1}^n (1 - Dl_i) \right) \quad (6b)$$

Of that total revenue ( $v_s$ ), residents have preferences for the total amount they would like to see devoted to social spending ( $P_s$ ). This is a function of the median individual in the capitol's winning coalition's preferences for transfers and public goods provision. This provides the total amount the capitol devotes to social spending. As we saw in the previous section, the degree to which this spending is devoted to public goods and transfers is affected by the type of electoral system a country has. The capitol predicts the total devoted to social spending if it raises ( $IP_s$ ) or lowers ( $DP_s$ ) the existing tax rate.

$$P_s = v_s * (\bar{s}^M + c^m) \quad (7)$$

$$IP_s = Iv_s * (\bar{s}^M + c^m) \quad (7)$$

$$DP_s = Dv_s * (\bar{s}^M + c^m) \quad (7)$$

Taking its particular electoral system into account, the capitol then calculates separate utilities ( $u_s$ ) for increasing ( $Iu_s$ ) or decreasing ( $Du_s$ ) the tax rate and the resultant social spending associated with either raising ( $IP_s$ ) or lowering ( $LP_s$ ) the tax rate.<sup>11</sup>

$$Iu_s = Iv_s - IP_s \quad (8a)$$

$$Du_s = Dv_s - DP_s \quad (8b)$$

We utilize a logit function to reconcile the two utility functions and produce a probability  $SPr[I]$  the capitol will raise the tax rate:

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<sup>11</sup> For the sake of space, here we only demonstrate how majoritarian capitols decide upon the tax rate based on majoritarian median preferences for transfers and public goods ( $\bar{s}^M + c^m$ ). The proportional calculations work similarly except we replace ( $\bar{s}^M + c^m$ ) with ( $\bar{s}^P + c^P$ ).



$$\text{SPr}[I] = \frac{e^{Iu_s}}{e^{Iu_s} + e^{Du_s}} \quad (8c)$$

The computer program then randomly chooses a number between 0 and 1. If that number is less than the probability the capitol raises the tax rate ( $\text{SPr}[I]$ ), the tax rate is raised. If it is higher than that probability, the tax rate is lowered.

*4c(ii): Citizen Utility Maximization (Main Model; Prehistory Over)*

Once the prehistory is over and political institutions are in place, the capitol prioritizes placating its median core supporter over raising revenue for itself. In this section, we work our way toward an individual utility calculation for citizens based on insights from Bueno de Mesquita and colleagues (2003), Milesi-Ferretti et al. (2002), and Alesina and Spolaore (2003).

In order to develop our own utility function, we use a modified utility function described by Bueno de Mesquita et al. as a starting point:<sup>12</sup>

$$V(x, g, y) = \sqrt{x_s} + \sqrt{(l_{WS,i})g_s} + \sqrt{(1 - l_i)(1 - r_s)} \quad (9a)$$

Where:

---

<sup>12</sup> We want to be clear that it is not our intention to recreate all the implications of selectorate theory here. While it provides a very useful starting point for modeling individual utilities, we are interested in the differential impacts of transfers versus public goods which necessitates revising that general framework. Selectorate theory and the frameworks provided by both Milesi-Ferretti et al. and Alesina and Spolaore think about public goods in different ways. We combine their insights for our own explanation that draws from each. In our framework, state leadership can provide either private goods or, if they decide not to do so, can provide funds to either transfers or geographically fixed public goods, and the preferences for these public goods vary systematically across ethnic groups.

$V(x,g,y)$ :

$V()$  is an additively separable, twice differentiable function that is increasing and concave in each component.

$x$  is public goods produced ( $x_s$ )

$g$  is private goods given by the capitol ( $g_s$ ) if part of the winning coalition ( $l_{ws,i}$ )

$l_{wL,i}$  is equal to 1 if part of winning coalition and 0 otherwise

$y$  is a resident's retained economic reward  $(1-l_i)(1-r_s)$

Where  $l_i$  is an individual's leisure time and  $r_s$  is the tax rate

Leisure, as noted above, is a function of the tax rate  $r_s$ :

$$l_i = \frac{1}{(2-r_s)^2}$$

However, rather than modeling the provision of public goods simply as  $x_s$ , we split such public investments into two parts with considerations developed from Milesi-Ferretti et al. (2002): 1) the provision of public goods and 2) welfare transfers. This is necessary as it ultimately allows us to assess the impacts of proportional vs. majoritarian electoral systems. We will integrate the following individual utility function below (9b) provided by Milesi-Ferretti et al. into equation 9a discussed above. Milesi-Ferretti et al. model an individual's preferences for transfers ( $\alpha_i$ ) against their preference for public goods ( $\beta_i$ ) as a percentage of their preferences for each type of spending relative to all government revenue. Both are model parameters between 0 and 1. In their stylized model, individuals can be members of one of three transfer groups ( $j$ ) and are in one of three public goods-providing districts in a country ( $k$ ). In majoritarian systems, each district sends one representative to a national legislature. In proportional systems, there are three representatives elected on a proportional basis who represent one national district, although there are still three

public goods providing districts. The utility of individual ( $i$ ) in potential transfer group ( $j$ ) in district ( $k$ ) is modeled by Milesi-Ferretti et al. as:

$$U_{ijk} = (1 - r_s)^{\alpha_i \beta_i} s_j^{\alpha_i (1 - \beta_i)} g_k^{1 - \alpha_i} \quad (9b)$$

... where  $r_s$  is the tax rate,  $s_j$  is the value of transfers received from the capitol, and  $g_k$  is the value from public goods received from the capitol. The calculations of  $s_j$  and particularly  $g_k$  will form a substantial proportion of our discussion going forward. If an individual does not receive public goods or transfers (under conditions described below), her utility is zero. The individual is not part of the winning coalition, and thus her preferences are not taken into consideration by the capitol.

An individual's personal utility from transfers ( $s_j$ ) is the total value of transfers provided by the capitol ( $\bar{s}^M$  above in majoritarian systems,  $\bar{s}^P$  above in proportional systems) multiplied by total revenue ( $v_s$ ) and then divided by the total number of individuals eligible for the particular transfers ( $n$ )<sup>13</sup> funded by the government: Majoritarian -  $s_j = \frac{v_s * \bar{s}^M}{n}$ ; Proportional -  $s_j = \frac{v_s * \bar{s}^P}{n}$ .

The calculation of an individual's personal utility from public goods ( $g_k$ ) involves several steps and calculations. First, the total amount of public goods sent from the capitol to each eligible district ( $c_k$ ) equals total revenue ( $v_s$ ) multiplied by the proportion of spending devoted to public goods ( $c^m$ ) divided by two as the capitol only sends public goods to two districts:  $c_k = \frac{v_s * c^m}{2}$ . In proportional systems, the amount of funds for public goods the capitol sends to each district in proportional systems equals total revenue multiplied by the production of spending

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<sup>13</sup> Majoritarian systems fund one transfer while proportional systems fund two transfers.

devoted to public goods ( $c^P$ ) divided by three as the capitol sends public goods to all three

districts:  $c_k = \frac{v_s * c^P}{3}$ .

In our model we are also interested in the impact of heterogeneity of preferences related to ethnicity (Alesina and Spolaore 2003). Accordingly,  $h_i$  represents each individual's idiosyncratic preference heterogeneity, and  $d_{gi}$  represents the distance to the nearest public good (counted as the number of patches between an individual's location and her nearest public goods distribution center). Furthermore, for individuals whose nation is different from the majority residing in a nation-capitol, their preferences for public goods differ by a factor of  $e_i$ . Thus, an individual's preferences for public goods ( $p_i$ ) in terms of the distance from their own idiosyncratic preferences, their distance from the public goods provided, and their preferences potentially exacerbated by nation can be represented by:

$$p_i = e_i * h_i * \left(1 + \left(1 - \frac{1}{\left(1 + \frac{d_{gi}}{\lambda}\right)}\right)\right) \quad (10a)$$

..... where  $\left(1 + \left(1 - \frac{1}{\left(1 + \frac{d_{gi}}{\lambda}\right)}\right)\right)$  moderates the impact of physical patch distance ( $d_{gi}$ ) on

an individual's utility calculation by  $\lambda$  and translates distance in number of patches to a value between 1 and 2 (making it amenable with the scale of both  $h_i$  and  $e_i$ ).

The capitol provides public goods in a manner that caters to the median preferences of its winning coalition residing within each district. In a majoritarian system, for example, the capitol targets public goods to appeal to the median preference for public goods, denoted here as  $p_m$ . The value of public goods provided by the capitol to an individual ( $g_k$ ) is a function of the amount of spending on public goods the capitol sends to each district ( $c_k$ ) subtracting how far the public goods

provided by the capitol deviate from each individual's personal preference ( $p_i$ ) from those provided by the capitol that match the median district preference ( $p_m$ ).

$$g_k = c_k - c_k * \left( 1 - \left( \frac{1}{1+|p_i-p_m|} \right) \right) \quad (10b)$$

Finally, then, we represent each individual's utility with the equation:<sup>14</sup>

$$u_i = \sqrt{(l_{WS,i})g_s} + \sqrt{((1-l_i)(1-r_s))^{\alpha_i\beta_i} s_j^{\alpha_i(1-\beta_i)} g_k^{1-\alpha_i}} \quad (11a)$$

Accordingly, the capitol assesses separate utility calculations for its median core supporter for either increasing ( $Iu_s$ ) or decreasing ( $Du_s$ ) the tax rate by the interval  $i_s$ :<sup>15</sup>

$$Iu_s = \sqrt{(l_{WS,i})g_s} + \sqrt{((1-l_i)(1-r_s+i_s))^{\alpha_i\beta_i} RAISEs_j^{\alpha_i(1-\beta_i)} RAISEg_k^{1-\alpha_i}} \quad (11b)$$

$$Du_s = \sqrt{(l_{WS,i})g_s} + \sqrt{((1-l_i)(1-r_s-i_s))^{\alpha_i\beta_i} LOWERS_j^{\alpha_i(1-\beta_i)} LOWERg_k^{1-\alpha_i}} \quad (11c)$$

We utilize a logit function to reconcile the two utility functions and produce a probability  $CPr[I]$  the capitol will raise that tax rate:

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<sup>14</sup> The individual utility from capitol spending on transfers ( $s_j$ ) equals total revenue ( $v_s$ ) multiplied by the proportion of capitol spending devoted to transfers ( $\bar{s}^M$  in majoritarian systems,  $\bar{s}^P$  in proportional systems).

<sup>15</sup> The capitol calculates the value of goods and transfers it provides if it either raises ( $RAISEs_j$  and  $RAISEg_k$ ) or lowers ( $LOWERS_j$  and  $LOWERg_k$ ) the tax rate. To do so, the capitol recalculates expected productivity (equation 5a) at higher and lower tax rates of interval  $i_s$ . It then recalculates expected revenue (equation 6) at higher and lower tax rates, and the revenue expected from raising or lowering taxes is then multiplied by the proportion of spending devoted to transfers ( $\bar{s}^M$  in majoritarian systems,  $\bar{s}^P$  in proportional systems) and public goods ( $c_k$ ).

$$\text{CPr}[I] = \frac{e^{Iu_s}}{e^{Iu_s} + e^{Du_s}} \quad (11d)$$

The computer program randomly chooses a number between 0 and 1. If that number is less than the probability the capitol raises the tax rate ( $\text{CPr}[I]$ ), the tax rate is raised. If it is higher than that probability, the tax rate is lowered. When choosing between the probability of raising taxes based on its own revenue ( $\text{SPr}[I]$ ) or placating the median core supporter ( $\text{CPr}[I]$ ), we assume the capitol will always choose to placate its core supporters. Doing so strengthens the likelihood politicians will be able to remain in office. However, so long as raising taxes both increases the utility of the median core supporter and increases revenue, the capitol will increase taxes at the greater of the two probabilities. However, if raising taxes would increase revenue but decrease the utility of the median supporter, it will defer to the probability based on the median core supporter ( $\text{CPr}[I]$ ).

#### *4d: Decide Irredentism/Annexation*

Just as in the prehistory, each patch of territory randomly targets one of its neighboring patches for potential annexation. The capitol considers what the median preferences for public goods would be for its winning coalition if it incorporated that patch of territory using equation 10a presented above, but this time it does so while considering a hypothetical total population including individuals residing on the potentially annexed territory in addition to the population residing within its own borders ( $\text{HYP}p_m$ ). The capitol assesses the hypothetical preferences for public goods for individual voters in its winning coalition ( $\text{HYP}g_k$ ) using equation 10b, but again this time for individuals in the state's territory and for individuals to potentially be annexed:<sup>16</sup>

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<sup>16</sup> Given the scale of units involved in the model, any act of irredentism has the potential to increase the utility of individual agents with regard to public goods to a degree that overwhelms

$$HYPg_k = c_k - c_k * \left( 1 - \left( \frac{1}{1 + \left( \frac{|p_i - HYPp_m|}{\lambda_2} \right)} \right) \right) \quad (12)$$

In addition to public goods considerations, the capitol assesses what the impact of adding new individuals to its transfer welfare scheme for the individual utility of its median supporter. If N individuals residing on the patch to be potentially annexed are transfer eligible, each individual in the winning coalition will have to share transfers distributed by the capitol with an additional N individuals (HYPs<sub>j</sub>).

