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Fearon–Kalyvas Model:
Toward a Unified Model of Battles and Violence in Civil War

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Keywords: Civil war, Armed conflict, Anti-civilian violence, Game theory, Bargaining, Territorial control.

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Abstract

Fearon (1995) and Kalyvas (2006) have arguably made the most influential contributions to conflict studies in recent decades. However, scholars tend to use their models separately—Fearon's for conflicts between armed groups and Kalyvas's for violence against civilians—overlooking how they inform each other. We propose a model that unifies these classical theories. The new model, Fearon–Kalyvas model, highlights the crucial role of the relative efficacy of battles and violence. When fighting has better prospects than violence, armed groups attack their adversaries to avoid intermediate territorial control and violence against civilians. Therefore, unlike in Kalyvas (2006), intermediate territorial control does not necessarily result in violence against civilians. Theoretically, this suggests that the "cost of peace"—maintaining control through violence—can result in a bargaining failure. Empirically, our model implies a selection bias: territorial control is endogenous to the efficacy of violence, and this endogeneity can bias naïve regression estimates.

Keywords: Civil war, Armed conflict, Anti-civilian violence, Game theory, Bargaining, Territorial control.

Fearon (1995; 2004) and Kalyvas (2006) have arguably made the most influential contributions to conflict studies over the last few decades (Balcells and Stanton 2021; Valentino 2014; Walter 2009).[1] Many scholars have tested and extended their models (see Balcells and Stanton 2021; Kalyvas 2012; Reiter 2003; Mason 2009; Valentino 2014; Walter 2009 for reviews). However, scholars tend to use two models separately for different outcomes—Fearon's (1995; 2004) for conflict between armed groups and Kalyvas's (2006) for violence against civilians. This eclectic approach leaves an important question: how can the models speak to each other?

We argue that a more integrated approach is necessary to better understand both conflicts between armed groups and violence against civilians.[2] To this end, we first formalize Kalyvas's (2006) argument parsimoniously, in which an armed group uses violence to punish defectors—citizens who collaborate with the group's adversaries.[3] The model replicates Kalyvas's (2006) key findings: in an irregular war where preventing civilian defections is key to military success, disloyal civilians defect at an intermediate level of territorial control, prompting the armed group

[1] Other influential studies include Kydd and Walter (2002) on spoilers and Weinstein (2006) on resource endowment. Here, we consider only theoretical contributions.

[2] We use *conflicts* for *battles* (military interactions between armed groups) and *wars* (sets of battles), and *violence* to refer to selective or indiscriminate killings of civilians. *Armed groups* are organized actors with military capabilities, such as national governments, rebels, and militias.

[3] Kalyvas (2006) formalizes his theory (195–209). However, his model does not include violence as a strategic choice and focuses primarily on the strategic interactions between a local defector and denouncer. Moreover, the model involves numerous parameters, which hinders further extension. Therefore, we consider his formal model as the local-level foundation of our model.

to selectively kill defectors. Conversely, anti-civilian violence does not occur under strong territorial control, where a credible threat of punishment deters defection, or under weak territorial control, where an armed group lacks the capability for selective killings.

This formalization allows us to extend the Kalyvas model into what we call the *Fearon–Kalyvas* model, in which armed groups bargain over territorial control. Armed groups may literally negotiate territorial control (Aponte González et al. 2024; Blair, Chenoweth, et al. 2022; Gade et al. 2019; Hartzell and Hoddie 2003; Hartzell et al. 2001; Walter 1999) or more implicitly collude for shared control (Hazen 2013; Kaldor 2001; Staniland 2012; Wagner 2007). This bargaining process creates a dilemma. An armed group can avoid a costly battle by conceding a certain level of territorial control to its adversary (e.g., allowing the adversary's control at nighttime; Kalyvas 2006; West 1985). However, such an agreement results in an intermediate level of territorial control, which, according to the Kalyvas model, requires violence against civilians. Thus, the group is forced to choose fighting enemies for complete control or killing civilians under incomplete control. The armed group's choice depends on the relative efficacy of battle and violence. Ironically, an agreement intended to avoid a battle can cause another bloody outcome: violence against civilians.

