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Segregation, Polarization, and Ethnic Conflict

Marko Klašnja[1] and Natalija Novta[1]

Abstract

An index of ethnic segregation conveys the extent of spatial mixing of ethnic groups, whereas an index of ethnic polarization and similar diversity measures show the overall balance between the groups. We present a game-theoretic model of conflict in which local success of one ethnic group encourages attacks by its co-ethnics in neighboring areas. Conditional on conflict breaking out, we find that for highly ethnically polarized societies, increasing ethnic segregation decreases the incidence and intensity of conflict. In contrast, in societies with low ethnic polarization, increasing segregation increases conflict. This is because segregation and polarization *jointly* determine the *spread* of conflict, an important channel that has been neglected previously. We find strong empirical support for model predictions in two very different conflicts: Hindu–Muslim riots in the 1980s and 1990s in India and the Bosnian Civil War from 1992 to 1995.

Keywords

conflict, ethnicity, segregation, polarization, spatial diffusion

The emergence and persistence of racial and ethnic segregation have intrigued scholars for decades. The work of Thomas Schelling (1969) has led to a large literature on the endogenous formation of segregated neighborhoods, tipping point phenomena, and especially the persistence of segregated equilibria (e.g., Durlauf 1996). This literature has often been motivated by an implicit understanding that racial, ethnic, or religious segregation is associated with negative economic and political

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outcomes—riots, higher crime, unemployment, and lower human capital (e.g., Borjas 1998). The ghettos in American cities paint this picture very clearly (e.g., Cutler, Glaeser, and Vigdor 1999). Segregated areas may make it easier for a marginalized ethnic group to become cohesive and organize protests and rebellions (Fearon and Laitin 1996). Some recent examples include riots in the suburbs of Paris and Stockholm and the decades of Hindu–Muslim riots in India.

However, one can also find examples to the contrary, when high segregation is associated with less conflict. Across the world, those living in ethnically homogenous neighborhoods often feel safer than do those living in mixed neighborhoods (Bhavnani et al. 2014; Weidmann and Salehyan 2013). This might be because they use tight social networks within the ethnic group for internal policing and maintenance of order (Olzak, Shanahan, and McEneaney 1996). It might also be because, in segregated neighborhoods, the locally dominant group knows that local conflict will likely be resolved in their favor, as they are strong on their home terrain (Field et al. 2008).

Ultimately, how segregation affects conflict will depend on the channel considered. A fundamental channel that has been neglected in the literature so far is that segregation may affect the *spread* of conflict. Numerous existing research have shown that conflict spreads spatially, and in particular via ethnic ties (e.g., Forsberg 2008). After conflict starts in one area, it is likely to spread to the neighboring areas if a sizable share of the neighboring community belongs to the same ethnic group. When segregation is high, so a protesting, dissatisfied ethnic group is concentrated in one region, or several regions, there will not be much opportunity for conflict to spread spatially beyond those regions. On the other hand, when a dissatisfied ethnic group is large but less segregated, then there are potentially many towns or regions to which conflict could spread.

In this article, we show theoretically and empirically that segregation has a *positive* effect on conflict when ethnic polarization is low and *negative* effect when polarization is high. Ethnic polarization is an index of ethnic diversity, and it is maximized when two groups of equal size face each other. In recent literature, ethnic polarization and other indices of ethnic diversity such as fractionalization, dominance, and horizontal inequality have received much more attention than segregation.[1] Ethnic segregation, as referred to in this article, is an index that measures the level of geographic mixing of ethnic groups within a country. Minimum ethnic segregation is obtained when the population share of each group in each region of a country is the same as their countrywide population share. Maximum segregation is achieved if every region of a country is perfectly homogenous, inhabited by only one of the ethnic groups present in the country.

To illustrate how ethnic polarization and segregation are connected, let's focus on a hypothetical country with two main ethnic groups, A and B. In the case of two groups, high polarization means the two groups are of equal size; low polarization means that one group is a countrywide minority (e.g., group B), even though they might be a local majority in some region or regions. Suppose group B is the

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dissatisfied ethnic group and makes decisions to initiate conflict in its own region based on its local probability of success, largely determined by its local population share.

When both polarization and segregation are low in the country, the few members of group B are so spread out that in no region of the country is group B large enough to initiate conflict. When polarization is low but segregation is high, group B is concentrated in one (or few) regions of the country, in which conflict might erupt. Therefore, in this case, *increasing* segregation *increases* conflict. In contrast, when both polarization and segregation are high, group B is about half of the total country's population and they are concentrated in many regions. Then, if conflict starts, it is likely to spread only to regions where group B is concentrated. When segregation is low, group B represents about half of each region in the country—then, if conflict starts it is likely to engulf the entire country. In this case, *decreasing* segregation *increases* conflict.

We present a game-theoretic model of conflict to formalize these ideas. We model conflict as a collection of local-level conflicts in which each group seeks control over their local territory. In each region, a dissatisfied group decides whether to attack the other group depending on its local probability of winning, which depends on (1) its regional population share and (2) previous battle successes of co-ethnics in neighboring regions. These neighborhood effects could take various forms, such as a psychological effect—success of co-ethnics in neighboring region may boost confidence so that the dissatisfied group believes they have a higher probability of winning their own region.

We use the Schelling (1971) model implementation in an agent-based modeling software (NetLogo) to generate thousands of hypothetical countries with different segregation and polarization levels that arise from different spatial distributions of ethnic groups. We then use our model to simulate conflict spread in each of these hypothetical countries, and we analyze at the hypothetical country level the effect of segregation on conflict. We primarily examine the number of regional attacks, but also derive predictions for total conflict effort of the two groups, and the duration of conflict spread.

Next, we test our theory empirically in two very different settings—India and Bosnia. Hindu–Muslim riots in India are an example of conflict over local power. The conflict in Bosnia was a secessionist ethnic war. We deliberately choose such disparate cases because we believe that the dynamic of conflict spread we describe can capture the spread of violence in various conflict situations. Our model predictions are strongly confirmed on both cases and are robust to the inclusion of important potential confounds. The key common feature we predict and find in the data is that when polarization is high, increasing segregation reduces conflict and that when polarization is low, increasing segregation increases conflict. Hence, we show that the relative size of ethnic groups in conflict crucially changes the effect of segregation on conflict, which helps shed light on some of the conflicting expectations and findings on the effect of segregation and violence. Our results thus indicate that any

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study of ethnic segregation should also consider its interaction with ethnic polarization.

The rest of the article is organized as follows. The first section reviews the literature, the second section describes the model of conflict and the dynamic model simulations, and the third section discusses the segregation index and the lack of one-to-one relationship between regional population shares and segregation, necessitating simulations to the derive comparative statics. The fourth section illustrates the intuition behind our findings. The fifth section presents our main findings based on simulations, and the sixth section presents the results for India and Bosnia. The seventh section presents our conclusion. Additional details are given in the Online Appendix.

Literature

Our article is situated in the large literature that examines the relationship between ethnic diversity and conflict. This literature has produced mixed results. Some studies find that ethnic diversity is associated with higher intensity of conflict (Montalvo and Reynal-Querol 2005; Weidmann 2011); some suggest that there is a nonmonotonic relationship (Collier and Hoeffler 1998), while others find no relationship (Fearon and Laitin 2003; Miguel, Satyanath, and Sergenti 2004). To resolve these conflicting findings, some scholars have shifted the focus to more refined concepts, taking into account the political importance of ethnic groups (Cederman, Wimmer, and Min 2010; Wucherpfennig et al. 2011), or the discrepancy between the group-based and individualistic nature of conflict (e.g., Cederman and Gleditsch 2011).

We focus on how the spatial distribution of ethnic groups combines with the overall balance of groups to influence conflict intensity and spread.[2] Other scholars have also examined how spatial aspects of ethnic diversity affect conflict but with notable differences from our study. Bhavnani et al. (2014) and Weidmann and Salehyan (2013) focus on the relationship between segregation and violence in urban settings, whereas we encompass areas larger than cities.[3] Other scholars have focused on group geographic concentration and population density (e.g., Weidmann 2009; Wucherpfennig et al. 2011), which are related to segregation in that they take into account the spatial configuration of groups and the extent of group mixing. However, the segregation index we use in our study is a more precise measure than geographic or demographic concentration and requires more refined data on ethnic composition. Moreover, our theory is explicitly informed by an index of segregation rather than these other related concepts.