When assessing the probability of engaging an irredentism, then, the capitol considers the interests of its core constituents. The capitol assesses any potential added value or liabilities to annexing foreign territory to the utility of its median core supporter. It considers a hypothetical run of the procedure described in Section 4b above in that it postulates what it would have to spend on public goods HYPg<sub>k</sub> and transfers HYPs<sub>j</sub> for its entire population, including the target, given preferences for public goods and transfers of its citizens as well as the target population. It is important to note here that the state also considers the relative wealth of the target (via its likely productivity). It calculates the implications of those changes in spending and revenue for the utility of the median core constituent (Au<sub>s</sub>):

$$Au_s = \sqrt{(l_{WS,i})g_s} + \sqrt{((1 - l_i)(1 - r_s))^{\alpha_i \beta_i} HYPs_j^{\alpha_i(1 - \beta_i)} HYPg_k^{1 - \alpha_i}} \quad (12c)$$

It assesses this against the status quo, which is the median core constituent's current utility without annexing any addition constituents.

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any consideration of differences in transfers. To correct, we divide the impact of the distance between the individual preference for public goods and the median by  $\lambda_2$ .

$$Qu_s = \sqrt{(l_{ws,i})g_s} + \sqrt{((1 - l_i)(1 - r_s))^{\alpha_i\beta_i} S_j^{\alpha_i(1-\beta_i)} g_k^{1-\alpha_i}} \quad (12d)$$

The decision, then, on whether the capitol will want to pursue irredentism is predicated simply on whether the median core constituent's utility is greater under potential irredentist annexation or under ( $Au_s$ ) or the status quo ( $Qu_s$ ).

The computer program then engages in the same decision-making procedure elaborated in section 2b above where it assesses the probability of winning and then potentially initiates a conflict with no guarantee of victory. If it subsequently decides not to attack or loses the conflict, the status quo remains.

#### *4e: Update Resources*

As in the prehistory, the capitol now reassesses its total number of resources and territories available as a result of whether it annexed or lost territory as a result of the previous round. It also now assigns potential new members of the population into public goods districts.

#### *4f: Structural Change*

As in the prehistory, this procedure accounts for situations where the capital of a nation is annexed by another capitol. In these situations, a random territory from the nation in which the capital was annexed is chosen to be the new capital. The procedure also accounts for whether public goods centers in each district have been annexed. In this case, the public goods center is repositioned in a random location within the remaining district.



#### *4g: Update Annexed*

This procedure assesses whether individuals reside within new capitols as a result of annexation and updates attributes accordingly. The considerations laid out in this section are only relevant when the irredentist state targets a populated patch. When the irredentist state targets an unpopulated patch, the only considerations for the potential irredentist state are those specified for the prehistory. Annexation of an unpopulated patch is not counted as an act of irredentism.

### **5. Single-Party Dictatorships; Military Dictatorships**

Dictatorships utilize most of the same decision-making criteria as electoral regimes, and so our discussion here will be shorter. However, to keep the support of individuals in a winning coalition, rather than offering a combination of public goods and transfers according to the preferences of voters, as in the electoral version of the model, the capitol in dictatorships offers private goods to individuals in exchange for supporting the regime. The key for the capitol is to develop the correct mix of private goods (relative to spending on public goods and transfers) that satisfies the median member of its typically very small winning coalition.

We model the size of the winning coalition in authoritarian regimes as exogenous to the model where the winning coalition constitutes some user-defined proportion of the selectorate ( $w_s$ ), resulting in a specific number of people ( $Nw_s$ ). The model also begins with an exogenously determined proportion of private goods ( $p_s$ ) to both public goods and transfers ( $np_s=1-p_s$ ). This ratio becomes endogenous to the model as it continues, but the user provides a beginning point of reference.<sup>17</sup> The model then endogenously changes the initial user-provided

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<sup>17</sup> In the models run for the paper, this ratio was initially set to an even 50/50 split.

ratio of private goods in accordance with maximizing the utility of the median member of the winning coalition. This is a function of the private goods that individual would receive in relation to public goods and transfers that individual would receive if the state either increased ( $Iu_s$ ) or decreased ( $Du_s$ ) private goods provision by an interval  $vi_s$  at the current tax rate (equation 13a below). We assume some token electoral system is in place, and the generally minimal remainder of revenue in place after satisfying the winning coalition with private goods is allocated to public goods and transfers according to the same logic as presented in the section above. The calculations of the median supporter's utility for increasing and decreasing the provision of private goods is modeled below in equations 13a and 13b:

$$Iu_s = \sqrt{(l_{ws,i})RPRIVg_s} + \sqrt{((1-l_i)(1-r_s))^{\alpha_i\beta_i} RPRIVS_j^{\alpha_i(1-\beta_i)} RPRIVg_k^{1-\alpha_i}} \quad (13a)$$

$$Du_s = \sqrt{(l_{ws,i})LPRIVg_s} + \sqrt{((1-l_i)(1-r_s))^{\alpha_i\beta_i} LPRIVS_j^{\alpha_i(1-\beta_i)} LPRIVg_k^{1-\alpha_i}} \quad (13b)$$

...with RPRIVgs (raising the proportion of state spending given to private goods) equal to the capitol's tax revenue ( $v_s$  - see equations 5a, 5b, 5c, and 6 in the appendix) multiplied by the proportion of the capitol's revenue devoted to private goods ( $p_s$ ) plus the potential incremental increase in private goods ( $vi_s$ ). This product is then divided by the number of individuals in the winning coalition ( $Nws_s$ ):  $RPRIVg_s = \frac{v_s*(p_s+vi_s)}{Nws_s}$ . Likewise, LPRIV examines the private payoff

to each individual when decreasing the proportion of capitol spending to private payoffs by  $vi_s$ :

$$LPRIVg_s = \frac{v_s*(p_s-vi_s)}{Nws_s}$$

After having settled on whether to raise or lower the proportion of the capitol's spending devoted to providing private goods in order to optimize the utility of the median member of the winning coalition, the capitol decides upon a tax rate utilizing the same procedure described in equations 11a through 11d above.

### *Irredentism*

When dictatorships consider irredentism, the capitols employ the same decision-making structures described above for democracies, culminating in the same utility function and decision-making procedures specified for majoritarian and proportional regimes.<sup>18</sup> However, we make an important change<sup>19</sup> by considering the hypothetical private goods an individual would receive (HYPgs) if irredentism were to occur, represented by equation 14c below.<sup>20</sup>

$$Au_s = \sqrt{(l_{WS,i})HYPg_s} + \sqrt{((1-l_i)(1-r_s))^{\alpha_i\beta_i} HYPs_j^{\alpha_i(1-\beta_i)} HYPg_k^{1-\alpha_i}} \quad (14c)$$

$$Qu_s = \sqrt{(l_{WS,i})g_s} + \sqrt{((1-l_i)(1-r_s))^{\alpha_i\beta_i} s_j^{\alpha_i(1-\beta_i)} g_k^{1-\alpha_i}} \quad (14d)$$

The decision, then, on whether the capitol will want to pursue irredentism is predicated simply on whether the median core constituent's utility is greater under potential irredentist annexation or under ( $Au_s$ ) or the status quo ( $Qu_s$ ).

The computer program then engages in the same decision-making procedure elaborated in section 2b above where it assesses the probability of winning and then potentially initiates a conflict with no guarantee of victory. If it subsequently decides not to attack or loses the conflict, the status quo remains.<sup>21</sup>

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<sup>18</sup> As specified in equations 12 through 12e above.

<sup>19</sup> Specifically to equation 12c

<sup>20</sup> Equations 14d and 14e are identical to 12d and 12e above

<sup>21</sup> We do not explicitly model the leader's residual share of state resources after allocating resources to public goods and private goods as does selectorate theory because we see no

To calculate  $HYPg_s$  (the payoff of private goods that median member could potentially receive given annexation, i.e., irredentism) in 14c above, individuals first calculate their likelihood of remaining in the state's winning coalition if the winning coalition were to shift given the incorporation of new ethnic kin who could potentially be competitors for access to the winning coalition. The probability of being excluded from any new potential winning coalition ( $\Pr[E]$ ) is modeled as:  $\Pr[E] = 1 - \frac{W}{S}$ .<sup>22</sup>

The program chooses a random number between 0 and 1. If that number is less than  $\Pr[E]$ ,  $(l_{WS,i})$  is set to 0. If that number is greater than  $\Pr[E]$ ,  $(l_{WS,i})$  is set to 1, and  $HYPg_s$  is set to  $\frac{v_s * (p_s)}{HYPNws_s}$  where  $HYPNws_s$  is the hypothetical number of individuals in the winning coalition if annexed individuals are part of the winning coalition with probability  $W$ . In this way, individuals calculate whether irredentism would threaten their continued access to private goods by maintaining their status as members of the winning coalition.

### **Model Analysis**

We use this computational model to make theoretical predictions for irredentism under four institutional regimes: military dictatorships, single-party dictatorships, proportional electoral

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compelling argument regarding its implications for irredentism. While engaging in irredentism may have implications for a leader's immediate residual share of wealth, we contend leadership would be unlikely to engage in such an act if it risked angering the median member of his or her winning coalition and the long-term gains associated with leadership. The leader will keep the interests of the median member of the winning coalition in mind above all.

<sup>22</sup> Bruce Bueno de Mesquita et al. (2003, 68) call this the 'loyalty norm'.

systems, and majoritarian electoral systems.<sup>23</sup> The unit of analysis is a model “run,” which involves ten states of the same institutional type (each populated by approximately 50 individuals) interacting together over 200 iterations (“rounds”), which provides sufficient time to examine patterns in irredentist behavior.<sup>24</sup> For each institutional type, we isolate its impact on irredentism.<sup>25</sup>

Appendix Table 11 placed further down in this appendix (as a default model for comparison to our sensitivity analyses) lists the default values used for key variables that remain constant across runs of the model. Appendix Figure 1 below provides a simple descriptive plot displaying the distribution of irredentist events across all model runs<sup>26</sup> and the four different

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<sup>23</sup> We collected data from 200 simulated experimental runs from each of our four regime types. This resulted in a total of 800 model runs. We pooled these runs into a single dataset with each run representing a single observation.

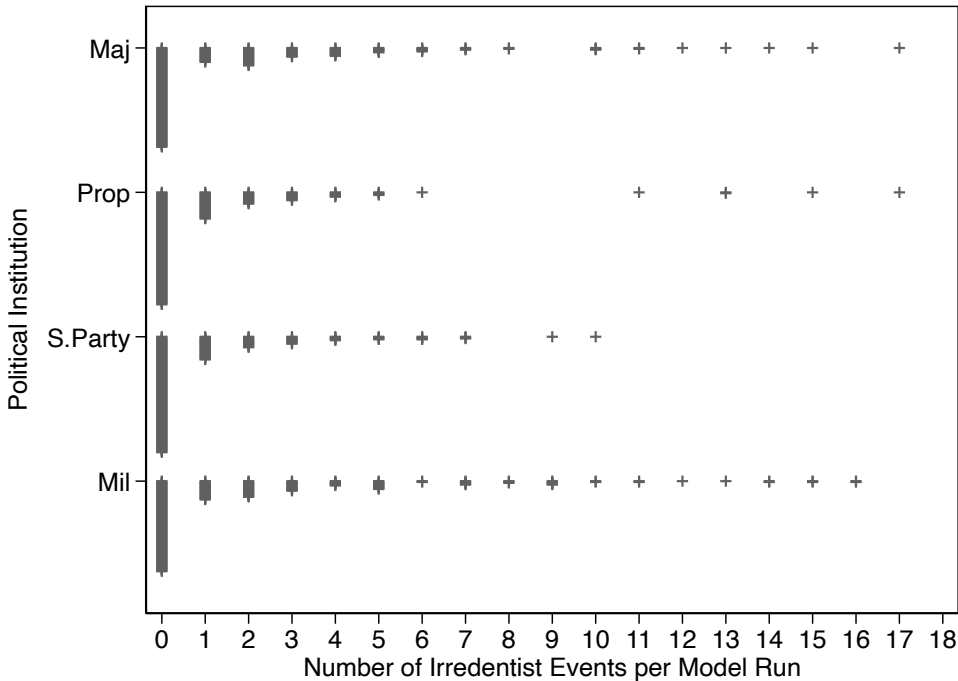
<sup>24</sup> During each round, each state decides upon a tax rate and then whether to annex territory with co-ethnics from neighboring states.