These analytical findings provide new insights into the study of conflict and violence. First, unlike Kalyvas (2006) who assumes that territorial control is exogenous (132–138), we endogenize territorial control to bargaining between armed groups, thereby suggesting the potential for selection bias in regression estimates. In our model, when violence against civilians has better prospects than battle, an armed group accepts intermediate control and resorts to violence against civilians. Thus, territorial control tends to be intermediate when anti-civilian violence is likely to be effective. This indicates that intermediate territorial control is confounded by the efficacy of violence against civilians. Given that the efficacy of violence increases the likelihood of violence against civilians, naïve regressions—including those in Kalyvas (2006)—overstate the effects of intermediate territorial control. This selection bias highlights the need for improved research designs (Asal and Rethemeyer 2008; Calle and Sánchez-Cuenca 2015; De la Calle 2017; Kalyvas and Kocher 2009; Liu 2024; Stewart and Liou 2017; Weber 2024; Welsh 2023) and more precise understandings of the causes of territorial control (Anders 2020; Aronson et al. 2024; Blair et al. 2024; Rubin 2020; Uribe and van Baalen 2024).

Second, unlike classical bargaining models (Fearon 1995; 2004), our model accounts for a cost of peace—the cost of maintaining territorial control through violence against civilians—providing a new logic of bargaining failure. Rather than commitment problems or asymmetric information, our explanation is based on the inefficiency of a negotiated settlement; a negotiated settlement can result in intermediate territorial control, which, according to Kalyvas (2006), requires violence against civilians. When fighting is more efficacious than anti-civilian violence, an armed group has positive incentives to fight. Thus, unlike prior studies that examine the economic inefficiency of peace (Coe 2018; Monteiro and Debs 2020; Slantchev 2012), domestic political benefits of war (Davis 2023; Debs and Goemans 2010; Qiu 2022), and costs for prolonged armament under peace (Fearon 2018; Jackson and Morelli 2009; Powell 1993), our model highlights another cost of peace: anti-civilian violence under incomplete territorial control, and, more broadly, the governance costs (Acharya and Lee 2018; 2022).[4]

[4] While several studies extend the logic of commitment problems (Coe 2018; Fearon 2018; Monteiro and Debs 2020), other studies explain war without referring to commitment problems (Davis 2023; Debs and Goemans 2010; Slantchev 2012). Our model is similar to the latter.

Third, and more technically, several existing models also examine a government, a rebel group, and civilians under endogenous territorial control.[5] However, these models either left out violence against civilians (Berman et al. 2011; Siqueira and Sekeris 2012) or battles between armed groups (Zhukov 2013) from the analyses. Tyson and Smith (2018) offer the closest model; however, their focus is on regime change rather than variation within the civil war. Finally, our model relates to Acharya and Lee (2018; 2022), who consider two states providing governance to citizens with costs increasing with distance. They show that, with repeated interactions, states geographically divide territories. Our model extends their model by specifying the functional form of governance costs (i.e., Kalyvas model) and considering how the governance costs can explain a bargaining failure.[6]

Kalyvas Model

Suppose citizens D reside in a territory controlled by an armed group G (either a government or a rebel group). The territory can represent a village, a province, or even an entire country. G's control over the territory—defined as "the extent to which actors are able to establish exclusive rule on a territory" (Kalyvas 2006, 111)—is denoted by $\alpha \in [0, 1]$, and is assumed to be exogenous in this

[5] Other models focus solely on interactions between armed groups (Nygård and Weintraub 2014; Carter 2015; Bar-El 2009; Mesquita and Shadmehr 2023), a single group and citizens (Beber and Blattman 2013; Bueno de Mesquita 2013; Gates 2002), or treat territorial control as exogenous (Bhavnani et al. 2011; Intriligator and Brito 1988; Rueda 2017; Zhukov 2013).

[6] Although Acharya and Lee (2022; Chapter 5) consider interstate war, the logic is based on private information over governance costs. Our model is based on complete information, and bargaining fails due to the inefficiency of a negotiated settlement.

model. G's objective is to maintain territorial control. However, citizens D may be disloyal and willing to collaborate with G's adversary by leaking tactical information (e.g., deployment plans and G's collaborators). We denote D's incentive to defect by $r > 0$ (e.g., loyalty to G's adversary).[7] Importantly, G does not know a priori whether D is loyal or disloyal. If D safely defects and the information is leaked, G suffers a strategic setback and thus loses by $s \in (0, 1)$. If D does not defect, G retains control and D does not receive r.[8]

However, if D attempts to defect, it rings a bell.[9] G identifies the suspects and decides whether to kill or release them. Importantly, the "suspects" may or may not include the defectors. With probability $p \in [0, 1]$, G correctly identifies the defectors, and otherwise, G mistakenly casts doubt on other innocent civilians. As Kalyvas (2006) argues, G's ability to identify defectors (p) depends on territorial control; strong control allows G to monitor and receive correct information from locals. In contrast, with weak control, G cannot precisely identify individual defectors and casts suspicion on a fuzzier set of civilians (e.g., ethnic groups), resulting in a low value of p. For simplicity, we assume $p = f(\alpha) = \alpha$. If G releases the suspects, D safely defects and receives r,

[7] Kalyvas (2006) notes that motivation behind collaboration, which is a flip side of defection, may reflect "genuine political preferences, expectations of personal gain, private grudges, coercion and blackmail, or survival consideration" (105).