In a broad sense, national and regional ethnic balances, on which we focus on in this article, are forms of intergroup inequality. Therefore, our study is related to the scholarship on horizontal inequalities and ethnic conflict. This literature similarly focuses on intergroup relations and examines how conflict is influenced by intergroup regional economic and political inequality (e.g., Østby 2008; Rustad et al. 2011), as well as social and cultural inequality (Stewart 2008). Horizontal

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inequalities can interact with ethnic concentration to increase the likelihood of conflict and secession, particularly in federations (Bakke and Wibbels 2006; Deiwiks, Cederman, and Gleditsch 2012) and decentralized polities (Brancati 2006).

In our model, ethnic conflict is a collection of local confrontations. This modeling choice is motivated by scholars such as Cunningham and Weidmann (2010) and Rustad et al. (2011), who persuasively argue that ethnic competition over political power manifests primarily at the local level. Hence, to test this theory empirically, it is best to look within regions of a country. In this way, we contribute a new theoretical basis for the expanding set of subnational conflict studies (e.g., Balcells 2010; Kalyvas 2006).

Our article also contributes to the growing literature that uses agent-based models (e.g., Bhavnani and Miodownik 2009; Hammond and Axelrod 2006). We use an agent-based implementation of the canonical Schelling (1971) model of segregation to generate hypothetical countries with different levels of polarization and segregation. We computationally derive the comparative statics of our model, since the spatial and dynamic structure of the model does not lend a unique analytical relationship between the regional population shares, segregation, and conflict outcomes.

Finally, we contribute further evidence in the debate on the benefits of ethnic segregation and partition for the reduction of violence. Due to findings of greater conflict along so-called ethnic fault lines, some authors have advocated ethnic separation (Sambanis 2000; Chapman and Roeder 2007). Others dispute such arguments on various grounds (Fearon 2004; Laitin 2004). Our results indicate that ethnic "unmixing" would not be universally beneficial but not universally harmful either. Rather, the effect of ethnic segregation is crucially conditioned by the level of ethnic polarization.

A Model of Conflict

Suppose a hypothetical country is populated by two ethnic groups, $i = 1,2$, the dissatisfied and the satisfied ethnic group, respectively. We assume that the group which represents less than 50 percent of the countrywide population, $i = 1$, is dissatisfied or potentially separatist. In this article, we focus on the spread of conflict and do not explore the issue of why a group is dissatisfied; we simply assume that a cleavage exists and runs along ethnic lines. The goal of the dissatisfied group in each region j is to win control over their own regional territory, which would allow them full control over local public goods. The group that is larger countrywide, $i = 2$, by virtue of being dominant in the country, already has more control than group 1, and hence is satisfied. This has been a common situation in many instances of conflict throughout the world, for example, the Malay minority in Thailand, the Baloch in Pakistan, the Albanians in Macedonia, Kosovo and Serbia, in episodes of ethnic tensions in African countries such as South Africa or Mali, or recently the Russian minority in Ukraine.

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The model focuses on conflict at the local, or regional, level. We assume that ethnic conflict is a collection of local-level conflicts fought by local members of groups 1 and 2 independently in each region. This assumption is reasonable in many instances of ethnic conflict. For example, Cunningham and Weidmann (2010), Rustad et al. (2011), and Treisman (2007) show that much of the conflict between the dominant and protesting minority groups take place within clearly defined administrative structures such as provinces or local governments. Also, a number of studies have shown that regional ethnic diversity is associated with conflict over the extent of the provision of public goods (e.g., Bandiera and Levy 2011; Habyarimana et al. 2007).

Control over local regional territory is a public good, which is assumed to produce one of three possible payoffs.[4] If a group captures and controls a region, they get a payoff of b, if they lose they get 0, and if neither group attacks, the dissatisfied group gets $\frac{1}{2}b$ as the peace payoff, while the satisfied group gets b as the peace payoff. Note that the payoff of the satisfied group is the same in peace and if they win, consistent with them being satisfied with the status quo. To seize control of region j, effort e_{ij} must be exerted. We assume that the cost of expending effort, $c(e_{ij})$, is convex and can be formulated as $c(e_{ij}) = \frac{1}{2}e_{ij}^2$.

We also assume that the success (or failure) of co-ethnics in neighboring regions affects each ethnic group's probability of winning their own region. The probability that group i wins in region j if conflict occurs is defined as follows:

$$p_{ij} = \frac{n_{ij}e_{ij}(1+s_{ij})}{\sum_{k=1}^{2} n_{kj}e_{kj}(1+s_{kj})}, \tag{1}$$

where s_{ij} is the share of battles[5] won by group i in the neighboring region j in the previous period.[6] The formula for p_{ij} above assumes that each group's probability of winning increases if more than half of all the regional battles fought in their immediate neighborhood in the previous period were won by their co-ethnic neighbors. Alternatively, if the group's co-ethnic neighbors won less than half of all the battles in the neighboring regions in the previous period, their probability of winning decreases.

The expected utility of group i in region j, if conflict occurs, is defined as $\mathrm{EU}_{ij} = p_{ij}b - c(e_{ij})$. For the dissatisfied ethnic group, with peace payoff $\frac{1}{2}b$, the condition for attack is satisfied if

$$p_{ij}b - c(e_{ij}) > \frac{1}{2}b. \tag{2}$$

Let $D_j = \sum_{i=1}^{2} n_{ij}e_{ij}(1+s_{ij})$ be the denominator in equation (1), so that $p_{ij} = n_{ij}e_{ij}(1+s_{ij})/D$. Since expected utility is concave in effort, the optimal level of effort is characterized by the following first-order condition:

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$$\frac{n_{ij}\left(1+s_{ij}\right)}{D_j}\left(1-\frac{n_{ij}e_{ij}\left(1+s_{ij}\right)}{D_j}\right)b = e_{ij}.$$

The equilibrium of the one-period conflict game in each region j is a vector $\mathbf{e_j} = \left(e_{1j}, e_{2j}\right)$ such that the first order condition is satisfied, that is, efforts are optimal, for both groups in the region.[7] In a similar setup, J. Esteban and Ray (1999) show that this equilibrium exists and is unique. Multiplying the first-order condition by $\frac{e_{ij}}{2}$ yields $\frac{e_{ij}^2}{2} = \frac{p_i(1-p_i)}{2}b$, so the payoff from conflict can be expressed as $\mathrm{EU}_{ij} = \frac{1}{2}p_{ij}\left(1+p_{ij}\right)b$. Hence, the dissatisfied group attacks if their expected conflict payoff exceeds their peace payoff, specifically if $\frac{1}{2}p_{ij}\left(1+p_{ij}\right)b > \frac{1}{2}b$. Solving this quadratic equation reveals the critical condition of $\frac{\sqrt{5}-1}{2}$, or approximately 0.618. That is, the dissatisfied ethnic group attacks the other group in their region whenever their local probability of winning exceeds 0.618.

Note that in the case of two groups, $p_{1j}\left(1-p_{1j}\right) = p_{2j}\left(1-p_{2j}\right)$, and since $\frac{1}{2}p_{ij}(1-p_{ij}) = \frac{e_{ij}^2}{2}$ is true for any i in any region, then $e_{1j}^2 = e_{2j}^2$ must hold in equilibrium. Hence, we need only s_{1j} and n_{1j} to derive the following expression for the probability of winning a region j, if conflict occurs, since

$$p_{1j} = \frac{n_{1j}(1+s_{1j})}{n_{1j}(1+s_{1j}) + (1-n_{1j})(1+s_{2j})} \tag{3}$$

Proposition 1: Assuming payoffs described earlier, and given n_{ij} and $\boldsymbol{s_j}$, group i attacks the other group in region j if $p_{ij} > p^*$, where $p_{ij} = p_{ij}(n_{ij}, \boldsymbol{s_j})$ is the probability of winning the battle and $p^* = \frac{\sqrt{5}-1}{2} \approx 0.618$.