<sup>25</sup> For example, in our assessment of military dictatorships, we examine the average count of irredentist events over 200 runs when ten military dictatorships interact with each other 200 individual rounds within each run. For military dictatorships, we set  $S$  to 0.02 (as a proportion of the population, ranging from 0 to 1) and  $W$  to 0.01 (small selectorate/small winning coalition). For single party dictatorships, we set  $S$  to 1 and  $W$  to 0.01 (large selectorate/small winning coalition).

<sup>26</sup> Although rare, it is possible for the model world to establish itself in such a fashion that it structurally enables one state to take over the entire system, resulting in an inflated number of

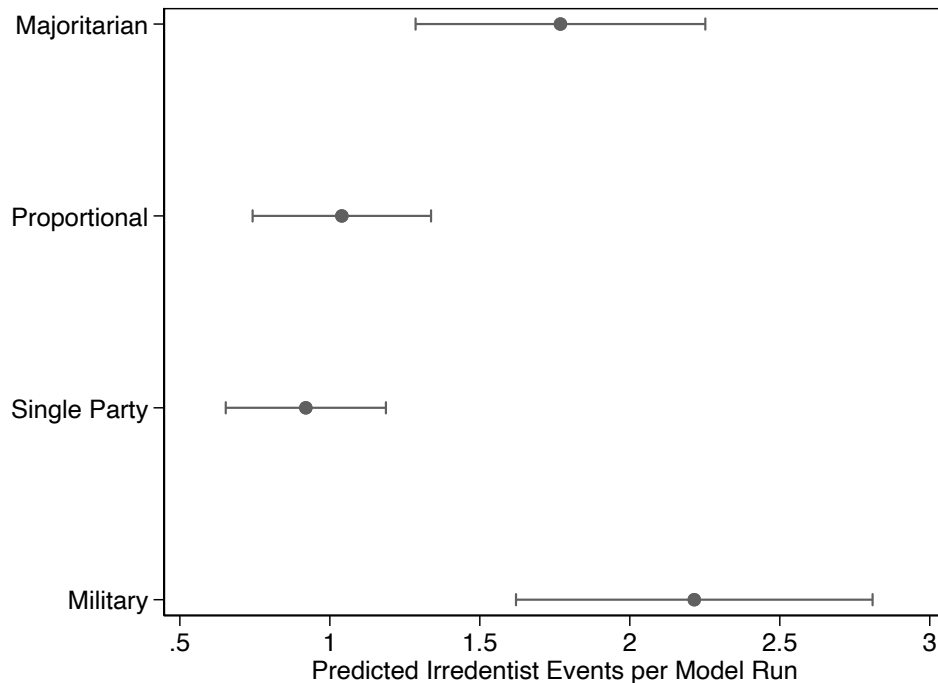
political regimes. Each plus sign signifies one model run. Plus signs are stacked when multiple model runs experience the same number of irredentist events. While Appendix Figure 1 provides us with a visual sense of the distribution of irredentist events, we also estimated a negative binomial regression model with the total count of irredentist events per model run as our dependent variable and regime type as our independent variable. For each of the four institutional types, we calculate and compare predicted counts of irredentism to assess the theory’s predictions. Appendix Figure 2 presents the mean observed count of irredentist events per model run by institutional type with confidence intervals.

*Appendix Figure 1: Irredentist Events Across Political Institutions*



irredentist takeovers. This occurred in 1 of our 800 model runs, and we have removed the outliers in our main analyses where the number of irredentist takeovers was greater than 20, the top 0.12% of observations. Including the model run has no substantive impact on these results.

*Appendix Figure 2: Predicted Irredentist Events per Model Run by Regime Type*



As can be seen visually from Appendix Figure 1, irredentism is a relatively rare event. Sixty percent of the time, irredentism does not occur at all, and zero irredentist events is the modal outcome across all political institutional categories. 57% of the majoritarian runs did not experience an irredentist event, while 64.5% of the proportional runs did not experience an irredentist event. Likewise, 66.5% of the single party runs and 52% of the military runs did not experience an irredentist event. At the same time, there is variation across political institutions' propensities for irredentism. Proportional electoral systems and single party dictatorships tended to see tighter distributions closer to a smaller number of irredentist events, with standard deviations of 2.42 and 1.8, respectively. Majoritarian electoral systems and military dictatorships saw greater spread away from zero with respective standard deviations of 3.10 and 3.61.

According to our negative binomial model visually depicted in Appendix Figure 2 above, proportional democracies and single party dictatorships, while not statistically differentiated

from each other, share significantly fewer incidences of irredentism than military dictatorships and proportional democracies. Proportional democracies have a mean of 1.04 predicted irredentist events per model run, while single party dictatorships have a mean of 0.92. Likewise, military dictatorships and majoritarian democracies are not statistically differentiated from each other, but all are significantly more predisposed to irredentism, at the 95% confidence interval, than either single-party dictatorships or proportional democracies. Military dictatorships have a mean of 2.215 irredentist events predicted by the model while majoritarian electoral systems have a mean of 1.77. In sum, the model predicts two distinct clusters: proportional systems and single-party dictatorships with a low incidence of irredentism; majoritarian systems and military dictatorships with a much higher incidence of irredentism.



## 6. Empirical Results

### *Appendix Tables Discussion*

Appendix Table 1 presents our empirical raw logit results when running separate models by excluding each of our four institutional types as a reference variable. While it is of course not necessary to include a column for each excluded regime category to interpret the results, we do so as a courtesy to the reader to facilitate comparison across institutions.

The coefficients of these models can be difficult to interpret directly, and so see our discussion of Figure 3 in the main article for a more interpretable discussion of our model results using predicted probabilities. The coefficients on the three included types of political institutions are interpreted in relation to the omitted institutional category. Model 1 excludes the majoritarian category, Model 2 excludes the proportional category, Model 3 the party category, and Model 4 the military/personalist category. When excluding the Majoritarian categorical variable (Model 1), we see that the Proportional variable has a negative sign and is statistically significant, with a coefficient of -1.73. This means the log odds of irredentism are statistically lower in proportional regimes than they are in majoritarian regimes. We see a similar relationship when looking at single-party regimes. Here the coefficient is -1.34 and statistically significant, also indicating that single-party dictatorships demonstrate lower log odds of irredentism than majoritarian electoral systems. Furthermore, military/personalist dictatorships are not statistically differentiated from majoritarian electoral systems. All of these results are consistent with the predictions from the computational model.

If we examine Model 2, the coefficients on our institutional variables are interpreted against proportional systems as a reference. Thus, we see that majoritarian systems and military/personalist systems demonstrated statistically significant and higher log odds of

irredentism than proportional systems, while single-party dictatorships are not statistically differentiated. In Model 3, the coefficients are interpreted against single-party dictatorships. Majoritarian systems and military/personalistic dictatorships are statistically significant and have higher log odds of irredentism than single-party dictatorships, while proportional electoral systems have no statistically differentiated effect. Finally, in Model 4 the coefficients are interpreted against military/personalistic dictatorships as the omitted category. We see that both proportional electoral systems and single-party dictatorships have statistically significantly negative log odds of irredentism as compared to military/personalistic dictatorships. All of these results are consistent with the predictions of the computational model.

As for other results of potential theoretical interest, our dyadic configurations highlight whether both the irredentist and host capitols are anocratic or not. Accordingly, the variable *anoc/anoc* reports when both the irredentist and host capitols are anocratic. *Anoc/no* refers to situations where the host capitol is anocratic and the potential irredentist capitol is not, *no/anoc* is when the host capitol is not anocratic but the potential irredentist capitol is, and finally the omitted reference *no/no* category refers to situations whether neither capitol is anocratic. We see that when both the irredentist capitol and host capitol are anocracies, the log odds of irredentism go up markedly relative to configurations where neither is anocratic. Similarly, when either one of the capitols is anocratic, the log odds of irredentism go up, but we have greater statistical confidence this is the case when the irredentist capitol is the one that is anocratic.

Appendix Table 2 presents logit results when we run our model as a rare events logistic regression rather than a standard logistic regression. As can be seen, there is little difference from the substantive results presented in Appendix Table 1.

Appendix Table 3 adds a variety of regional controls to the model. These regional categories included Western Europe and the Americas, Eastern Europe, Central Europe/The Middle East/ North Africa, Southeast Asia, and Sub-Saharan Africa. Western Europe and the Americas is the excluded reference category. As can be seen, the inclusion of regional controls has little substantive impact on our primary institutional variables of interest.

Appendix Table 4 utilizes all of Geddes et al.'s authoritarian regime categorizations rather than the condensed version we use in our primary model results. We have disaggregated the military and personalistic regime types, and we have also added the monarchy category. There are a few points to note here. First, the main model patterns remain the same. Second, the personal and military categories follow the same general pattern with each other in terms of their relationships with the other variables, providing support for our theoretical decision to aggregate them into a single measure (based on the theoretical assumption that both had small selectorates and small winning coalitions). Finally, monarchy does not have a statistically significant relationship with any of the other regime types except for being less likely to engage in irredentism than proportional democracies at the 90% confidence interval. This is likely because they constitute just under 2% of the observations.

Appendix Table 5a utilizes regime characteristics of the irredentist state, rather than the dyadic considerations with the host state utilized in the main model. Here we employ three categorical variables for regime type tracking the general influence of democracy, autocracy, and anocracy with anocracy constituting the omitted reference variable. Inclusion of these regime characteristics as controls has no substantive impact on our model results.

Appendix Table 5b assesses the robustness of our results when we add a distinction between presidential and parliamentary systems with a categorical variable assessing whether a

country is presidential, parliamentary, or authoritarian. This data comes from Bormann and Golder (2013), and parliamentary systems serve as the omitted reference category. We include these controls because selectorate theory makes a distinction among democracies by suggesting presidential systems possess larger winning coalitions than parliamentary systems (Bueno de Mesquita et al. 2003, 54-55). This could, in turn, have associated implications for irredentism. Bueno de Mesquita and colleagues argue parliamentary systems may have smaller winning coalitions than presidential systems and subsequently may be more predisposed to providing private goods. Although parliamentary systems certainly would have significantly larger winning coalitions than single party dictatorships, they would similarly be characterized by smaller winning coalitions (relative to presidential systems) with large selectorates, and individuals in the winning coalition would subsequently covetously safeguard their private goods and oppose irredentism. While we find that parliamentary systems do have a lessened association with irredentism relative to presidential systems at the 90% confidence interval, inclusion of these controls has no substantive impact on our primary model results.

To further assess the robustness of our statistical results, we remove the anocracy dyads and Soviet controls for Appendix Table 6. As can be seen, there is little substantive difference on our key regime variables from those presented in the paper's primary model. Additionally, Appendix Table 7(a-d) provides descriptive cross tabs for the anocracy dyads and our four institutional variables.

Furthermore, Appendix Table 8a assesses the potential impact of crosscutting linguistic and religious cleavages (Crosscut) (Selway 2011) along with several group-level economic controls including the ratio of wealth of the ethnic group in the irredentist state relative to the group in the host state and the economic status of the group in the irredentist state relative to

other ethnic groups in the irredentist state (IrrHigh/IrrLow). Inclusion of these controls do not alter the primary results of our main model.

In Appendix Table 8b, we further test for the possibility that ethnic or religious factors might be a cause for party alignment in proportional democracies rather than ideology. In such a situation, ethnic identities might inhibit PTP goods provision, even in a proportional setting, and encourage irredentism to further strengthen the economic status of members of the ethnic group in power. As ethnic fractionalization increases, then, irredentism becomes more likely. We provide a control for ethnic fractionalization (Ethnic Fractionalization) in Model 1 along with an interaction effect between proportional systems and ethnic fractionalization (ProportionXEthnic), a control for religious fractionalization (Religious Fractionalization) in Model 2 along with an interaction effect between proportional systems and religious fractionalization (ProportionXReligious), and a control for crosscutting ethnic and religious identities (Crosscutting) in Model 3 along with an interaction effect between proportional systems and religious fractionalization (ProportionXCrosscutting) (Selway 2011).