[8] We assume that D defects when D is indifferent on a defection. Although D might use violence against civilians even without any information about defection, we follow Kalyvas (2006) and model anti-civilian violence as a mean to punish defection.

[9] The "bell" includes information provided by G's police and/or local collaborators. Kalyvas (2006, 195–209) provides more detailed discussion on this mechanism (see footnote 3 of this manuscript).

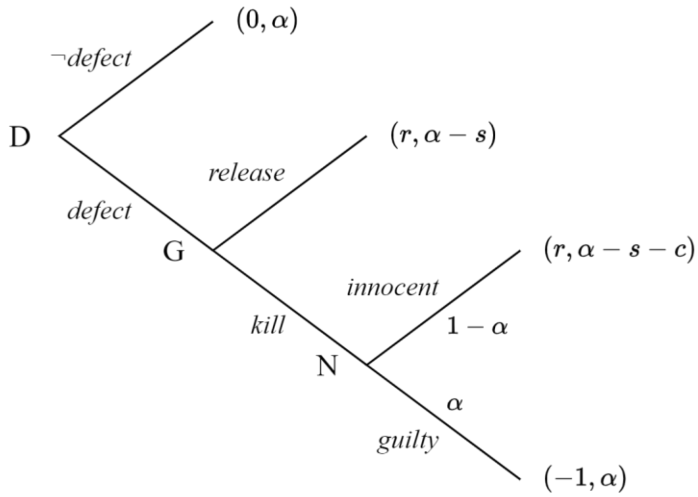
while G loses by s. By contrast, if G successfully kills the defectors, G prevents the defection, while D receives the worst payoff -1 (i.e., death). Finally, if G mistakenly kills other innocent civilians, not only does D survive and safely defect, but G's reputation is tarnished, resulting in the alienation of domestic or international constituents (Kalyvas 2006; Schutte 2017).[10] The cost of mistargeting is denoted by $c \in (0, 1)$.[11] Figure 1 model is illustrated in Figure 1.[12]

[10] The payoff at the final node, {D: defect, G: kill, N: innocent}, is the payoff of the defectors D instead of the killed innocent civilians.

[11] The results are similar even when G incurs a fixed cost of anti-civilian violence, regardless of the suspects' identity (i.e., G's utility for {defect, kill, guilty} is changed to $\alpha - c$). The lower threshold of α in Proposition 1 is changed to $\frac{c}{s}$, and the scope condition changes accordingly.

[12] We assume that G releases the suspects when indifferent on violence against civilians.

Figure 1. Kalyvas Model



The figure represents the Kalyvas model, where citizens D living under G's control tries to defect to G's adversary. The parentheses contain D and G's payoffs. The following summarizes the symbols in the model.
G: Current controller of a territory.
D: Civilians who can potentially defect from G to R.
N: Nature (probabilistic outcomes).
α: G's territorial control.
c: Penalty to G for killing innocent suspects.
s: G's loss due to D's defection.
r: D's incentive for defection.

Note that the model omits the local-level interaction between defectors and denouncers–citizens who report defectors to G. In Kalyvas (2006), denunciation is a mechanism that explains why territorial control affects the success rate of G's violence against civilians, with the dynamics determined by territorial control (196–202). We therefore abstract from this mechanism and present a "reduced form" of his argument. Both his and later empirical studies focus on the reduced-form effect of territorial control on anti-civilian violence (Calle and Sánchez-Cuenca 2015; Kalyvas 2006; Kalyvas and Kocher 2009; Weber 2024; Welsh 2023). Finally, the success rate of killing defectors, $p = f(\alpha) = \alpha$, represents the selectiveness of G's violence against civilians (i.e., violence with low p is indiscriminate).[13] This indicates that the model captures both selective and indiscriminate violence along a continuum.