The critical p^* threshold can be achieved via high n_{ij} or high s_{ij}. At the beginning of conflict (i.e., when $s_{1j} = s_{2j} = 0$), the dissatisfied group would attack in region j only if $n_{1j} > 0.618$, since in this case $\boldsymbol{p_j} = \boldsymbol{n_j}$. After neighboring co-ethnics have participated in conflict, then co-ethnic's victories must mean the other group's losses, so the share of victories won by co-ethnic neighbors of the two groups must add up to one (i.e., $s_{1j} = 1 - s_{2j}$). If in the first period co-ethnic neighbors of the dissatisfied group have won half of all the neighboring battles, then conflict will happen if $n_{1j} > 0.618$, otherwise both groups prefer peace. If in the first period the dissatisfied group won all the battles in regions neighboring j, then they will attack in the next period if $n_{1j} > 0.448$. Alternatively, if the dissatisfied group lost all the battles fought in regions neighboring region j, the dissatisfied group in region j will reattack in the next period only if $n_{1j} > 0.765$.

Whether an attack happens in a region is a crude measure of conflict because it can only take values of 0 or 1. A more nuanced measure is the total effort expended by both ethnic groups fighting in a region. We define the total conflict effort

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expended in one period in region j as $E_j = \sum_{i=1}^{2} n_{ij} e_{ij}$. We previously derived that $e_{1j} = e_{2j}$, and since $n_{1j} + n_{2j} = 1$, then $E_j = e_{ij}$. Then, total countrywide one-period effort is equal to $E = \sum_j^J E_j$, where J is the total number of regions.

Conflict Dynamics

To see how conflict evolves over time, the model needs input on the share of neighboring battles won by each ethnic group in each period (s_{ij}). Ex ante, this information is unavailable, because the probability of winning can be—and typically is—less than one. Therefore, for each attack that the model predicts, we need to assign a victory or a loss based on the equilibrium probability of winning, which depends on the optimal effort levels. The equilibrium probability of winning we derive from the A Model of Conflict section is a number in the range [0, 1]. To convert this probability into a victory or loss, we make a random draw from a uniform distribution between 0 and 1—if the draw is less than the calculated probability of winning we a assign a victory; if it is greater, we assign a loss. Note that this is simply an operationalization of the concept of probability (and not a new element of the model).

Depending on whether a victory or a loss occurs, conflict might evolve differently. Hence, the same underlying regional population shares yield a distribution of different conflict outcomes. This distribution can be recovered by running the conflict model many times with repeated random draws that assign a victory or a loss. Due to space constraints, a detailed description and an illustration of how the dynamic conflict is simulated are provided in section A1 of the Online Appendix.

Segregation and Regional Ethnic Population Shares

To measure polarization among ethnic groups, we use a standard measure of countrywide ethnic polarization:

$$\text{Polarization} = 4 \sum_{i}^{N} n_i^2 (1 - n_i), \tag{4}$$

where $n_i = \frac{1}{T} \sum_j n_{ij} t_j$ is the countrywide population share of group i, T is the entire population of a country, and t_j is the entire population of region j. The concept of income polarization was introduced by J. Esteban and Ray (1994) and defined in the ethnic context by Reynal-Querol (2002) and Montalvo and Reynal-Querol (2005). Polarization ranges from zero to one and is maximized when two groups of equal size face each other.

For segregation, we use the same definition as in Alesina and Zhuravskaya (2011):

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$$\text{Segregation} = \frac{1}{M-1}\sum_{i}^{M}\sum_{j}^{J}\frac{t_j}{T}\frac{(n_{ij}-n_i)^2}{n_i}, \tag{5}$$

where M is the total number of groups. The segregation index also ranges from zero to one. Maximum segregation is achieved when the two groups are perfectly segregated into ethnically homogeneous regions. Minimum segregation is obtained when the groups are mixed in the same proportion in every region as in the country as whole, that is, when $\forall j$, $n_{ij} = n_i$.[8]

For a given vector of regional population shares $(n_{11}, n_{12}, \ldots, n_{1j})$, first-period attacks and effort levels are always the same in our model. However, for a given segregation level, there could be *different* first-period attacks and effort levels. This is because two countries with different regional population shares can have the *same* segregation level—that is, the mapping from regional population shares to segregation is not an injection. Given this, one cannot uniquely express first-period conflict outcomes as a function of segregation.

Consider the following example of two countries with the same segregation level and different regional population shares. The countries have three regions each, and the regional population numbers (t_1, t_2, t_3); total population, T; and countrywide population shares (n_1, n_2) are all the same. Let $(n_{11}, n_{12}, n_{13}) = (0.25, 0.25, 0.85)$ for country 1 and $(n_{11}, n_{12}, n_{13}) = (0.65, 0.65, 0.05)$ for country 2. Letting $(n_1, n_2) = (0.45, 0.55)$, and $\frac{t_j}{T} = \frac{1}{3}$ for each region j, for both countries the calculation for segregation is given by the following:

$$\text{Segregation} = \frac{1}{3}\left[2\left(\frac{0.04}{0.45}+\frac{0.04}{0.55}\right)+\left(\frac{0.16}{0.45}+\frac{0.16}{0.55}\right)\right] = \frac{0.08}{0.2475} \approx 0.3232.$$

Clearly, when regional population shares are different, then first-period conflict outcomes will be different. In country 1, an attack takes place only in region 2, the region with 85 percent of the dissatisfied group. In country 2, however, first-period attacks happen in regions 1 and 2, which both have 65 percent of the dissatisfied group. Total effort expended in first-period fighting in country 2 is more than double the effort in country 1.

Because we cannot derive a unique analytical result between segregation and conflict outcomes, we resort to simulations to derive comparative statics in the Comparative Statics section. In section A5 of the Online Appendix, we derive an injective function between population shares and segregation for two levels of polarization, when the regional population shares are restricted, so that they all depend on a single variable. The results are qualitatively identical to those shown with simulations subsequently.

Segregation, Polarization, and Conflict: An Illustration

To systematically generate a range of segregation levels with different spatial distributions of ethnic groups, we use the NetLogo implementation (Wilensky 1997) of

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the Schelling (1971) segregation model. To save space, hereafter, we equate the implementation with the original model and refer to it simply as the Schelling model. In the Schelling model, there are two types of agents, for example, black and white, distributed on a checkerboard. Each agent prefers that a certain share of his or her immediate neighbors are of the same type as him- or herself, and agents move until their preference is satisfied. The percentage of similar neighbors that agents desire determines the level of segregation in the model.

Let us be clear from the outset that the Schelling model has no substantive relationship with the conflict model; it is just a convenient way for us to generate hypothetical countries with different levels of segregation and polarization. Details about parameters in the Schelling model that were used to generate different segregation and polarization levels in the examples in this section, as well as for main results in the fifth section, are given in section A2 of the Online Appendix.

Figure 1a gives one example of the Schelling model output with maximum polarization and high segregation. The satisfied and dissatisfied ethnic groups are represented with gray stars and black squares, respectively. We convert the Schelling model output, shown in the left panels of Figure 1, into regional population shares, shown in the right panels, which serve as the input for the conflict model simulation. Figures 1b through 1d give examples with high polarization/low segregation, low polarization/high segregation, and low polarization/low segregation, respectively. In the low-polarization countries in these examples, the dissatisfied group makes about 5 percent of the countrywide population.

In the two high-polarization countries (Figures 1a and 1b), conflict will start only in regions that have at least 61.8 percent of the dissatisfied ethnic group. In our examples, conflict will begin in 59 of the 121 regions in the high-segregation country, and in 20 of the 121 regions in the low-segregation country. But, the low-segregation country has many more regions with dissatisfied group shares between 44.8 percent and 61.8 percent—there are sixty such regions in the low-segregation country, and only five in the high-segregation country. This indicates that the low-segregation country has much more potential for conflict spread than the high-segregation country. Hence, increasing segregation leads to less conflict spread and therefore less conflict overall.

Turning to low-polarization countries shown in Figure 1c and 1d, the effect of segregation is the opposite. In the low-segregation country, there are no regions with the share of the dissatisfied ethnic group greater than 61.8 percent (or greater than 44.8 percent, for that matter); so conflict will not even begin, let alone spread. With high segregation, there are twenty-eight regions in which conflict breaks out in the first period, and only two additional regions that may be attacked later, so we can expect short-lived conflict. Hence, in the case of low polarization, increasing segregation leads to more conflict.