We find an interaction effect, but negative and in the opposite direction as expected from the discussion in the preceding paragraph. Model 1 suggests that as ethnic heterogeneity increases in proportional systems, propensities for irredentism decrease relative to majoritarian electoral systems. Model 2 suggests a similar relationship for religious fractionalization and its interaction with proportional systems. Model 3, on the other hand, does not indicate a statistically significant interaction effect between crosscutting ethnic and religious identities and proportional systems. While the inclusion of these interaction terms does not have a substantive impact on our primary results, their negative and significant coefficients do highlight another distinction between proportional and majoritarian systems. The predicted probability of

irredentism in proportional systems goes down as countries become more ethnically or religiously fractionalized and remain well below, and statistically differentiated from, the predicted probability of irredentism in majoritarian systems at all but the bottom ten percent of the values of ethnic and religious fractionalization.

Appendix Table 9 provides additional controls regarding the ethnic composition of the host state and the potential for the irredentist state to be incorporating ethnically heterogeneous populations. These include, in models 1 through 4, a control for the ethnic fractionalization of the host state and, in models 5 through 8, a control for the number of groups in the host state. The inclusion of these control variables does not impact the main model results.

Finally, Appendix Table 10 runs model fit and classification tests between the primary model presented in this paper and the model presented by Siroky and Hale (2017) that previously demonstrated a positive interaction effect between majoritarian democracies and the size of the largest ethnic group relative to the second largest ethnic group. That model further included the group-level economic controls we have already controlled for in Appendix Table 8. The point of this analysis is to assess the performance of the theoretical model presented in this paper against potentially alternative arguments presented in the earlier paper by Siroky and Hale.

To assess the performance of the current model against the previous paper, and to facilitate an apples-to-apples comparison for our model fit statistics, we reproduce the primary model presented in Siroky and Hale (2017) but dropped those observations for which the regime categorical variables in the current paper had missing data values<sup>27</sup> and present the results of that

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<sup>27</sup> There are observations that are present in Siroky et al. 2017 and missing in Geddes, Wright, and Frantz (2014), and vice versa. Given our institutional variables are mutually exclusive

analysis in Model 1. They are substantively the same as those presented in the previous paper.<sup>28</sup> In Model 2, we replace the majoritarian and majoritarian/margin interaction variables from Model 1 and replace them with the Majoritarian, Proportional, Party, and Military institutional variables that constitute the predominant theoretical preoccupation of our current paper.<sup>29</sup> Finally, in Model 3, we add a majoritarian/ethnic margin interaction term to the model presented in Model 2 in order to assess the value added for including such a term in the model including our new regime variables. We then run a variety of model fit and classification assessments including log-likelihood, Akaike information criterion (AIC), Bayesian information criterion (BIC), area under the curve (AUC), F<sub>1</sub> Score (F<sub>1</sub> Score), and Matthews Correlation Coefficient (MCC), all presented in Appendix Table 10 below.<sup>30</sup>

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categories interpreted in reference to each other, we coded any such observations as missing in the dataset presented in this paper.

<sup>28</sup> In order to use software commands facilitating comparison of model fit statistics across our statistical models, we run a logit model, rather than rare events logit utilized by Siroky and Hale in the previous paper. Siroky and Hale note in the 2017 paper that the rare events logit results are nearly identical to logit results, and we demonstrate the same for the current model in Appendix Table 2.

<sup>29</sup> In the primary models presented in the main text, Majoritarian systems are the omitted reference category. However, because we must interact the margin variable with majoritarian, majoritarian is included here, and Military is used as the omitted reference category.

<sup>30</sup> Though included here, we do not run the asymmetric inequality variables utilized in Siroky and Hale (2017) or presented in Appendix Table 8 in in this paper's main model. Their inclusion is

The results unambiguously demonstrate the models including the new regime distinctions of the current paper (Models 2 and 3) outperform the model based on the previous 2017 paper (Model 1). Each of the model fit and specification statistics including BIC, AIC, log likelihood, the  $F_1$  score, and MCC strongly support a better model fit or specification for Model 2 over Model 1 (AUC is tied). Among most of the measures of model fit or specification, inclusion of the interaction term (in Model 3) causes that model to marginally perform better than Model 2 (without the interaction term). However, we note the BIC score, which penalizes further complications to the model, provides support that Model 2 better and more parsimoniously fits the data. For this reason, and more critically because inclusion of the interaction term greatly complicates interpretation of the key theoretical relationships we wish to examine amongst the four institutional regime types (which are mutually exclusive categorical variables interpreted against an omitted category), we do not utilize the interaction term in the main model presented in the paper.

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not essential for the theoretical orientation of the paper and excluding them gains us several hundred observations.



*Appendix Table 1: Logistic Regression Results*

VARIABLES	(1) Majoritarian	(2) Proportional	(3) Party	(4) Military
1.Majoritarian		1.73*** (0.50)	1.34** (0.58)	-0.07 (0.55)
2.Proportional	-1.73*** (0.50)		-0.39 (0.57)	-1.80*** (0.43)
3.Party	-1.34** (0.58)	0.39 (0.57)		-1.41*** (0.51)
4.Military	0.07 (0.55)	1.80*** (0.43)	1.41*** (0.51)	
Anocracy/Anocracy	2.02*** (0.47)	2.02*** (0.47)	2.02*** (0.47)	2.02*** (0.47)
Anocracy/No	0.88* (0.45)	0.88* (0.45)	0.88* (0.45)	0.88* (0.45)
No/Anocracy	0.73*** (0.24)	0.73*** (0.24)	0.73*** (0.24)	0.73*** (0.24)
Margin	0.30 (0.50)	0.30 (0.50)	0.30 (0.50)	0.30 (0.50)
Dispersed	-1.55 (1.14)	-1.55 (1.14)	-1.55 (1.14)	-1.55 (1.14)
Discriminated	-0.18 (0.53)	-0.18 (0.53)	-0.18 (0.53)	-0.18 (0.53)
Wealth Ratio	-0.28 (0.31)	-0.28 (0.31)	-0.28 (0.31)	-0.28 (0.31)
Host Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Irredentist Population	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Power Disparity	0.07 (0.10)	0.07 (0.10)	0.07 (0.10)	0.07 (0.10)
Irredentist Soviet	-0.77 (0.70)	-0.77 (0.70)	-0.77 (0.70)	-0.77 (0.70)
Host Soviet	0.32 (0.49)	0.32 (0.49)	0.32 (0.49)	0.32 (0.49)
Peace years	-1.47*** (0.23)	-1.47*** (0.23)	-1.47*** (0.23)	-1.47*** (0.23)
Peace years <sup>2</sup>	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)
Peace years <sup>3</sup>	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Constant	0.22 (0.64)	-1.50*** (0.53)	-1.11 (0.68)	0.29 (0.50)
Observations	3,527	3,527	3,527	3,527

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Appendix Table 2: Rare Events Logistic Regression Results

VARIABLES	(5) MajRare	(6) PropRare	(7) PartRare	(8) MilRare
1.Majoritarian		1.62*** (0.50)	1.28** (0.57)	-0.07 (0.55)
2.Proportional	-1.62*** (0.50)		-0.34 (0.56)	-1.69*** (0.43)
3.Party	-1.28** (0.57)	0.34 (0.56)		-1.36*** (0.51)
4.Military	0.07 (0.55)	1.69*** (0.43)	1.36*** (0.51)	
Anocracy/Anocracy	1.91*** (0.47)	1.91*** (0.47)	1.91*** (0.47)	1.91*** (0.47)
Anocracy/No	0.87* (0.45)	0.87* (0.45)	0.87* (0.45)	0.87* (0.45)
No/Anocracy	0.70*** (0.24)	0.70*** (0.24)	0.70*** (0.24)	0.70*** (0.24)
Margin	0.27 (0.50)	0.27 (0.50)	0.27 (0.50)	0.27 (0.50)
Dispersed	-1.06 (1.14)	-1.06 (1.14)	-1.06 (1.14)	-1.06 (1.14)
Discriminated	-0.16 (0.52)	-0.16 (0.52)	-0.16 (0.52)	-0.16 (0.52)
Wealth Ratio	-0.27 (0.31)	-0.27 (0.31)	-0.27 (0.31)	-0.27 (0.31)
Host Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Irredentist Population	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Power Disparity	0.08 (0.10)	0.08 (0.10)	0.08 (0.10)	0.08 (0.10)
Irredentist Soviet	-0.69 (0.69)	-0.69 (0.69)	-0.69 (0.69)	-0.69 (0.69)
Host Soviet	0.29 (0.49)	0.29 (0.49)	0.29 (0.49)	0.29 (0.49)
Peace years	-1.39*** (0.23)	-1.39*** (0.23)	-1.39*** (0.23)	-1.39*** (0.23)
Peace years <sup>2</sup>	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)
Peace years <sup>3</sup>	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Constant	0.19 (0.64)	-1.43*** (0.53)	-1.09 (0.67)	0.26 (0.50)
Observations	3,527	3,527	3,527	3,527

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Appendix Table 3: Regional Controls*

VARIABLES	(1) Majoritarian	(2) Proportional	(3) Party	(4) Military
1.Majoritarian		1.29*** (0.48)	1.39** (0.55)	0.39 (0.53)
2.Proportional	-1.29*** (0.48)		0.10 (0.52)	-0.91* (0.47)
3.Party	-1.39** (0.55)	-0.10 (0.52)		-1.01** (0.50)
4.Military	-0.39 (0.53)	0.91* (0.47)	1.01** (0.50)	
Anocracy/Anocracy	1.97*** (0.44)	1.97*** (0.44)	1.97*** (0.44)	1.97*** (0.44)
Anocracy/No	1.07** (0.50)	1.07** (0.50)	1.07** (0.50)	1.07** (0.50)
No/Anocracy	0.56* (0.31)	0.56* (0.31)	0.56* (0.31)	0.56* (0.31)
Margin	1.23 (0.75)	1.23 (0.75)	1.23 (0.75)	1.23 (0.75)
Dispersed	-1.62 (1.06)	-1.62 (1.06)	-1.62 (1.06)	-1.62 (1.06)
Discriminated	-0.18 (0.58)	-0.18 (0.58)	-0.18 (0.58)	-0.18 (0.58)
Wealth Ratio	-0.14 (0.32)	-0.14 (0.32)	-0.14 (0.32)	-0.14 (0.32)
Host Population	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Irredentist Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Power Disparity	0.17 (0.14)	0.17 (0.14)	0.17 (0.14)	0.17 (0.14)
Irredentist Soviet	-0.60 (0.63)	-0.60 (0.63)	-0.60 (0.63)	-0.60 (0.63)
Host Soviet	0.27 (0.59)	0.27 (0.59)	0.27 (0.59)	0.27 (0.59)
Eastern Europe	1.74* (0.95)	1.74* (0.95)	1.74* (0.95)	1.74* (0.95)
C. Europe/ME/N. Africa	2.89*** (1.03)	2.89*** (1.03)	2.89*** (1.03)	2.89*** (1.03)
Southeast Asia	-	-	-	-
Sub-Saharan Africa	2.39** (1.11)	2.39** (1.11)	2.39** (1.11)	2.39** (1.11)
Peace years	-1.42*** (0.25)	-1.42*** (0.25)	-1.42*** (0.25)	-1.42*** (0.25)
Peace years <sup>2</sup>	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)
Peace years <sup>3</sup>	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Constant	-2.63** (1.03)	-3.93*** (1.12)	-4.03*** (1.18)	-3.02*** (1.14)
Observations	3,248	3,248	3,248	3,248

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Appendix Table 4: Inclusion of Original Geddes et al. Regime Types