Equilibrium

The model has a unique pure-strategy subgame perfect equilibrium (SPE). Proposition 1 states that when G's costs of violence are small relative to its losses owing to D's defection, anti-civilian violence occurs only at an intermediate level of territorial control—a result that replicates Kalyvas (2006).[14]

Proposition 1. When $c < sr$, the game reaches three different outcomes depending on α;

(i) D defects, and G releases the suspect for $\alpha \in \left[0, \frac{c}{s+c}\right]$;

(ii) D defects, and G kills the suspect for $\alpha \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$;

(iii) D does not defect, and G kills the suspect for $\alpha \in \left(\frac{r}{1+r}, 1\right]$.

Violence against civilians occurs on the equilibrium path only in case (ii).

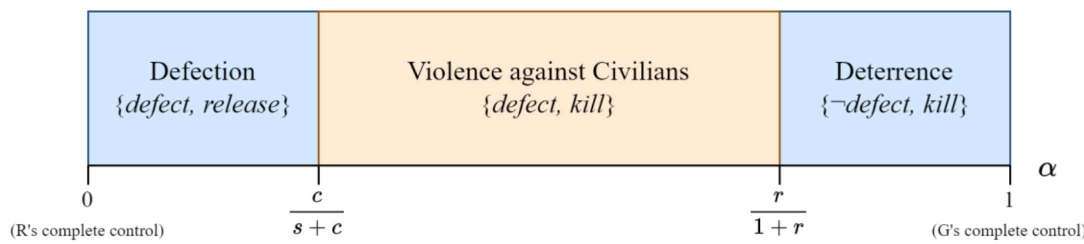
Under weak control $\alpha \in \left[0, \frac{c}{s+c}\right]$, G cannot identify defectors and thus does not kill them. Under strong control $\alpha \in \left(\frac{r}{1+r}, 1\right]$, G can kill defectors with certainty, which deters D's defection. Only under intermediate control $\alpha \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$, D defects, and G uses violence against civilians. Proposition 1 is summarized in Figure 2. Applying a similar model to G's adversary replicates Kalyvas's (2006) five categories, in which anti-civilian violence occurs under strong but incomplete control by one party. Proposition 1 also implies that G's violence tends to be

[13] This aligns with Kalyvas (2006); "[v]iolence is selective when there is an intention to ascertain individual guilt" (142).

[14] See Appendix A1 for proof.

indiscriminate when the cost of violence c is low and/or the cost of defection s is high. In such cases, G kills suspects even when they are unlikely to be defectors.

Figure 2. Equilibrium Outcomes of the Kalyvas Model



The figure represents the equilibrium outcomes regarding G's territorial control α when $c < sr$ holds (Assumption 1). The texts within the curly brackets indicate the equilibrium choices.

Importantly, Proposition 1 is subject to the scope condition $c < sr$; G must be willing to use violence against civilians (i.e., low c) and have strong incentives to prevent defection (i.e., high s), whereas D must have positive incentives to defect (i.e., high r).[15] Following Kalyvas (2006), who compellingly argues that preventing defection and thus securing tactical information, is crucial in *irregular wars* (87–111), we follow him and assume $c < sr$ in subsequent analyses (Assumption 1).

Exogenous Territorial Control?

A crucial assumption in the Kalyvas model is that territorial control α is exogenous. Although Kalyvas (2006) argues that "control hinges largely on military effectiveness; in turn, this type of effectiveness is often (but not always) determined by geography" (132). In practice, however, armed groups often formally or informally bargain over territorial control. For instance, according

[15] If this condition does not hold, case (ii) disappears, and violence does not occur. Similarly, in the following Fearon–Kalyvas model, G never uses violence. Instead, G and R engage in battle when G prefers fighting to tolerating D's defection, while R prefers fighting to the status quo without D's defection.

to ACLED (2019; Africa from 2019 to 2023), 34% of territorial transfers were non-violent, whereas 37% and 28% were violent captures by governments and rebels, respectively. Notably, such "bargaining" need not involve direct communication; it only requires common knowledge of relevant parameters (Chadefaux 2020; Fearon 1995; Reiter 2003; Walter 2009). For example, rebels facing militarily superior government forces may anticipate the adversary's demand (i.e., complete control) and voluntarily abandon their positions (Albrecht and Koehler 2018).

Thus, a more relevant question is whether armed groups can explicitly or implicitly agree to *intermediate* levels of territorial control, wherein one side has dominant control whereas the other side can still exercise some influence. This occurs when armed groups explicitly or implicitly agree on the presence of both sides in a territory. For instance, rebels may officially retreat but remain hidden inside or outside a village, while government forces refrain from attacking them. In Syria, the government permitted a rebel group to remain in East Aleppo until it reclaimed parts of the area during the Syrian Civil War.[16] Similarly, as Kalyvas (2006, 212) himself emphasizes, armed groups can implicitly agree on their *hours* of control. During the Vietnam War, the government militia ruled the village of Binh Nghia during the day, while the Viet Cong collected taxes at night.