We run 1,000 repetitions of the dynamic model of conflict for the hypothetical countries in Figure 1 and show the results in section A3 of the Online Appendix. Overall, when polarization is high, the highly segregated country has smaller

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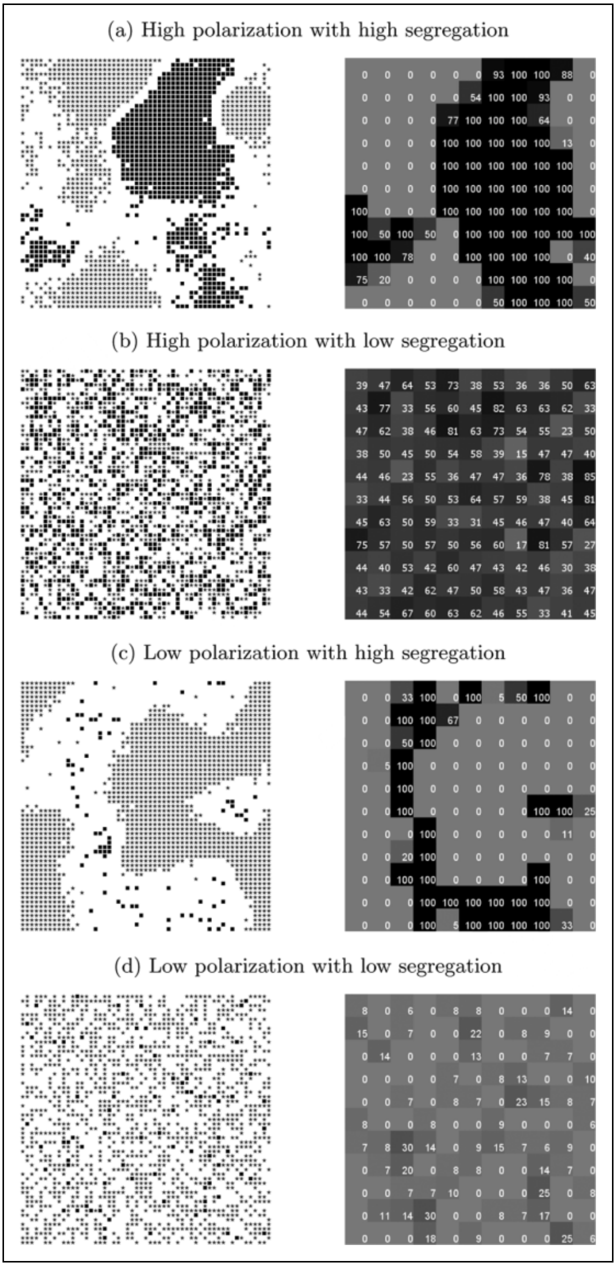

Figure 1. Illustration of conflict dynamics with different levels of polarization and segregation.
Note: (a) Pol = 1; Seg = 0.95; 75 percent similar wanted. (b) Pol = 1; Seg = 0.07; 0 percent similar wanted. For (a) and (b), we use 1,700 agents, 850 in in the dissatisfied and satisfied group. (c) Pol = 0.2; Seg = 0.93; 87.5 percent similar wanted. (d) Pol = 0.2; Seg = 0.08; 0 percent similar wanted. For (c) and (d), we use 1,500 agents and a ratio of dissatisfied to

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variance in attacks and victories—a battle either does not occur or is quickly won by the attackers (because most regions have either a clear majority or a clear minority of the dissatisfied group). In the case of the low-segregation country, the average number of attacks and victories is higher and the variance is higher, because of the dependence on neighbors' success and location of previous attacks. When polarization is low, increasing segregation has the opposite effect—there are more attacks in the more segregated country. The effect of segregation, therefore, is *conditional* on the level of polarization, even though the underlying dynamic of conflict is identical.

Comparative Statics

We now extend the illustration from the previous section to derive the full comparative statics. We study the effect of segregation on conflict outcomes at eight levels of polarization: 1, 0.97, 0.93, 0.85, 0.75, 0.55, 0.30, and 0.20. These correspond to the following countrywide population shares of the dissatisfied and satisfied group, respectively: (0.5,0.5), (0.42,0.58), (0.37,0.63), (0.31,0.69), (0.25,0.75), (0.17,0.83), (0.08,0.92), and (0.05,0.95). We chose these polarization levels to make the comparative statics maximally informative. We run the Schelling model to create a sample of 48,000 hypothetical countries or 6,000 per polarization level. Then we run the conflict model 100 times for each country and use the median conflict outcome for each country for further analysis. Hence, we have 48,000 observations in our analysis with the full sample of simulated data. We show graphically in the Online Appendix that our choice of median outcomes does not affect the interpretation of comparative statics, since using any part of the distribution yields qualitatively identical results.

Figure 2 shows the relationship between ethnic segregation and total number of attacks across the eight levels of ethnic polarization. The gray dots are the median outcomes of our simulations. The black line (and the associated confidence interval) represents the estimates from a flexible nonparametric model similar to a lowess smoother, which allows us to characterize with high precision our comparative static predictions. The red lines represent the expected number of attacks based on the estimates from a negative binomial regression as in equation (6) subsequently. We regress the number of attacks on segregation, polarization, and their interaction from the entire sample of simulations at all levels of polarization:

$$y_i = \beta_0 + \beta_1 \text{polarization}_i + \beta_2 \text{segregation}_i + \beta_3 \text{polarization}_i \times \text{segregation}_i + \varepsilon_i. \tag{6}$$

Figure 1. (Continued) satisfied group of 1:17 (overall about 5 percent of dissatisfied group). We modify the NetLogo implementation of the Schelling model (Wilensky 1997) by enlarging the world to 55 by 55 patches, the neighborhood to 25 patches and allowing agents to move up to 50 steps at a time. Pol = polarization; Seg = segregation.

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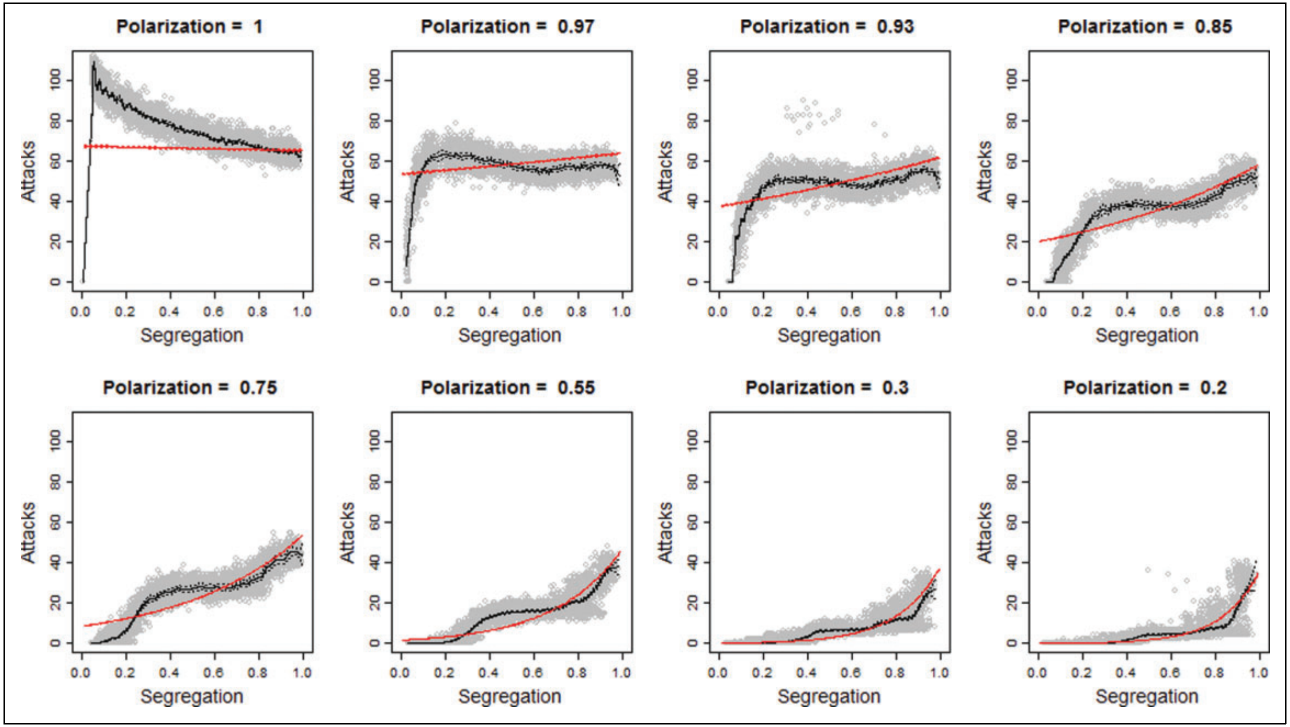

Figure 2. Relationship between ethnic segregation and the total number of attacks, for eight levels of polarization.