VARIABLES	(1) Majoritarian	(2) Proportional	(3) Party	(4) Military	(5) Monarchy	(6) Personal
1.Majoritarian		1.71*** (0.50)	1.34** (0.57)	-0.42 (0.34)	0.43 (0.80)	0.00 (0.58)
2.Proportional	-1.71*** (0.50)		-0.37 (0.56)	-2.13*** (0.40)	-1.28* (0.72)	-1.71*** (0.44)
3.Party	-1.34** (0.57)	0.37 (0.56)		-1.76*** (0.57)	-0.91 (0.81)	-1.34** (0.52)
4.Military	0.42 (0.34)	2.13*** (0.40)	1.76*** (0.57)		0.85 (0.68)	0.42 (0.46)
5.Monarchy	-0.43 (0.80)	1.28* (0.72)	0.91 (0.81)	-0.85 (0.68)		-0.43 (0.74)
6.Personal	-0.00 (0.58)	1.71*** (0.44)	1.34** (0.52)	-0.42 (0.46)	0.43 (0.74)	
Anocracy/Anocracy	1.97*** (0.45)	1.97*** (0.45)	1.97*** (0.45)	1.97*** (0.45)	1.97*** (0.45)	1.97*** (0.45)
Anocracy/No	0.83** (0.42)	0.83** (0.42)	0.83** (0.42)	0.83** (0.42)	0.83** (0.42)	0.83** (0.42)
No/Anocracy	0.68*** (0.22)	0.68*** (0.22)	0.68*** (0.22)	0.68*** (0.22)	0.68*** (0.22)	0.68*** (0.22)
Margin	0.21 (0.47)	0.21 (0.47)	0.21 (0.47)	0.21 (0.47)	0.21 (0.47)	0.21 (0.47)
Dispersed	-1.62 (1.14)	-1.62 (1.14)	-1.62 (1.14)	-1.62 (1.14)	-1.62 (1.14)	-1.62 (1.14)
Discriminated	-0.15 (0.52)	-0.15 (0.52)	-0.15 (0.52)	-0.15 (0.52)	-0.15 (0.52)	-0.15 (0.52)
Wealth Ratio	-0.26 (0.29)	-0.26 (0.29)	-0.26 (0.29)	-0.26 (0.29)	-0.26 (0.29)	-0.26 (0.29)
Host Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Irredentist Population	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Power Disparity	0.05 (0.10)	0.05 (0.10)	0.05 (0.10)	0.05 (0.10)	0.05 (0.10)	0.05 (0.10)
Irredentist Soviet	-0.75 (0.70)	-0.75 (0.70)	-0.75 (0.70)	-0.75 (0.70)	-0.75 (0.70)	-0.75 (0.70)
Host Soviet	0.33 (0.48)	0.33 (0.48)	0.33 (0.48)	0.33 (0.48)	0.33 (0.48)	0.33 (0.48)
Peace years	-1.40*** (0.21)	-1.40*** (0.21)	-1.40*** (0.21)	-1.40*** (0.21)	-1.40*** (0.21)	-1.40*** (0.21)
Peace years <sup>2</sup>	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)
Peace years <sup>3</sup>	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Constant	0.26 (0.63)	-1.45*** (0.52)	-1.08* (0.66)	0.67 (0.44)	-0.18 (0.66)	0.26 (0.53)
Observations	3,590	3,590	3,590	3,590	3,590	3,590

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Appendix Table 5a: Irredentist Democracy, Autocracy, and Anocracy*

VARIABLES	(1) Majoritarian	(2) Proportional	(3) Party	(4) Military
1.Majoritarian		1.31*** (0.49)	1.52** (0.71)	0.26 (0.62)
2.Proportional	-1.31*** (0.49)		0.21 (0.81)	-1.05* (0.63)
3.Party	-1.52** (0.71)	-0.21 (0.81)		-1.26*** (0.47)
4.Military	-0.26 (0.62)	1.05* (0.63)	1.26*** (0.47)	
Democracy	-1.55*** (0.54)	-1.55*** (0.54)	-1.55*** (0.54)	-1.55*** (0.54)
Autocracy	-0.25 (0.40)	-0.25 (0.40)	-0.25 (0.40)	-0.25 (0.40)
Margin	0.15 (0.61)	0.15 (0.61)	0.15 (0.61)	0.15 (0.61)
Dispersed	-1.78 (1.15)	-1.78 (1.15)	-1.78 (1.15)	-1.78 (1.15)
Discriminated	-0.02 (0.49)	-0.02 (0.49)	-0.02 (0.49)	-0.02 (0.49)
Wealth Ratio	-0.39 (0.37)	-0.39 (0.37)	-0.39 (0.37)	-0.39 (0.37)
Host Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Irredentist Population	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Power Disparity	0.03 (0.11)	0.03 (0.11)	0.03 (0.11)	0.03 (0.11)
Irredentist Soviet	-0.74 (0.73)	-0.74 (0.73)	-0.74 (0.73)	-0.74 (0.73)
Host Soviet	0.77* (0.47)	0.77* (0.47)	0.77* (0.47)	0.77* (0.47)
Peace years	-1.36*** (0.21)	-1.36*** (0.21)	-1.36*** (0.21)	-1.36*** (0.21)
Peace years <sup>2</sup>	0.08*** (0.02)	0.08*** (0.02)	0.08*** (0.02)	0.08*** (0.02)
Peace years <sup>3</sup>	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Constant	1.30** (0.57)	-0.01 (0.59)	-0.22 (0.80)	1.04 (0.67)
Observations	3,651	3,651	3,651	3,651

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Appendix Table 5b: Including Parliamentary/Presidential Distinction

VARIABLES	(1) Majoritarian	(2) Proportional	(3) Party	(4) Military
1.Majoritarian		1.75*** (0.55)	1.32** (0.55)	-0.14 (0.42)
2.Proportional	-1.75*** (0.55)		-0.43 (0.71)	-1.89*** (0.51)
3.Party	-1.32** (0.55)	0.43 (0.71)		-1.46*** (0.52)
4.Military	0.14 (0.42)	1.89*** (0.51)	1.46*** (0.52)	
2.Presidential	1.15* (0.66)	1.15* (0.66)	1.15* (0.66)	1.15* (0.66)
3.Authoritarian	0.50 (0.38)	0.50 (0.38)	0.50 (0.38)	0.50 (0.38)
Anocratic/Anocratic	2.01*** (0.49)	2.01*** (0.49)	2.01*** (0.49)	2.01*** (0.49)
Anocratic/No	0.94** (0.48)	0.94** (0.48)	0.94** (0.48)	0.94** (0.48)
No/Anocratic	0.72*** (0.27)	0.72*** (0.27)	0.72*** (0.27)	0.72*** (0.27)
Margin	0.48 (0.52)	0.48 (0.52)	0.48 (0.52)	0.48 (0.52)
Dispersed	-1.81 (1.39)	-1.81 (1.39)	-1.81 (1.39)	-1.81 (1.39)
Discriminated	-0.11 (0.51)	-0.11 (0.51)	-0.11 (0.51)	-0.11 (0.51)
Wealth Ratio	-0.30 (0.32)	-0.30 (0.32)	-0.30 (0.32)	-0.30 (0.32)
Host Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Irredentist Population	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Power Disparity	0.01 (0.10)	0.01 (0.10)	0.01 (0.10)	0.01 (0.10)
Irredentist Soviet	-1.11* (0.57)	-1.11* (0.57)	-1.11* (0.57)	-1.11* (0.57)
Host Soviet	0.23 (0.47)	0.23 (0.47)	0.23 (0.47)	0.23 (0.47)
Peace years	-1.43*** (0.22)	-1.43*** (0.22)	-1.43*** (0.22)	-1.43*** (0.22)
Peace years <sup>2</sup>	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)
Peace years <sup>3</sup>	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Constant	-0.41 (0.67)	-2.15*** (0.72)	-1.73* (0.89)	-0.27 (0.67)
Observations	3,527	3,527	3,527	3,527

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Appendix Table 6: Removal of Anocracy and Soviet Controls*

VARIABLES	(1) Majoritarian	(2) Proportional	(3) Party	(4) Military/Personal
1.Majoritarian		1.44*** (0.54)	1.26*** (0.49)	-0.01 (0.47)
2.Proportional	-1.44*** (0.54)		-0.18 (0.51)	-1.46*** (0.47)
3.Party	-1.26*** (0.49)	0.18 (0.51)		-1.28** (0.52)
4.Military	0.01 (0.47)	1.46*** (0.47)	1.28** (0.52)	
Margin	0.13 (0.68)	0.13 (0.68)	0.13 (0.68)	0.13 (0.68)
Dispersed	-1.71 (1.10)	-1.71 (1.10)	-1.71 (1.10)	-1.71 (1.10)
Discriminated	0.25 (0.51)	0.25 (0.51)	0.25 (0.51)	0.25 (0.51)
Wealth Ratio	-0.41 (0.33)	-0.41 (0.33)	-0.41 (0.33)	-0.41 (0.33)
Host Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Irredentist Population	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Power Disparity	0.01 (0.10)	0.01 (0.10)	0.01 (0.10)	0.01 (0.10)
Peace years	-1.47*** (0.21)	-1.47*** (0.21)	-1.47*** (0.21)	-1.47*** (0.21)
Peace years <sup>2</sup>	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)
Peace years <sup>3</sup>	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Constant	0.85 (0.59)	-0.60 (0.63)	-0.42 (0.62)	0.86* (0.50)
Observations	3,681	3,681	3,681	3,681

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Appendix Table 7a: Anocratic/Anocratic by Institution*

Institution	Anocratic/Anocratic		Total
	0	1	
Majoritarian	969 94.9%	52 5.09%	1,021 100.00%
Proportional	861 96.20%	34 3.80%	895 100.00%
Party	1,123 96.39%	42 3.61%	1,165 100.00%
Military	804 88.16%	108 11.84%	912 100.00%
Total	3,757 94.09%	236 5.91%	3,993 100.00%

*Appendix Table 7b: Anocratic/Not Anocratic by Institution*

Institution	Anocratic/Not Anocratic		Total
	0	1	
Majoritarian	874 85.60%	147 14.40%	1,021 100.00%
Proportional	797 89.05%	98 10.95%	895 100.00%
Party	956 82.06%	209 17.94%	1,165 100.00%
Military	786 86.18%	126 13.82%	912 100.00%
Total	3,413 85.47%	580 14.53%	3,993 100.00%



*Appendix Table 7c: Not Anocratic/Anocratic by Institution*

Institution	Not Anocratic/Anocratic		Total
	0	1	
Majoritarian	896 87.76%	125 12.24%	1,021 100.00%
Proportional	828 92.51%	67 7.49%	895 100.00%
Party	1,073 92.10%	92 7.90%	1,165 100.00%
Military	642 70.39%	270 29.61%	912 100.00%
Total	3,439 86.13%	554 13.87%	3,993 100.00%

*Appendix Table 7d: Not Anocratic/Not Anocratic by Institution*

Institution	Not Anocratic/Not Anocratic		Total
	0	1	
Majoritarian	324 31.73%	697 68.27%	1,021 100.00%
Proportional	199 22.23%	696 77.77%	895 100.00%
Party	343 29.44%	822 70.56%	1,165 100.00%
Military	504 55.26%	408 44.74%	912 100.00%
Total	1,370 34.31%	2,623 65.69%	3,993 100.00%

Appendix Table 8a: Crosscutting Cleavages; Group-Level Economic Controls

VARIABLES	(1) Majoritarian	(2) Proportional	(3) Party	(4) Military/Personal	(5) Majoritarian	(6) Proportional	(7) Party	(8) Military/Personal
1.Majoritarian		2.69*** (0.94)	1.64** (0.79)	0.02 (0.62)		3.00*** (0.82)	1.10** (0.54)	-0.04 (0.61)
2.Proportional	-2.69*** (0.94)		-1.05 (1.17)	-2.68*** (1.04)	-3.00*** (0.82)		-1.90** (0.89)	-3.04*** (0.90)
3.Party	-1.64** (0.79)	1.05 (1.17)		-1.63** (0.83)	-1.10** (0.54)	1.90** (0.89)		-1.14** (0.57)
4.Military	-0.02 (0.62)	2.68*** (1.04)	1.63** (0.83)		0.04 (0.61)	3.04*** (0.90)	1.14** (0.57)	
Crosscutting	-1.49 (1.86)	-1.49 (1.86)	-1.49 (1.86)	-1.49 (1.86)				
High Inequality					-3.79*** (1.10)	-3.79*** (1.10)	3.79*** (1.10)	-3.79*** (1.10)
Low Inequality					-3.17*** (1.06)	-3.17*** (1.06)	3.17*** (1.06)	-3.17*** (1.06)
Group Wealth Ratio					1.01*** (0.32)	1.01*** (0.32)	1.01*** (0.32)	1.01*** (0.32)
Anocracy/Anocracy	2.13*** (0.57)	2.13*** (0.57)	2.13*** (0.57)	2.13*** (0.57)	2.03*** (0.69)	2.03*** (0.69)	2.03*** (0.69)	2.03*** (0.69)
Anocracy/No	0.97 (0.61)	0.97 (0.61)	0.97 (0.61)	0.97 (0.61)	1.50*** (0.57)	1.50*** (0.57)	1.50*** (0.57)	1.50*** (0.57)
No/Anocracy	0.68** (0.28)	0.68** (0.28)	0.68** (0.28)	0.68** (0.28)	0.39 (0.32)	0.39 (0.32)	0.39 (0.32)	0.39 (0.32)
Margin	-0.06 (0.90)	-0.06 (0.90)	-0.06 (0.90)	-0.06 (0.90)	1.60* (0.83)	1.60* (0.83)	1.60* (0.83)	1.60* (0.83)
Dispersed	-0.89 (1.23)	-0.89 (1.23)	-0.89 (1.23)	-0.89 (1.23)	-0.49 (1.30)	-0.49 (1.30)	-0.49 (1.30)	-0.49 (1.30)
Discriminated	-0.89 (0.60)	-0.89 (0.60)	-0.89 (0.60)	-0.89 (0.60)	-1.20** (0.61)	-1.20** (0.61)	-1.20** (0.61)	-1.20** (0.61)
Wealth Ratio	-0.04 (0.31)	-0.04 (0.31)	-0.04 (0.31)	-0.04 (0.31)	-1.41*** (0.51)	-1.41*** (0.51)	1.41*** (0.51)	-1.41*** (0.51)
Host Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Irredentist Population	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Power Disparity	0.01 (0.13)	0.01 (0.13)	0.01 (0.13)	0.01 (0.13)	0.13 (0.11)	0.13 (0.11)	0.13 (0.11)	0.13 (0.11)
Irredentist Soviet	-0.86 (0.73)	-0.86 (0.73)	-0.86 (0.73)	-0.86 (0.73)	-1.51* (0.79)	-1.51* (0.79)	-1.51* (0.79)	-1.51* (0.79)
Host Soviet	0.51 (0.63)	0.51 (0.63)	0.51 (0.63)	0.51 (0.63)	0.90 (0.78)	0.90 (0.78)	0.90 (0.78)	0.90 (0.78)