> The PFs [militias] and the Viet Cong had certain rules to their war, understandings which were kept because, and only so long as, they were mutually advantageous. What often has been called accommodation frequently has been nothing more than

[16] Reuters. 13 December 2016. "Timeline: The battle for Syria's Aleppo city." Available at: https://jp.reuters.com/article/world/timeline-the-battle-for-syrias-aleppo-city-idUSKBN1412BO/ (accessed on 11 April 2025).

> a precarious balance of power, perceived as such by both sides. Deterrence is a better word than accommodation to describe a situation wherein each side is unwilling to undertake certain acts while the other side retains capability to retaliate in kind (Kalyvas 2006, 241; West 1985, 219–20).

Armed groups also bargain over control of the war economy. In the Bosnian War, such bargaining was even more prevalent than direct fighting.

> Apart from a few strategic points, … there was relatively little fighting between the opposing sides. There were, indeed, various examples of cooperation, mostly in the black market, but also differing short-term and local military cooperation between different parties. On one occasion, UNPROFOR (the United Nations Protection Force) intercepted a telephone conversation between the local Muslim commander in Mostar and the local Serb commander discussing the price in German market to be paid if the Serbs would shell the Croats. The nadir was reached when the Serbs took Mount Igman, overlooking Sarajevo, in July 1993; the paramilitary groups at that time defending Mount Igman were ready to 'sell' their positions in order to control the black-market routes (Kaldor 2001, 53).

In other cases, including the Sierra Leone Civil War, armed groups colluded to loot civilians.

> [Government forces] withdraw from a town, leaving arms and ammunition for the rebels behind them. The rebels pick up the arms and extract the loot, mostly in the form of cash, from the townspeople and then they themselves retreat. At this point, the government forces reoccupy the town and engage in their own looting, usually of property (which the rebels find hard to dispose of) as well as engaging in illegal

mining (Kaldor 2001, 112; Keen 1995, 13–14; see also Raleigh and De Bruijne 2017).

Similar patterns of cooperation and bargaining are also reported in Afghanistan (Staniland 2012), Angola (Gamba and Cornwell 2000), Colombia (Aponte González et al. 2024), Kivu conflict in the Democratic Republic of the Congo (Prunier 2008), Myanmar (Callahan 2005; Smith 1999), Naxalite insurgency in India (Chakravarti 2008), Ogoni conflict in Nigeria (Reno 2000), and Peru (Simpson 1994). Thus, as Staniland (2012) argues, "[b]argains, deals, and tacit understandings between states and insurgents are common in civil wars" (243). In the following section, we generalize the Kalyvas to the Fearon–Kalyvas model by allowing armed groups to bargain over territorial control.

Fearon–Kalyvas Model

Consider an armed group G currently controlling a territory (e.g., village, province, or even country) and its adversary group R.[17] One day, R arrives in G's territory. G then makes an offer $x \in [0, 1]$ to decide G and R's control over the territory. An offer $x = 1$ means that G demands complete control over the territory, whereas $x = 0$ means G abandons the territory. Intermediate values $x \in (0, 1)$ involve G's partial retreatment or an explicit and implicit agreement on shared

[17] G and R can be a government and rebel group, a rebel group and government, two governments (i.e., irregular interstate war), or two rebel groups (i.e., non-state war). When G and R are a government and rebel group, and a territory is an entire country, the "battle" corresponds to civil war as in the classical model of Fearon (1995). When a territory is a village or province, the model explains a battle during civil war (Fearon 2004).

control. R can accept or reject an offer.[18] When R rejects this, G and R fight and incur the costs $d_G, d_R \in (0, 1)$. Following Fearon (1995; 2004), we assume that the battle is decisive and costly; G wins with a probability of $q \in (0, 1)$, and the winner obtains complete control over the territory. Consistent with the bargaining literature, we assume $q + d_R < 1$ to focus on substantively important cases (Assumption 2).[19]

After the intergroup bargaining, G plays the Kalyvas game. The subgame is identical to the model presented in Figure 1 except that D's successful defection transfers tactical information and thus strategic advantage s from G to R. Figure 3 represents the Fearon-Kalyvas model, where $\mathbf{K}(\alpha)$ refers to the Kalyvas subgame with a certain level of G's territorial control α. For instance, after a victory in a battle, G plays the Kalyvas subgame with complete control $\mathbf{K}(\alpha = 1)$, while G's loss entails $\mathbf{K}(\alpha = 0)$. By contrast, after a negotiated settlement, the territorial control depends on the agreement: $\mathbf{K}(\alpha = x)$.