Note: Gray dots are outcomes of simulations. Black lines represent estimates from a bivariate generalized additive model of attacks on segregation, for each polarization level separately. Approximate 95 percent confidence intervals are also plotted. Red lines (and the associated 95 percent confidence intervals) represent the expected number of attacks from a negative binomial regression of attacks on segregation, polarization, and their interaction, estimated for all polarization levels combined.

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Table 1. Simulated Results and Marginal Effects.

	Marginal effect	Difference
Polarization = 1	−2.090	–
Polarization = 0.97	10.421	12.511
Polarization = 0.93	24.368	13.948
Polarization = 0.85	38.438	14.070
Polarization = 0.75	45.545	7.107
Polarization = 0.55	44.736	−0.810
Polarization = 0.30	37.691	−7.044
Polarization = 0.20	34.790	−2.901

Note: The estimates are based on the negative binomial regression of the median number of attacks based on simulations on segregation, polarization, and their interaction. All marginal effects are statistically significant at $p < .05$.

Conflict simulations confirm our expected findings—the effect of segregation depends on the level of polarization. When polarization is very high, higher segregation is associated with *less* conflict. Then, as polarization decreases, the effect of segregation begins to change, so that at some point increasing segregation neither increases nor decreases conflict. When polarization is at lower levels, increasing segregation is associated with *more* conflict. The estimated marginal effects by each level of polarization from the negative binomial regression shown in equation (6) and Figure 2 are given in Table 1. Given the large size of our simulated data set, it is not surprising that we get very precise estimates and highly statistically significant results.

Empirical Tests

The best way to test our theory is using within-country cross-sectional data (see Online Appendix for further discussion). In this context, we need ethnic population data at two subnational levels—regional and subregional—in order to calculate segregation at the regional level. We also need a relatively large number of regions in order to conduct meaningful statistical analysis. Moreover, these regions and subregions have to plausibly delineate units in which ethnic groups might fight for power over territory. Finally, such a sample space must be characterized by the actual presence of some level of conflict.

We draw detailed data from two countries that satisfy such conditions: India and Bosnia. In India, we test our theory using district-level data on Hindu–Muslim violence in the 1980s and the 1990s. In Bosnia, we focus on the ethnic conflict between Serbs, Muslims, and Croats in the period 1992 to 1995.

India

India is composed of hundreds of administrative districts, which are further divided into tehsils, and the census records ethnic population at the tehsil level. Tehsils

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typically consist of multiple villages and a few towns. We use the cross sections of Indian districts from the 1981 and 1991 census.

Summary statistics for the 314 (389) districts in 1981 (1991) are presented in Table A2 in the Online Appendix. We observe the full range of polarization, from 0 to 1, but the average polarization tends to be rather low at about 0.34 (0.38) in 1981 (1991), which corresponds to the average Muslim share of about 10 percent. Segregation ranges from 0 to 0.52 (0.58), with median segregation of 0.03 (0.04) in 1981 (1991). If ethnic information were available at the sub-tehsil level, most likely we would have been able to obtain a greater range for segregation. This is because certain blocks within a city or even a whole village might be either Hindu or Muslim, but the entire tehsil is unlikely to be composed of only one group.[9] However, the census does not release ethnic composition at lower levels of administration, deeming this potentially sensitive information.

Conflict data are taken from the Varshney–Wilkinson data set (Varshney and Wilkinson 2006) for the 1980s and the 1990s. This data set covers conflict events from 1950 to 1995. Data on conflicts from 1995 to 2000 were provided by Mitra and Ray (2011). Detailed description of the data and the literature on riots in India can be found in Wilkinson (2004) and Mitra and Ray (2014). Our control variables are drawn from the decennial censuses as well as from Duflo and Pande (2007) and Banerjee, Iyer, and Somanathan (2005).

Indian Results

To verify that our model has predictive power with real world data, we estimate a negative binomial regression model as in equation (7), which is appropriate when the number of riots is overdispersed. This is the same as equation (6) in the Comparative Statics section, with the inclusion of a vector **X** of j controls. In the main results shown subsequently, we include only a factor income scale composed of several district characteristics as the most important control.[10]

$$\begin{aligned} y_i = \beta_0 + \beta_1 \text{polarization}_i + \beta_2 \text{segregation}_i + \beta_3 \text{polarization}_i \times \text{segregation}_i \\ + \gamma_j \mathbf{X}_{ij} + \varepsilon_i. \end{aligned} \quad (7)$$

Figures 3a and 3b show the predicted number of riots based on equation (7) across Indian districts in the 1980s and the 1990s, respectively. We present the results for eight levels of polarization, similar to our simulations. The polarization levels shown in Figure 3a and b are not identical to those shown for simulations (Figure 2). Rather, these levels were chosen to better reflect the actual distribution of polarization levels across Indian districts. In general, the distribution of polarization is right skewed—there are few districts with very high polarization. The eight polarization levels shown represent the 99th, 95th, 90th, 80th, 65th, 50th, 30th, and 10th percentiles of the observed distribution of polarization among Indian districts in each year.

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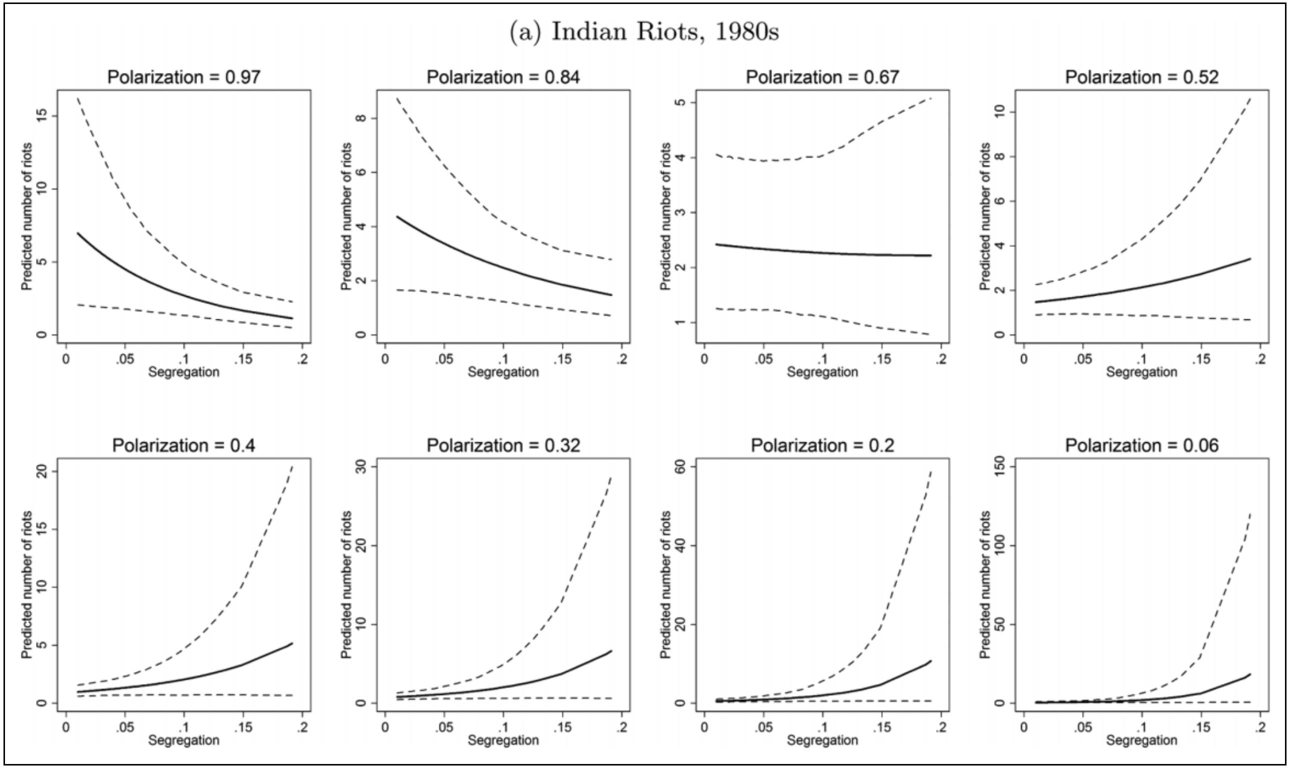

Figure 3. Segregation, polarization, and Hindu–Muslim riots in India, 1980s and 1990s.