Peace years	-1.71*** (0.37)	-1.71*** (0.37)	1.71*** (0.37)	-1.71*** (0.37)	-1.51*** (0.30)	-1.51*** (0.30)	1.51*** (0.30)	-1.51*** (0.30)
Peace years <sup>2</sup>	0.11*** (0.03)	0.11*** (0.03)	0.11*** (0.03)	0.11*** (0.03)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.09*** (0.02)
Peace years <sup>3</sup>	-0.00*** (0.00)	-0.00*** (0.00)	0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	0.00*** (0.00)	-0.00*** (0.00)
Constant	1.44 (1.36)	-1.25 (1.36)	-0.20 (1.14)	1.43 (1.28)	3.46** (1.52)	0.46 (1.25)	2.36* (1.38)	3.51*** (1.29)
Observations	3,218	3,218	3,218	3,218	2,611	2,611	2,611	2,611

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Appendix Table 8b: Proportional Systems / Ethnic Interactions*

VARIABLES	(1) Proportional/Ethnic	(2) Proportional/Religious	(3) Proportional/Crosscut
2.Proportional	-0.03 (0.81)	-1.46* (0.86)	-5.23* (2.79)
3.Party	-1.37** (0.64)	-1.52** (0.67)	-1.64** (0.79)
4.Military	0.05 (0.67)	0.16 (0.62)	-0.01 (0.62)
Ethnic Fractionalization	1.85 (2.32)		
ProportionXEthnic	-93.80*** (23.71)		
Religious Fractionalization		-1.22 (1.20)	
ProportionXReligious		-19.31*** (7.22)	
Crosscutting			-1.58 (1.91)
ProportionXCrosscutting			3.55 (3.08)
Anocratic/Anocratic	2.23*** (0.54)	2.10*** (0.59)	2.12*** (0.57)
Anocratic/No	0.92 (0.58)	0.91 (0.59)	0.93 (0.60)
No/Anocratic	0.57** (0.29)	0.62** (0.25)	0.67** (0.27)
Margin	1.82 (2.14)	-0.24 (0.90)	-0.03 (0.92)
Dispersed	-1.07 (1.17)	-1.00 (1.31)	-0.88 (1.23)
Discriminated	-0.79 (0.69)	-0.89 (0.67)	-0.90 (0.61)
Wealth Ratio	0.11 (0.33)	-0.06 (0.35)	-0.04 (0.31)
Host Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Irredentist Population	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Power Disparity	0.06 (0.14)	0.03 (0.14)	0.02 (0.14)
Irredentist Soviet	-0.73 (0.75)	-0.72 (0.80)	-0.88 (0.73)
Host Soviet	0.50 (0.61)	0.26 (0.63)	0.51 (0.64)
Peace years	-1.76*** (0.41)	-1.73*** (0.40)	-1.71*** (0.37)
Peace years <sup>2</sup>	0.11*** (0.03)	0.11*** (0.03)	0.11*** (0.03)
Peace years <sup>3</sup>	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Constant	-1.50 (1.97)	0.96 (1.15)	1.49 (1.38)
Observations	3,310	3,218	3,218

Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Appendix Table 9: Host State Controls

VARIABLES	(1) Fract Majoritarian	(2) Fract Proportional	(3) Fract Party	(4) Fract Military	(5) # Majoritarian	(6) # Proportional	(7) # Party	(8) # Military
1.Majoritarian		1.60*** (0.55)	1.22** (0.59)	0.00 (0.54)		1.72*** (0.54)	1.06** (0.52)	0.06 (0.53)
2.Proportional	-1.60*** (0.55)		-0.38 (0.59)	-1.60*** (0.49)	-1.72*** (0.54)		-0.66 (0.59)	-1.65*** (0.55)
3.Party	-1.22** (0.59)	0.38 (0.59)		-1.22** (0.52)	-1.06** (0.52)	0.66 (0.59)		-0.99** (0.51)
4.Military	-0.00 (0.54)	1.60*** (0.49)	1.22** (0.52)		-0.06 (0.53)	1.65*** (0.55)	0.99** (0.51)	
Host Fractionalization	1.81** (0.91)	1.81** (0.91)	1.81** (0.91)	1.81** (0.91)				
Host # Groups					0.18*** (0.06)	0.18*** (0.06)	0.18*** (0.06)	0.18*** (0.06)
Anoc/Anocracy	1.87*** (0.49)	1.87*** (0.49)	1.87*** (0.49)	1.87*** (0.49)	1.98*** (0.46)	1.98*** (0.46)	1.98*** (0.46)	1.98*** (0.46)
Anocracy/No	0.98** (0.46)	0.98** (0.46)	0.98** (0.46)	0.98** (0.46)	1.04** (0.47)	1.04** (0.47)	1.04** (0.47)	1.04** (0.47)
No/Anocracy	0.69*** (0.26)	0.69*** (0.26)	0.69*** (0.26)	0.69*** (0.26)	0.67** (0.30)	0.67** (0.30)	0.67** (0.30)	0.67** (0.30)
Margin	0.73 (0.52)	0.73 (0.52)	0.73 (0.52)	0.73 (0.52)	0.86* (0.52)	0.86* (0.52)	0.86* (0.52)	0.86* (0.52)
Dispersed	-1.15 (1.09)	-1.15 (1.09)	-1.15 (1.09)	-1.15 (1.09)	-0.93 (1.19)	-0.93 (1.19)	-0.93 (1.19)	-0.93 (1.19)
Discriminated	-0.18 (0.52)	-0.18 (0.52)	-0.18 (0.52)	-0.18 (0.52)	-0.24 (0.57)	-0.24 (0.57)	-0.24 (0.57)	-0.24 (0.57)
Wealth Ratio	-0.21 (0.31)	-0.21 (0.31)	-0.21 (0.31)	-0.21 (0.31)	-0.18 (0.36)	-0.18 (0.36)	-0.18 (0.36)	-0.18 (0.36)
Host Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Irredentist Population	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Power Disparity	0.08 (0.12)	0.08 (0.12)	0.08 (0.12)	0.08 (0.12)	0.06 (0.12)	0.06 (0.12)	0.06 (0.12)	0.06 (0.12)
Irredentist Soviet	-0.30 (0.62)	-0.30 (0.62)	-0.30 (0.62)	-0.30 (0.62)	-0.19 (0.61)	-0.19 (0.61)	-0.19 (0.61)	-0.19 (0.61)
Host Soviet	0.46	0.46	0.46	0.46	0.43	0.43	0.43	0.43

	(0.50)	(0.50)	(0.50)	(0.50)	(0.52)	(0.52)	(0.52)	(0.52)
Peace years	-1.47***	-1.47***	-1.47***	-1.47***	-1.44***	-1.44***	-1.44***	-1.44***
	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)
Peace years <sup>2</sup>	0.09***	0.09***	0.09***	0.09***	0.09***	0.09***	0.09***	0.09***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Peace years <sup>3</sup>	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-1.31	-2.91***	-2.53***	-1.31	-1.78**	-3.50***	-2.84***	-1.84**
	(0.98)	(0.79)	(0.80)	(0.84)	(0.81)	(0.76)	(0.81)	(0.82)
Observations	3,527	3,527	3,527	3,527	3,527	3,527	3,527	3,527

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Appendix Table 10: Model Performance

VARIABLES	(1) Original	(2) NewInst	(3) Interact
1.Majoritarian	-2.72** (1.34)	-0.51 (0.62)	-4.63** (2.14)
2.Proportional		-3.67*** (1.02)	-3.51*** (1.04)
3.Party		-1.52** (0.61)	-1.77*** (0.65)
Margin	-0.37 (0.64)	1.46 (0.95)	0.53 (1.08)
MajoritarianXMargin	5.06** (2.05)		5.56* (2.86)
Dispersed	-0.45 (1.38)	-0.80 (1.62)	-0.61 (1.61)
High Inequality	-3.17*** (0.98)	-3.67*** (1.09)	-4.05*** (1.10)
Low Inequality	-2.29** (0.93)	-2.53** (1.08)	-2.67** (1.09)
Discriminated	-0.92 (0.61)	-1.15* (0.62)	-1.01* (0.60)
Wealth Ratio	-0.22 (0.34)	-0.12 (0.35)	-0.23 (0.36)
Anocracy/Anocracy	2.34*** (0.59)	2.04*** (0.62)	2.08*** (0.60)
Anocracy/No	0.97** (0.47)	1.52*** (0.55)	1.54*** (0.57)
No/Anocracy	0.20 (0.28)	0.45 (0.28)	0.37 (0.25)
Host Population	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Irredentist Population	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Power Disparity	-0.04 (0.12)	-0.05 (0.13)	-0.11 (0.14)
Irredentist Soviet	-0.76 (0.53)	-1.63** (0.69)	-2.13*** (0.64)
Host Soviet	-0.02 (0.60)	0.53 (0.63)	0.62 (0.66)
Peace years	-1.54*** (0.30)	-1.56*** (0.32)	-1.56*** (0.32)
Peace years <sup>2</sup>	0.10*** (0.02)	0.10*** (0.03)	0.10*** (0.03)
Peace years <sup>3</sup>	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Constant	2.66** (1.26)	3.40** (1.34)	4.30*** (1.32)
Observations	2,934	2,934	2,934
BIC	500.075	491.954	494.818
AIC	380.393	366.288	363.167
Log likelihood	-170.196	-162.144	-159.583
F1 Score	0.750	0.778	0.784
MCC	0.740	0.770	0.775
AUC	0.976	0.976	0.977

Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 7. Model Sensitivity Analyses

In this section of the appendix, we assess the robustness of our computational model when we systematically vary what had been fixed parameters in our primary model. These parameters included the patches of territory in the model, the number of rounds utilized per model run, the median transfer preferences, and others as detailed in Appendix Table 11 below. Appendix Table 11 further details the parameter values used in the default model under the “Default Value” heading.

While keeping all other parameters constant at their default values, we run our analyses assessing the impact of our four institutional types while changing one default parameter value at a time. For example, we vary all four of our institutional types while keeping all default parameter values the same except for changing patches of territory from 1,089 to 841, as signified by the row “Patches of Territory” in table 11 below. We then vary all four institutional types while keeping all default parameter values the same except for changing patches of territory to 1,369. This procedure helps us assess whether our model results are sensitive to the default parameter values we included in our main model analyses. Because running 100 rounds of the model produced the same irredentist patterns as the 200 rounds, we used for the model in the main text, we ran all sensitivity analyses for 100 rounds.

Appendix Figure 3 graphically presents the results of each parameter change across several pages, and these can be compared against our model results with our primary default model results presented in Appendix Figure 1 presented earlier in this appendix. We engage in some discussion of these results following the presentation of Figure 3.