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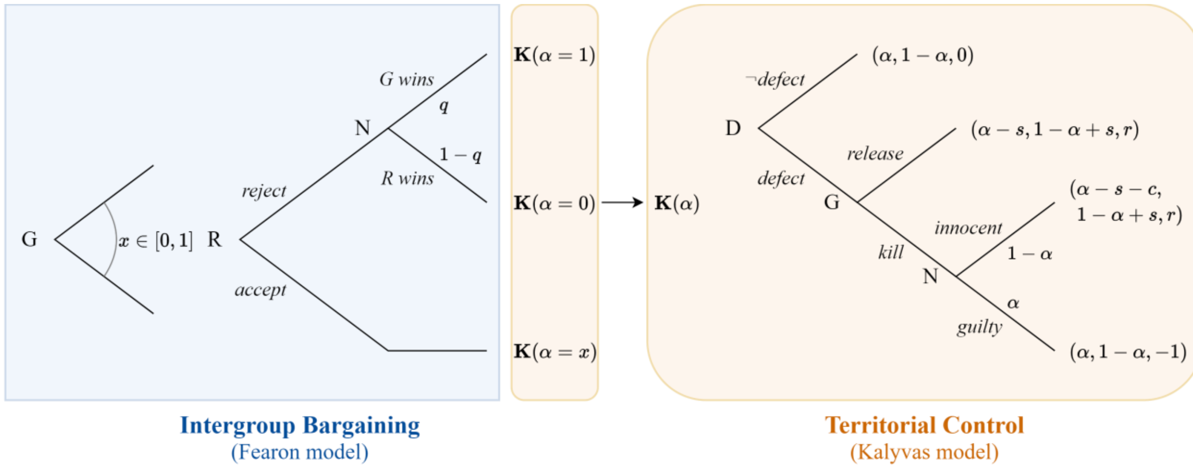
[18] R is assumed to accept the offer when R is indifferent between accepting and rejecting the offer.

[19] When $q + d_R \geq 1$, R accepts even the worst offer $x = 1$, and thus G always offers $x = 1$. Battle or violence against civilians never occurs.

Figure 3. Fearon–Kalyvas Model



The figure represents the Fearon–Kalyvas model, where G negotiates the control of a territory with its adversary R. If R rejects G's offer, G and R fight and incur the costs d_G and d_R, respectively. After the bargaining, G plays the Kalyvas game $\mathbf{K}(\alpha)$, where D chooses to kill or release a suspected defector with a given level of territorial control α. The parentheses contain G, R, and D payoffs in the subgame (the order differs from that in Figure 1). The following summarizes the symbols in the model.

G: Current controller of a territory.
R: Challenger to G's territorial control.
D: Civilians who can potentially defect from G to R.
N: Nature (probabilistic outcomes).
x: G's offer of territorial control.
q: Probability of G's victory in a battle.
α: G's territorial control (endogenous).
$\mathbf{K}(\alpha)$: Kalyvas subgame with G's territorial control α.
d_G, d_R: G and R's costs of battles (e.g., combatant deaths).
c: Penalty to G for killing innocent suspects (e.g., domestic and international backlash).
s: Transfer of strategic advantage from G to R due to D's defection (e.g., leak of G's tactical information).
r: D's incentive for defection (e.g., loyalty to R).

Comments on the Model

A few caveats are in order. First, we assume that G's winning probability q is exogenous. However, G's military capabilities may depend on territorial control. One way to model mutual endogeneity is through a repeated game, where q depends on territorial control in the previous period. Alternatively, one may create a one-shot game, where G and R first play the Kalyvas game, determine the value of q, and then bargain with each other ("Kalyvas–Fearon" model). Although such extensions are promising, many studies have already endogenized q (for instance, see Fearon

2018; Powell 2012; 2013 among many others). Therefore, we focus on the endogeneity of territorial control, which, in our view, is under-explored in the literature.

Second, the model assumes that a battle results in either side's complete control. However, battles can result in a stalemate or an intermediate level of control, which can lead to violence against civilians (Aronson et al. 2024). Although the model can be extended to such cases, we surmise that our results hold unless a battle is almost surely accompanied by anti-civilian violence. Otherwise, G still faces a trade-off between fighting a battle with a lower likelihood of anti-civilian violence and striking a deal that surely comes with anti-civilian violence. Therefore, we prefer the simple setup shown in Figure 3 because it distills the core logic of our argument.