Note: The *y* axis shows the predicted number of riots based on the model in equation (7). Segregation and polarization are calculated based on the 1981 Indian census data in the upper panel and 1991 Indian census data in the lower panel. We use only the population of Hindus and Muslims, discarding other ethnic groups and recalculating the ethnic shares of Hindus and Muslims accordingly. Dashed lines represent the 95 percent bootstrapped confidence intervals.

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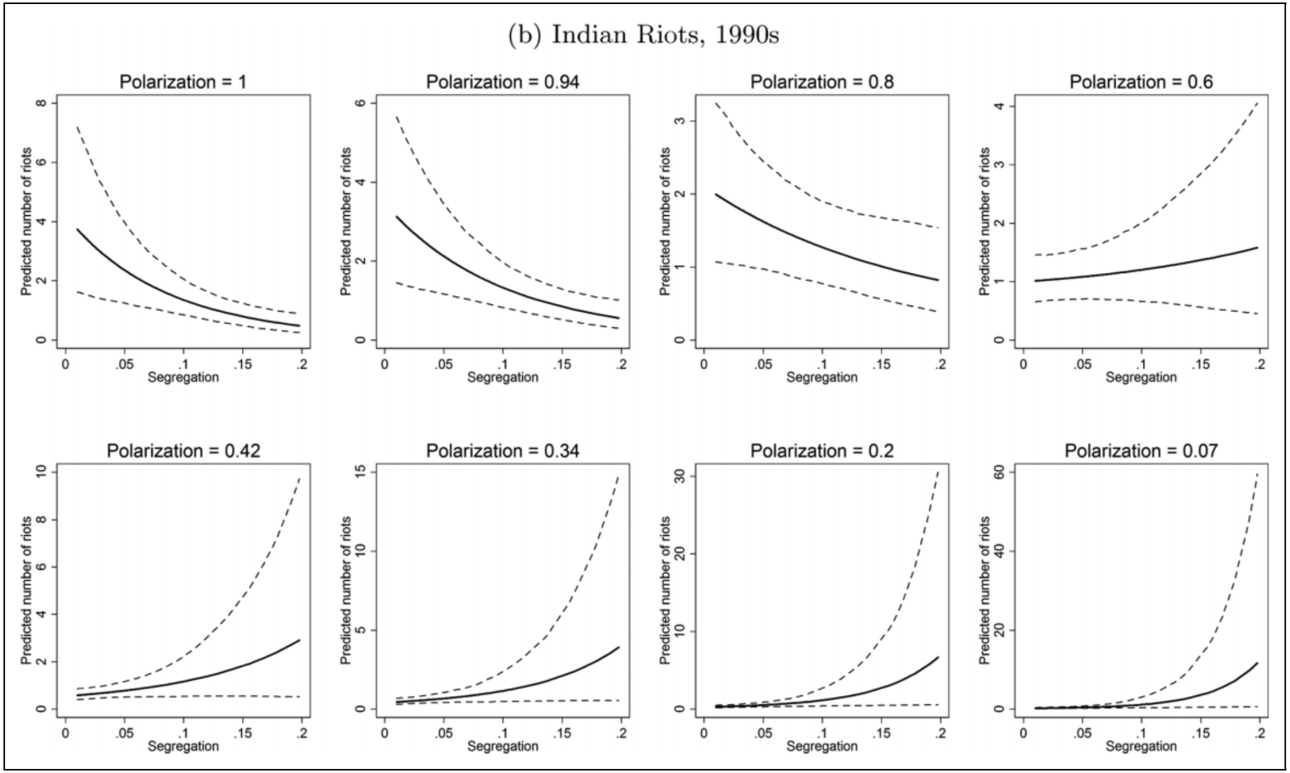

Figure 3. Continued

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Table 2. Marginal Effects for Indian Results.

	Marginal effect	Lower bound	Upper bound	Difference	Lower bound	Upper bound
Results for 1980s						
Polarization = 0.97	−5.367	−14.955	−0.768			
Polarization = 0.84	−2.672	−6.969	−0.218	2.696	0.362	8.000
Polarization = 0.67	−0.204	−1.721	2.134	2.468	0.375	6.548
Polarization = 0.52	1.823	−0.574	8.686	2.027	0.247	6.905
Polarization = 0.40	4.078	−0.255	19.899	2.255	0.153	10.383
Polarization = 0.32	5.876	−0.143	29.090	1.798	0.063	9.589
Polarization = 0.20	10.997	−0.028	57.442	5.121	0.080	30.387
Polarization = 0.06	21.327	0.048	121.534	10.330	0.047	64.286
Results for 1990s						
Polarization = 1	−2.889	−6.202	−0.927			
Polarization = 0.94	−2.277	−4.737	−0.736	0.612	0.183	1.422
Polarization = 0.80	−1.047	−2.304	−0.065	1.230	0.418	2.655
Polarization = 0.60	0.467	−0.577	2.493	1.514	0.511	3.293
Polarization = 0.42	1.990	−0.117	8.074	1.523	0.289	5.388
Polarization = 0.34	2.988	0.002	12.370	0.998	0.097	4.407
Polarization = 0.20	5.623	0.170	25.467	2.635	0.127	13.508
Polarization = 0.07	10.382	0.278	52.810	4.758	0.077	27.714

Note: The dependent variable is the number of Hindu–Muslim riots. Segregation and polarization are calculated based on the 1981 Indian census data in the upper panel and the 1991 Indian census data in the lower panel. We use only the population of Hindus and Muslims, discarding other ethnic groups and recalculating the ethnic shares of Hindus and Muslims accordingly. The lower and upper bounds are given for the 95 percent bootstrapped confidence interval, calculated based on empirical centiles.

The marginal effects of segregation for the same levels of polarization as well as the associated confidence intervals on which the graphs are based are given in Table 2. In the figures and the table, we restrict the range of segregation from 0.01 to 0.2, compared to the data we use for estimation (where we use the full observable range). The reason is that the more extreme levels of segregation contain very few observations (see the histogram of segregation levels in Figure A13 in the Online Appendix). This causes a large amount of model extrapolation at the extreme ends with very high variance, which is of limited informativeness.[11]

We find that the results based on Indian data follow quite closely the predictions of the model. In both the 1980s and the 1990s, the effect of segregation on the number of riots is highly dependent on polarization, exactly as predicted by our theory. At the highest polarization level, increasing segregation *decreases* the number of riots. At intermediate levels of polarization, increasing segregation *neither increases nor decreases* the number of riots. At low levels of polarization, increasing segregation *increases* the number of riots.

At the highest polarization level, the marginal effect of segregation is statistically significantly different from zero for both samples, as seen in the first row of column 1

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in both panels of Table 2. Lower and upper bounds of the 95 percent bootstrapped confidence interval for the marginal effects are shown in columns 2 and 3.[12] For example, increasing segregation from 0.01 to 0.2 in nearly maximally polarized district in the 1980s *decreases* the predicted number of riots by about 5.4, from about 6 to less than 1. On the other hand, at the lowest polarization level of 0.06, increasing segregation from 0.01 to 0.2, increases the mean number of riots by about 21.

In column 4 of Table 2, we show the difference between the adjacent marginal effects shown in the first column. The 95 percent confidence interval for each difference is shown in columns 5 and 6. As expected, the marginal effect of an increase in segregation (from 0.01 to 0.2) statistically significantly varies across polarization levels. For example, the marginal effect of segregation on the number of riots in the 1990s at the highest level of polarization (0.97) is statistically different from the marginal effect of segregation when polarization is at 0.84 (row 2 of column 2 in the lower panel of Table 2). The difference in the marginal effects is significant for most adjacent comparisons shown in the tables, suggesting that the effect of segregation really does change as polarization changes, in line with our predictions.

Bosnia

We collected very rich ethnic composition data for Bosnia, broken down to the level below municipalities. In 1991, Bosnia, a total population of 4.4 million, was distributed into 109 municipalities, each of which had a median of seventeen settlements. A settlement is a small administrative unit—a median settlement in 1991 Bosnia was home to about 1,400 people, while the median municipality was home to 30,624 people. We use a Bosnian municipality as our unit of analysis, as in Weidmann (2011).