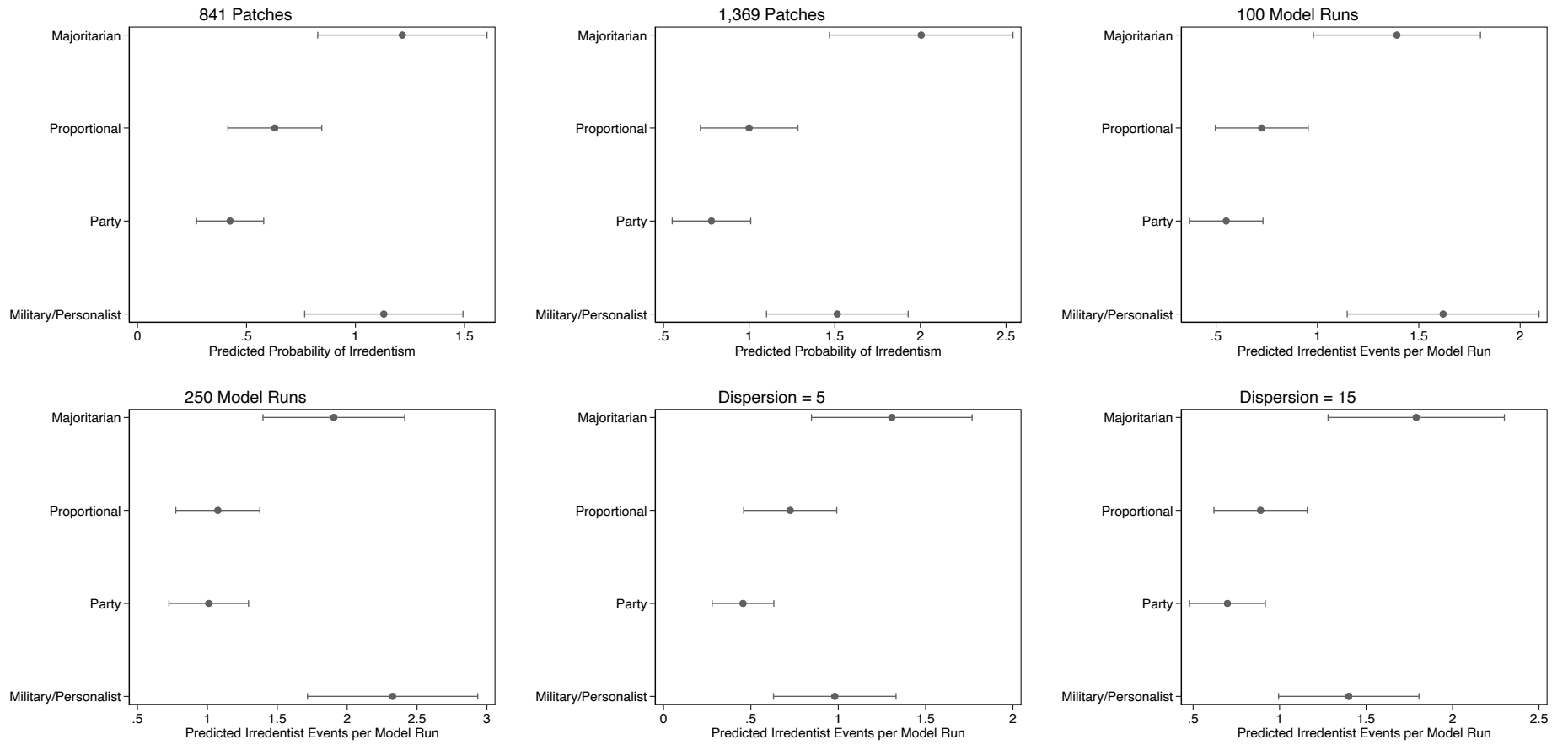
*Appendix Table 11: Default Model Values*

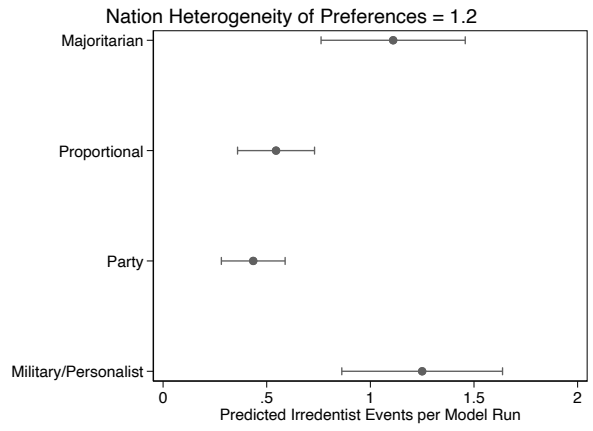
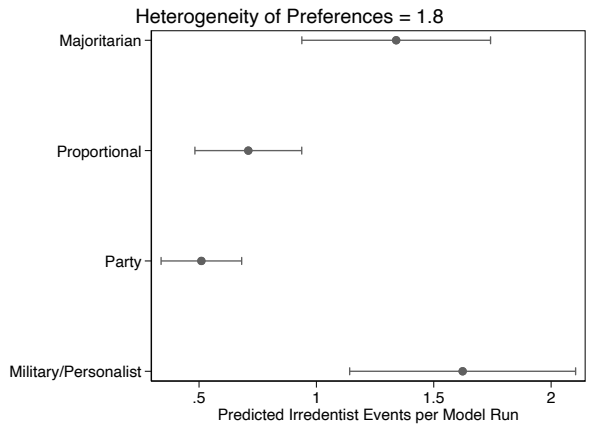
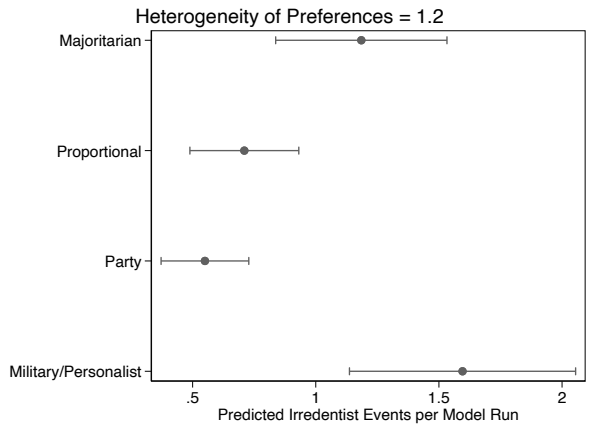
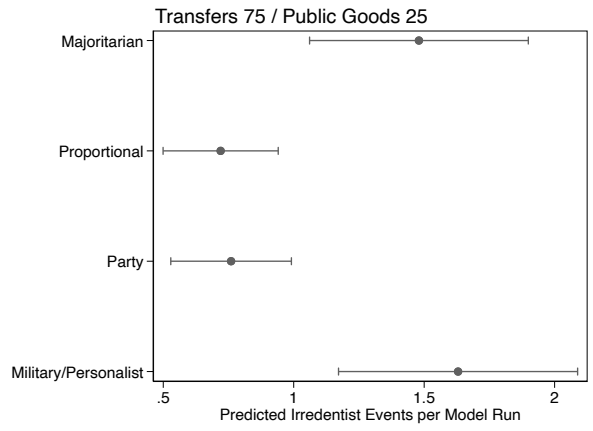
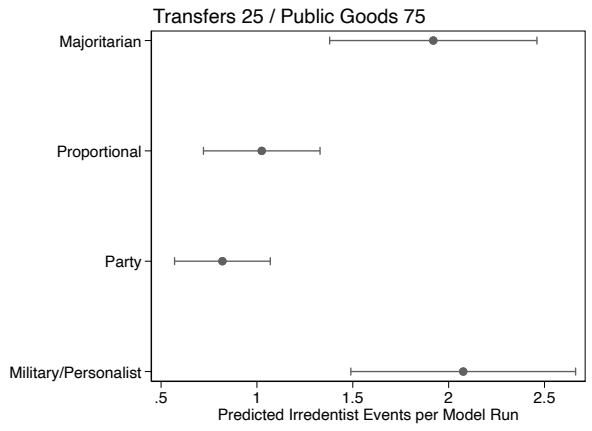
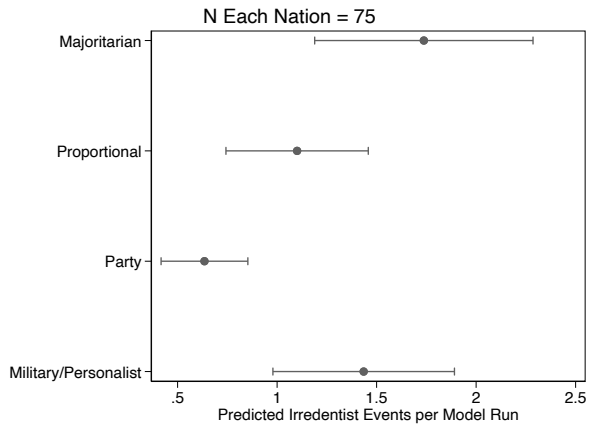
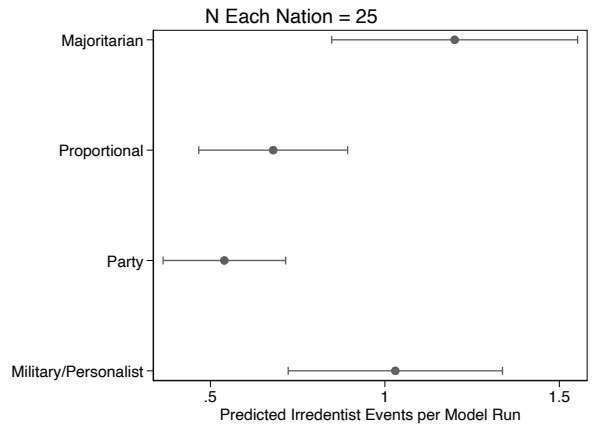
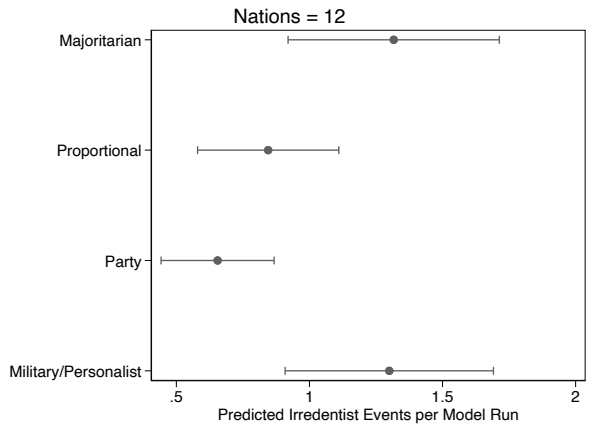
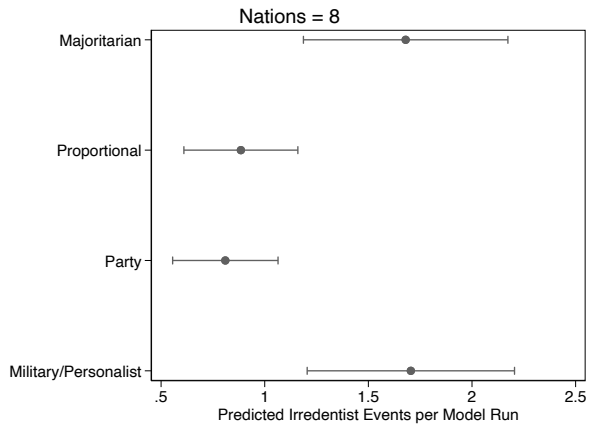
Variables held constant	Default Value	Sensitivity Check
Patches of Territory <sup>31</sup>	1,089	841; 1,369
Rounds per Model Run	200	100; 250
Dispersion	10	5; 15
$N$ – Number of Nations	10	8; 12
$I$ – Number of Individuals	50	25; 75
$\alpha_m$ – Median Transfer Preferences	0.5	0.25, 0.75
$\beta_m$ – Median Public Goods Preferences	0.5	0.75; 0.25
$h_i$ – Preference Heterogeneity	1.5	1.2; 1.8
$e_i$ – Nation Preference Heterogeneity	1.5	1.2; 1.8
$\lambda$ – Distance Scale Correction	5	2, 8
$\lambda_2$ – Public Goods/Transfer Scale Correction	300	200, 600
$p_s$ – Starting Proportion of Private to Public	0.5	0.25, 0.75