Third, the model omits the Kalyvas subgame for R. However, in reality, R also plays the Kalyvas subgame. Although the extension is relatively straightforward, we use a simpler model to illustrate how the addition of a Kalyvas subgame changes Fearon's baseline model, and hence to distill the core results of the model integration. We surmise that adding the subgame for R makes battles even more prevalent because G and R's bargaining ranges are even less likely to overlap. We leave it to the task of future studies to prove those conjectures; our objective is to integrate Fearon (1995) and Kalyvas (2006) and hence to point a new direction for future studies.

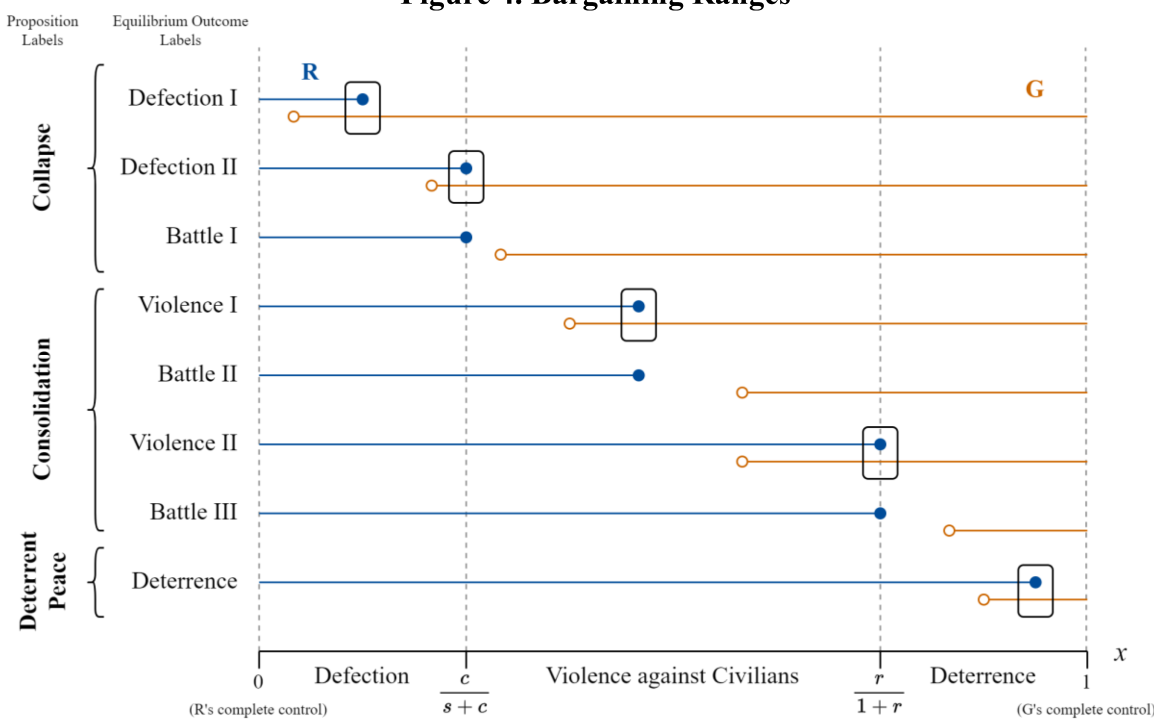
Summary of Equilibrium Outcomes

The solution concept is a pure strategy SPE. Given that Proposition 1 has already characterized the equilibrium of the Kalyvas subgame, we only consider G's optimal offers and R's responses given the subgame equilibrium.[20] Figure 4 summarizes the bargaining ranges of G and R (i.e., the ranges of acceptable offers) for each equilibrium outcome presented on the vertical axis. The label

[20] See Appendix A2 for proof.

for each equilibrium outcome corresponds to that in Appendix A2. For interpretation, we group the equilibrium outcomes into **Deterrent Peace**, **Consolidation**, and **Collapse**. Notably, unlike Fearon (1995), the results include non-overlapping bargaining ranges and, thus, battles even with complete information.

Figure 4. Bargaining Ranges



The figure represents G and R's bargaining ranges (i.e., the ranges of acceptable offers; filled circle ● for R's range, and empty circle ○ for G's range) in each equilibrium outcome. The vertical axis denotes the labels of the equilibrium outcomes (see Appendix A2) and those used in the following propositions (bold letters). The horizontal axis denotes the value of $x \in [0, 1]$ and corresponding outcomes in the Kalyvas subgame. The rectangular boxes ☐ indicate equilibrium agreements if any.