Summary statistics for Bosnia are presented in Table A14 in the Online Appendix. As in India, we observe the full range of polarization, from 0 to 1, but the median polarization is very high, at 0.8. Segregation ranges from zero to about 0.7, with median segregation of 0.19. The median segregation level in Bosnia is substantially higher than in India, at least partly owing to the fact that we have ethnic composition data at smaller administrative units. Still, even the Bosnian data deliver a smaller range of segregation than our simulated data.

Bosnian conflict data were coded from the Balkan Battlegrounds, published by Central Intelligence Agency (2002, 2003), which provide one of the most detailed narratives of individual conflict events during the Bosnian war.[13] Note that there were three ethnic groups involved—the Serbs, the Muslims, and the Croats, which seems an apparent deviation from our model that only includes two groups. However, aside from very few exceptions, there were only two groups fighting each other in any given municipality—typically Serbs against Muslims or Croats against Muslims. This is unsurprising, given that in a median Bosnian municipality the two largest groups make up 91 percent of the total population. Hence, even when there are

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more than two groups, if only two groups fight locally, our model is broadly applicable.

Bosnian Results

The presentation of results proceeds in the same way as in the previous section. Figure 4 shows the predicted number of attacks based on a negative binomial regression similar to the one in equation (7).[14] To again ease the comparison with the theoretical predictions and the results based on Indian data, we present the results for eight polarization levels. Taking into account the distribution of polarization across Bosnian municipalities, we show results for the 99th, 80th, 60th, 40th, 30th, 20th, 15th, and 10th percentiles of the distribution of polarization in the data. The marginal effects of segregation at these polarization levels are given in Table 3. In the presentation of results, we once again restrict the range of segregation, from 0.01 to 0.3, even though the estimates are based on the full range of segregation in the data. As for Indian results, we do this to remove the very high variability of estimates in the regions where the data are very scarce. Coefficient estimates that form the basis of the figures and marginal effects are given in column 1 of Table A5.

We find that the Bosnian results, too, are remarkably consistent with the predictions of the model. Once again, at the highest polarization level, increasing segregation *decreases* the number of attacks, at low levels of polarization, increasing segregation *increases* the number of attacks, while at intermediate levels of polarization, increasing segregation *neither increases nor decreases* the number of attacks.

The transition from a negative effect of segregation to a positive effect occurs at a polarization level of about 0.65 in the Indian data, 0.8 in Bosnian data, and 0.95 in our simulated data (see Figures 3a and 3b, 4, and 2, respectively). The high level of polarization where the transition happens is not rare in the empirical data. In the Bosnian data, median polarization is close to 0.8, and the distribution is left skewed (see Figure A14 in the Online Appendix), implying that a number of municipalities have polarization higher than the approximate threshold level. Neither is polarization below the approximate threshold levels rare. In the Indian data, the median polarization is approximately 0.35 and the distribution is right skewed, suggesting that many districts have polarization below the threshold level. Our key message is that this transition does occur in each case and that it is consistent across two very different conflict situations, in India and Bosnia, as well as in our model simulations.

Prior cross-national studies often find a uniformly positive effect of group concentration and other measures related to segregation, on the probability of conflict (Horowitz 1985; Toft 2003; Laitin 2004; Weidmann 2009). Most countries have country-level polarization below 0.6 in cross-national data (e.g., Montalvo and Reynal-Querol 2005).[15] In our empirical results, 0.7 or 0.8 is the threshold at which the effect of segregation on conflict switches from negative to positive. Hence, in cross-national studies, even if good segregation data were available, it might be difficult to uncover the possible negative effect of segregation on incidence of conflict,

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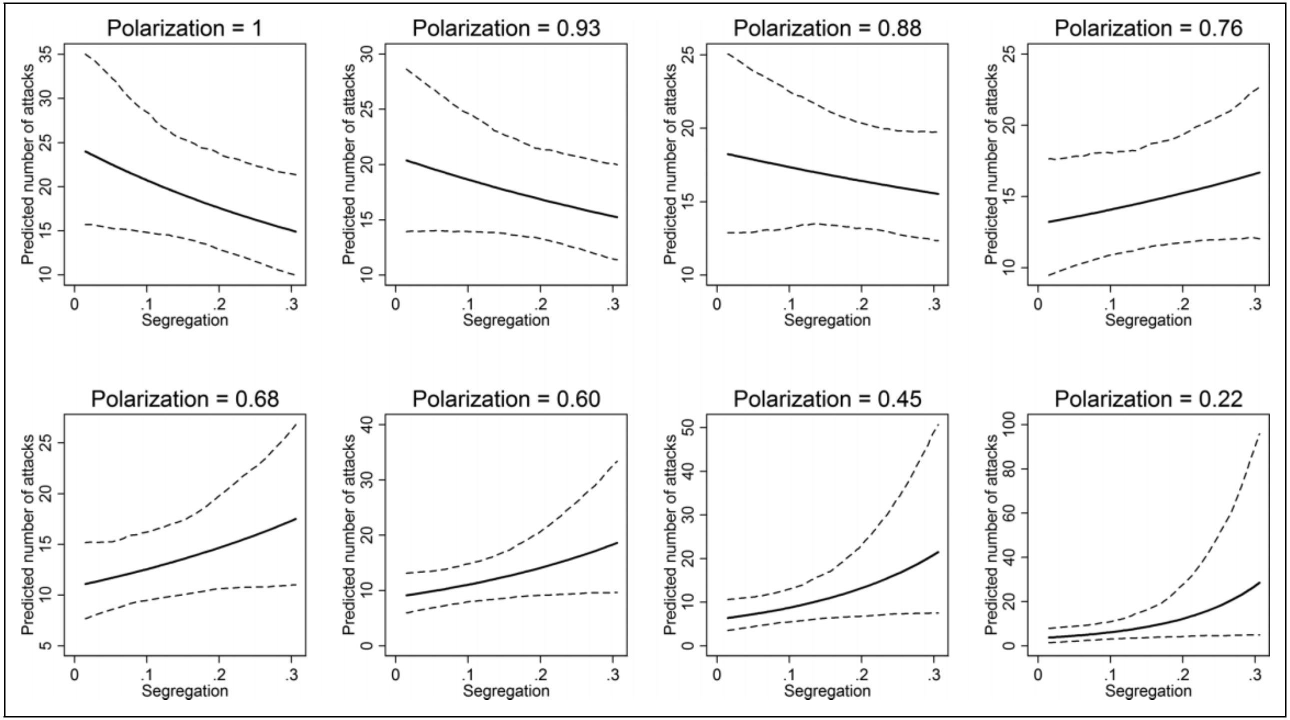

Figure 4. Segregation, polarization, and the number of attacks in Bosnia.

Note: The *y* axis shows the predicted number of attacks based on the model in equation (7). Segregation and polarization are calculated based on the 1991 census data including all three groups. Dashed lines represent the 95 percent bootstrapped confidence intervals.

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Table 3. Marginal Effects for the Bosnian War.

	Marginal effect	Lower bound	Upper bound	Difference	Lower bound	Upper bound
Polarization = 0.99	−10.257	−22.838	0.709			
Polarization = 0.93	−5.846	−14.589	2.143	4.411	0.392	9.172
Polarization = 0.88	−3.103	−10.016	3.409	2.743	0.244	5.549
Polarization = 0.76	4.177	−3.386	12.908	7.280	0.627	15.602
Polarization = 0.68	7.889	−1.884	21.461	3.712	0.168	9.870
Polarization = 0.60	12.036	−0.728	33.221	4.147	0.123	12.687
Polarization = 0.45	20.458	0.021	67.274	8.422	0.152	32.020
Polarization = 0.22	38.488	0.641	157.928	18.029	−0.126	93.479

Note: The dependent variable is the total number of attacks in a municipality. Segregation and polarization are calculated based on the 1991 census data including all three groups. We use only the population of the three groups, discarding other ethnic groups and recalculating the ethnic shares accordingly. The lower and upper bounds are given for the 95 percent bootstrapped confidence interval, calculated based on empirical centiles.

because of relatively few observations with high polarization levels. This is another reason why looking at subnational data, as we do here, is fruitful.