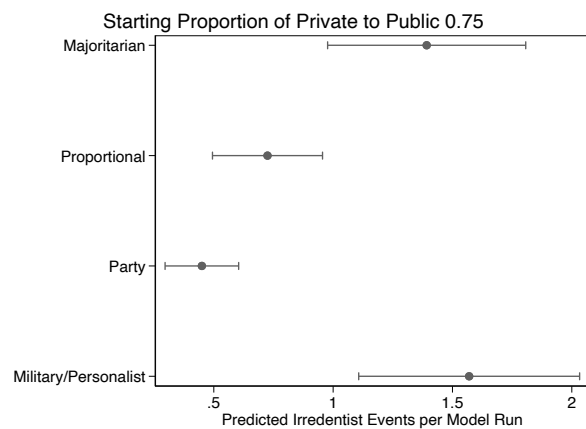
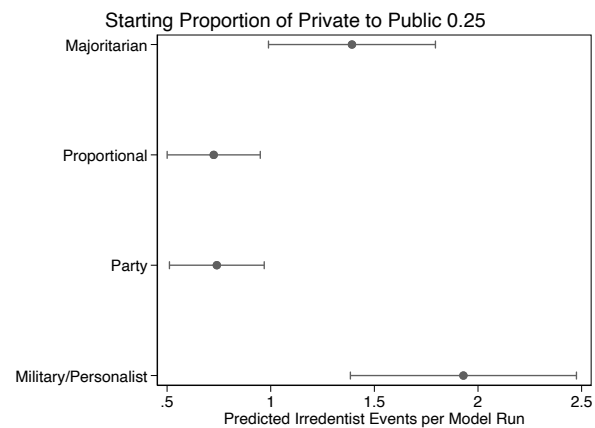
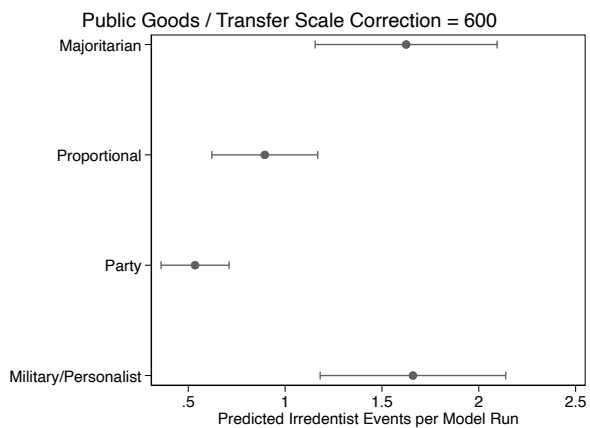
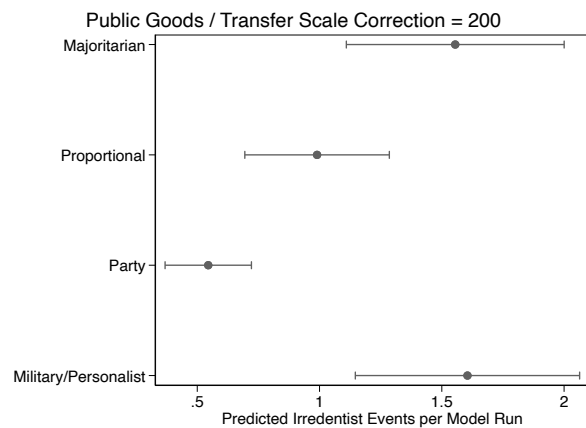
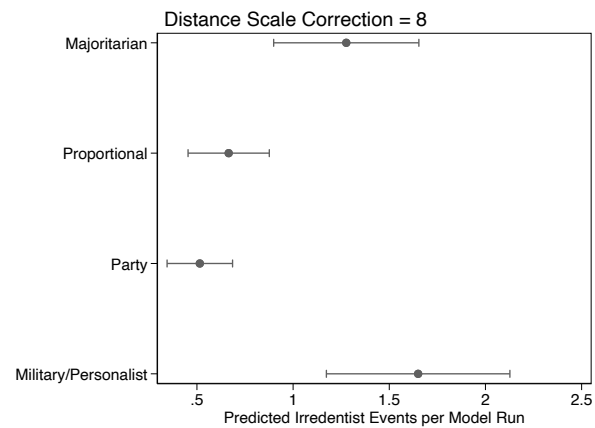
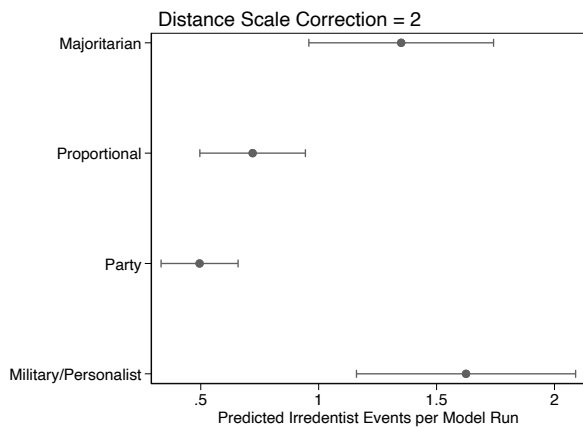
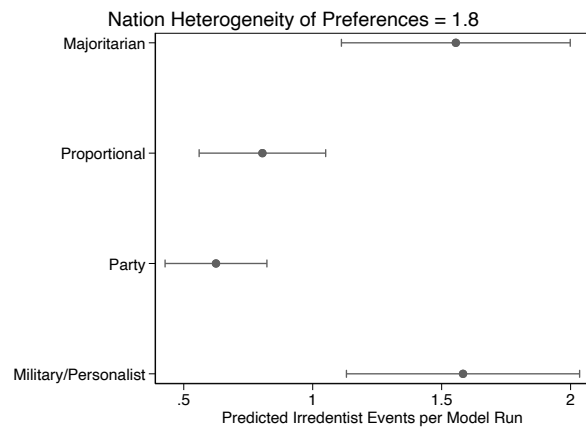
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<sup>31</sup> The default 1,089 patches results from NetLogo's default 33x33 grid. The sensitivity analysis assesses our results if we instead employ a 29x29 grid (841 patches) or a 37x37 grid (1,369 patches).

Appendix Figure 3: Graphical Results from Sensitivity Analysis







*Discussion:*

Across the vast majority of our analyses, the results follow the same pattern as those presented in the main text of the paper. We see that there are two clusters: majoritarian systems and military/personalist systems have higher incidences of irredentism than proportional electoral systems and single party authoritarian systems. Put differently, majoritarian systems and military/personalistic systems are not statistically differentiated from each other, but they are statistically differentiated from and see higher predicted irredentist events than proportional electoral systems and single party electoral systems, and these two latter systems also are not statistically differentiated from each other.

There are 3 models in the sensitivity analysis that do not follow this general pattern, although they do not deviate greatly, and they do not give us a great deal of pause. In each case, majoritarian and military personalistic systems have higher predicted values of irredentism than proportional electoral and single party systems, but proportional and military systems are occasionally not statistically differentiated from each other. The models that deviate slightly from the typical model include: 1) when the level of dispersion is set to 5 (rather than the default value of 10), 2) when the number of individuals is set to 75 (rather than the default value of 50), and 3) when the public goods correction is set to 200 (rather than the default value of 300).

When the level of dispersion is set to 5, we are not surprised to see that this setting produces some mild degree of difference from our main results. To have irredentism, there need to be opportunities for it. With nations clustered more tightly together, there are fewer opportunities (and subsequently incidences) of irredentism and thus fewer opportunities for the various political regimes to differentiate themselves. The general pattern, however, is largely the

same except that proportional electoral systems are not statistically differentiated from military/personalistic authoritarian regimes.

When the number of individuals in each nation is set to 75 and when the public goods correction is set to 200, we see that while military/personalistic regimes have a higher number of predicted irredentist events in the model than proportional electoral systems, that difference is not statistically significant. Military/personalistic regimes often having the highest number of predicted irredentist events, but they also demonstrate the greatest variability across model runs. It may be that when the prediction is on the low end of this spectrum, there is a tendency for military/personalistic regimes to not be statistically differentiated from proportional electoral systems.

#### **7a. Multiple Interacting Regimes**

Our primary model looks at interacting states who all share the same regime type. We do this for two reasons. First, it allows us to experimentally isolate the impact of regime type. Second, it allows a more efficient means to run our various model analyses. However, some readers may wonder the extent to which our results might change if we examined a world of interacting states who shared different regime characteristics.

To assesses this, we ran a version of our model with all the same attributes as the main model described in this appendix. However, rather than look at a world of 10 interacting states of all the same regime type, we ran one thousand iterations of a model where the regime type for each of the interacting states was randomly chosen between majoritarian, proportional, single-party, and military. We ran 1,000 model iterations to approximately match the number of total observations for each regime in our main model analyses.

To further clarify with an example, consider that in our original model we ran 200 iterations of a model with 10 interacting majoritarian states. This provided us with 10 examples of majoritarian regimes in each run and subsequently 2,000 total observations across 200 model iterations. However, in the model runs with 10 states where the regime type of each state is randomly chosen, we had an average of between 2 and 3 majoritarian observations in each model run. To approach 2,000 total observations, we needed to run 1,000 model iterations. We tracked, as separate variables, the number of irredentist instances from each regime type across 1,000 model runs.

Appendix Table 12(a-d) below presents summary statistics and paired t tests for all paired variable combinations. The summary statistics in Appendix Table 12a inform us that for each model run of 10 interacting states averaged slightly less than 1 act of irredentism (0.979) across 1,000 runs. Majoritarian regimes averaged 0.33 acts of irredentism per model run, proportional regimes averaged 0.177 acts of irredentism, while single-party and military regimes averaged 0.149 and 0.323 acts of irredentism per model run, respectively. These results closely mirror the results of our main models in that majoritarian and military regimes average relatively high propensities for irredentism while proportional and single-party regimes average relatively low propensities for irredentism.

To assess the statistical significance of these differences, Appendix Tables 12b through 12c present paired t tests. Appendix Table 12b demonstrates whether statistically significant differences exist between majoritarian regimes against proportional, single party, and military regimes. We see majoritarian regimes have a statistically different and higher irredentist events than both proportional and single party regimes, while, as in the main models, there is not statistically significant difference between majoritarian and military regimes. Similarly,

Appendix Table 12c demonstrates that proportional systems are not statistically differentiated from single party dictatorships, but they have fewer instances of irredentism than military regimes and this difference is statistically significant. Finally, Appendix Table 12d demonstrates that single party dictatorships have significantly fewer instances of irredentism than do military regimes. There is no table for military regimes as, obviously, its paired comparisons have already been examined by the previous tables. All results are consistent with the predictions coming from our primary model.

*Appendix Table 12a: Summary Statistics*

Variable	Obs	Mean Irred.	Std. Dev.	Min	Max
Total Incidences	1,000	.979	2.015595	0	16
Majoritarian	1,000	.33	1.210192	0	16
Proportional	1,000	.177	.7267731	0	13
Party	1,000	.149	.7651042	0	13
Military	1,000	.323	1.140163	0	11

*Appendix Table 12b: Majoritarian Paired Reference*

Variable	Obs	Mean Irred.	Std. Err.	Std. Dev.	[95% Conf. Interval]
Maj.	1,000	.33	.0382696	1.210192	.2549019 .4050981
Proportion.	1,000	.177	.0229826	.7267731	.1319003 .2220997
diff	1,000	.153	.0433759	1.371668	.0678816 .2381184
	Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0
	Pr(T < t) = 0.9998		Pr(T > t) = 0.0004		Pr(T > t) = 0.0002

Variable	Obs	Mean Irred.	Std. Err.	Std. Dev.	[95% Conf. Interval]
Maj.	1,000	.33	.0382696	1.210192	.2549019 .4050981
Party	1,000	.149	.0241947	.7651042	.1015217 .1964783
diff	1,000	.181	.0453464	1.433979	.0920149 .2699851
	Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0
	Pr(T < t) = 1.0000		Pr(T > t) = 0.0001		Pr(T > t) = 0.0000

Variable	Obs	Mean Irred.	Std. Err.	Std. Dev.	[95% Conf. Interval]
Maj.	1,000	.33	.0382696	1.210192	.2549019 .4050981
Military	1,000	.323	.0360551	1.140163	.2522476 .3937524
diff	1,000	.007	.0531204	1.679813	-.0972403 .1112403
	Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0
	Pr(T < t) = 0.5524		Pr(T > t) = 0.8952		Pr(T > t) = 0.4476



*Appendix Table 12c: Proportional Paired Reference*

Variable	Obs	Mean Irred.	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Proportion.	1,000	.177	.0229826	.7267731	.1319003	.2220997
Party	1,000	.149	.0241947	.7651042	.1015217	.1964783
diff	1,000	.028	.0333816	1.055618	-.0375061	.0935061
	Ha: mean(diff) < 0 Pr(T < t) = 0.7991		Ha: mean(diff) != 0 Pr(T > t) = 0.4018		Ha: mean(diff) > 0 Pr(T > t) = 0.2009	

Variable	Obs	Mean Irred.	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Proportion.	1,000	.177	.0229826	.7267731	.1319003	.2220997
Military	1,000	.323	.0360551	1.140163	.2522476	.3937524
diff	1,000	-.146	.0411628	1.301683	-.2267755	-.0652245
	Ha: mean(diff) < 0 Pr(T < t) = 0.0002		Ha: mean(diff) != 0 Pr(T > t) = 0.0004		Ha: mean(diff) > 0 Pr(T > t) = 0.9998	

*Appendix Table 12d: Party Paired Reference*

Variable	Obs	Mean Irred.	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Party	1,000	.149	.0241947	.7651042	.1015217	.1964783
Military	1,000	.323	.0360551	1.140163	.2522476	.3937524
diff	1,000	-.174	.0433775	1.371716	-.2591214	-.0888786
	Ha: mean(diff) < 0 Pr(T < t) = 0.0000		Ha: mean(diff) != 0 Pr(T > t) = 0.0001		Ha: mean(diff) > 0 Pr(T > t) = 1.0000	