As before, we present the marginal effect of segregation in Bosnia, at eight different polarization levels, in Table 3. The magnitudes of the marginal effects are larger than in India, which in not surprising given that one was a full-scale civil war and the other consists of more sporadic ethnic riots. However, the overall pattern in marginal effects is the same in both countries. The results are also somewhat noisier, but this is not surprising given that we have fewer observations and thus lower statistical power. Nonetheless, every difference but one between segregation effects across polarization levels is significant.

Robustness Checks

We must ensure that our key results on segregation are robust to the inclusion of potentially confounding variables previously discussed in the conflict literature. In particular, the coefficients on segregation and its interaction term with polarization, β_2 and β_3 from equation (7), and the associated standard errors, should remain relatively stable after the inclusion of other potential confounds. For reference, the first column of Tables A4 and A5 in the Online Appendix shows the coefficient estimates from our main specifications for India and Bosnia, respectively, which served as the basis for the graphs and tables of marginal effects presented in the previous sections.

The remaining columns of Tables A4 and A5 in the Online Appendix show that indeed our results are maintained with the inclusion of other potential confounders (columns 2–3 and 5–6 in Table A4 and columns 2–4 in Table A5). One important control variable is the roughness of terrain, which others have argued provides better

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shelter, making mountainous regions more favorable for conflict (Buhaug and Rød 2006; Fearon and Laitin 2003). For our purposes, the roughness of terrain may also increase segregation by keeping groups further apart.[16] Such increased segregation may make mobilization and intragroup communication easier, lessening collective action problems (Toft 2003). In columns 2 and 4 in Table A4 and column 2 in Table A5, we add variables that capture the roughness of terrain as proxied by elevation. The results remain unchanged.

In our main specification in India, our main control is a factor income scale. In columns 3 and 6 of Table A4, we replace the factor scales with what we deem the most important components (share of rural population, miners, and migrants). We further include several other important controls that have been shown to affect conflict, such as two measures of economic inequality (Banerjee, Iyer, and Somanathan 2005; L. M. Esteban and Ray 2012), rainfall (Miguel, Satyanath, and Sergenti 2004), and the district balance along another important dimension of conflict—caste (Varshney 2003). The results are again broadly unchanged.

In addition to terrain ruggedness, major roads and borders can attract greater fighting because of strategic importance, such as greater ability to safeguard the passage of supplies and troops (Buhaug and Rød 2006; Novta and Klašnja 2014). In our analysis, this is particularly important in Bosnia. In columns 3 and 4 of Table A5, we include an indicator of the presence of a major road, as well as an indicator of whether the municipality contains an international border.[17] While both variables are correlated with greater attacks, our main results remain substantively unchanged.

Our results therefore appear quite robust to other potential confounds of segregation. In the Online Appendix, we further show that our results are insensitive to different sample definitions, to the presence of other ethnic groups, or the exclusion of outliers (Tables A6–A8).

Discussion and Conclusion

We have shown that when studying the effect of ethnic diversity on conflict, ethnic segregation is an important factor. The article explains how even when countrywide balance between ethnic groups is fixed (i.e., ethnic polarization is fixed), different distributions of ethnic groups into smaller units over which conflict may occur may lead to very different conflict outcomes. This finding provides one potential reason why cross-country studies linking ethnic diversity and conflict have provided mixed results: there may be an important interaction between ethnic segregation and ethnic polarization. We have shown theoretically that when polarization is very high, higher segregation tends to decrease the intensity of conflict, while the opposite is true when ethnic polarization is low. We find strong empirical support for these predictions in two countries characterized with very different types of conflict. Our model predictions are borne out in the context of Hindu–Muslim riots in Indian districts in the 1980s and 1990s, as well as the ethnic civil war in Bosnia in the early 1990s.

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We can think of several interesting extensions of our study. Our theory is directly linked to an index of segregation, calculation of which requires fine-grained data on ethnic composition at the subnational level. Such data are difficult to obtain for many countries due to a lack of consistent and reliable census data. Moreover, these census data would ideally indicate ethnic population shares at very low levels. However, it is possible that other measures related to the index of segregation that have been used in the past literature, such as group concentration (Gurr, Marshall, and Davenport 2009; Weidmann 2009; Wucherpfennig et al. 2011), might also interact with ethnic polarization. This is potentially a fruitful avenue for future research.

In our study, we assume that the cleavage that causes conflict is salient and runs along ethnic lines. However, the dynamic we describe may apply to other important cleavages, such as class, religion, and so on. For example, cities like London, Stockholm, and Paris have recently experienced riots involving immigrants protesting perceived discrimination. The logic outlined in our article may apply to such conflicts as well. Different patterns of segregation between the immigrants and the native population may interact with the size of the immigrant population in a town or a region to produce different patterns of violence. Given the prominence of immigration as a cleavage in many developed countries (e.g., Norris 2005), this may be a worthwhile and fruitful extension of our study.

In our study, we focused primarily on the (initial) spread of conflict. We also argued and showed empirically that the dynamic we describe applies equally well to small and large-scale ethnic conflicts. However, we did not consider the ultimate outcomes once the spread of conflict is completed. For example, our model does not address the question of when the dissatisfied group may prefer secession or regional autonomy to trying to conquer the national power. It would be interesting to examine the factors that interact with segregation and polarization to affect the ultimate goals of groups engaged in conflict. For example, natural resource abundance, which has been shown to strongly influence violence (e.g., Morelli and Rohner 2013), may augment the interactive effect of ethnic segregation and ethnic polarization, in that the regional power won by neighbors in a resource-rich region may encourage even regions with low presence of co-ethnics to start a rebellion, if the resources allow for more effective financing of conflict or greater mobility of man power. In such instances, the dissatisfied group may be more likely to contest the national power than seek regional autonomy.

Authors' Note

Any errors are our own.

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Notes

1. See, for example, Reynal-Querol (2002); Cederman and Gleditsch (2011); Fearon, Kasara, and Laitin (2007); and others for more details.
2. While many studies examine the effect of ethnic diversity on the likelihood of conflict outbreak (e.g., Collier and Hoeffler 1998; Powell 1999; Toft 2003; Weidmann 2009), we assume that the differences between ethnic groups are salient enough to produce conflict.
3. Moreover, the concept of segregation used by Bhavnani et al. (2014) is different from ours—they emphasize the social distance more generally, while we focus on the spatial distribution of ethnic populations. Weidmann and Salehyan (2013) are interested in the effect of a third party—the counterinsurgency—highly specific to the case they study.
4. The public good assumption implies that each member of a group gets the same payoff, which does not depend on the size of their group. J. Esteban and Ray (2011) study the case when conflict may occur over public or private goods.
5. A battle is simply a conflict that results in a victory or a loss.
6. In Novta (2014), another factor that determines the probability of winning is the relative military strength of the two groups. Here, we assume that the groups are of equal strength.
7. One can assume that the local-level leader for each ethnic group enforces the provision of optimal effort by all members of his or her ethnic group in the region, or we could think that the provision of optimal effort is voluntary. We abstract from problems of free riding.
8. For other related indices of segregation, see Reardon and Firebaugh (2002) and Echenique and Fryer (2007).
9. Note that this data limitation likely induces some measurement error in our estimates subsequently, since conflict sometimes takes place within city or village neighborhoods that are smaller than a tehsil (Field et al. 2008).
10. See Table A2 in the Online Appendix for more details on the construction of the factor scale.
11. In fact, if we restrict the range of segregation in the regression, say to an interval [0–0.4], the results are even stronger, since we eliminate the high variance inherent in model extrapolation over regions with little data.

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12. The bootstrapped confidence intervals are not necessarily symmetric, given that they are based on the empirical centiles (the 2.5th and the 97.5th percentile of the bootstrapped distribution of marginal effects).
13. For more information on the coding and comparisons to other data sets, see Novta (2013, chap. 3) and Novta and Klašnja (2014).
14. The dependent variable is once again overdispersed. In the main regression, we control for total income of the municipal government in 1991 (logged), which we obtained from Weidmann (2011). In the Online Appendix, we show the results when other potentially important controls are included.
15. Based on data from Montalvo and Reynal-Querol (2005), the average polarization level in a sample of 137 countries is 0.52 (and the median is 0.57), while the 90th percentile country has polarization level of 0.81.
16. We thank an anonymous reviewer for pointing this out.
17. In India, these considerations are far less important, given that the conflict is entirely internal and that very few districts border another country.

Supplemental Material

The online appendices are available at http://jsr.sagepub.com/supplemental.

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