Cases of High q: G's Military Superiority

First, when G has military superiority over R, G makes few concessions and holds near-complete control over the territory, thus deterring D's defection.

Proposition 2 (Deterrent Peace). For $q \in \left(\left(\frac{1}{1+s}\right)\left(\frac{r}{1+r} + s - d_R\right), 1 - \frac{d_R}{1+s}\right)$, G offers $x^* = q + d_R - s(1 - q)$, which R accepts. D does not defect, and if D were to defect, G would kill the suspects.

In this case, G has military superiority, which forces R to accept G's near-complete control. The agreement does not hurt G because G's near-complete control deters D's defection.

At the micro level, this result represents a situation where R has weak military capability and thus cannot effectively challenge G's control. A macro-level analog is a sovereign state that monopolizes military capacity, precludes any challenges or insurgents, and completely controls its territory (Weber 1946). In both cases, G's military superiority forestalls its adversary's challenges and deters its citizens' defection. Peace is maintained in the shadow of strong coercive power. This aligns with the rationale of "guns and butter" where a government buys peace by increasing military investment (Coe 2018; Fearon 2018; Jackson and Morelli 2009; Meirowitz and Sartori 2008; Monteiro and Debs 2020; Powell 1993; 2013).

Cases of Medium q: Balanced Military Capabilities

However, the situation is different when the military balance is less favorable to G. When R is strong enough to reject G's near-complete control but is willing to accept intermediate control, G must choose to share intermediate control with R or fight for complete control. Because maintaining intermediate control requires violence against civilians (Proposition 1), the choice is reduced to violence or battle, both of which allow G, if successful, to consolidate territorial control. This choice depends on the relative efficacy of battle and anti-civilian violence.

Proposition 3 (Consolidation). For $q \in \left(\left(\frac{1}{1+s}\right)\left(\frac{c-s^2}{s+c} - d_R + s\right), \left(\frac{1}{1+s}\right)\left(\frac{r}{1+r} + s - d_R\right)\right]$, when $\tau_{battle} \leq \tau_{violence}$, G offers $x^* = \frac{\tau_{violence}+s+c}{1+s+c}$, which R accepts. D defects, and G kills the suspects. By contrast, when $\tau_{battle} > \tau_{violence}$, G offers $x^* > \frac{\tau_{violence}+s+c}{1+s+c}$, which R rejects, and a battle occurs.

Definition (Efficacy of Battle and Anti-civilian Violence). The efficacy of battle for G is $\tau_{battle} = q - d_G - s(1-q)$. The efficacy of violence against civilians for G is

$$\tau_{violence} = \begin{cases} q + d_R - c + \frac{q+d_R+qs}{1+s}c - s(1-q) & \text{for} \quad q \in \left(\left(\frac{1}{1+s}\right)\left(\frac{c-s^2}{s+c} - d_R + s\right), \left(\frac{1}{1+s}\right)\left(\frac{r-s}{1+r} + s - d_R\right)\right] \\ \frac{r-c-s}{1+r} & \text{for} \quad q \in \left(\left(\frac{1}{1+s}\right)\left(\frac{r-s}{1+r} + s - d_R\right), \left(\frac{1}{1+s}\right)\left(\frac{r}{1+r} + s - d_R\right)\right] \end{cases}.$$

In this equilibrium outcome, G kills D only if the expected payoff of anti-civilian violence $\tau_{violence}$ exceeds that of a battle τ_{battle}. With relatively balanced military capabilities, G may share intermediate control with R and use violence against the civilians. However, this occurs only when G sees anti-civilian violence as a better prospect than battle. When the battle is more efficacious, G refuses the intermediate controls and fights. Thus, unlike Kalyvas's propositions (2006, 132–38), military balance alone does not determine territorial control or violence against civilians. The results also depend on the relative efficacy of battle and anti-civilian violence, τ_{battle} and $\tau_{violence}$. The efficacy of anti-civilian violence takes a complicated form, as it depends on a negotiated settlement x^*, which in turn differs across q.

These cases characterize the processes by which G consolidates territorial control. At the micro level, for instance, a commander can either fight against an adversary, or explicitly or implicitly co-opt with the adversary and kill disloyal citizens (Kaldor 2001; Keen 1995; Reno 2000), both of which can potentially help the consolidation of territorial control. At the macro level, a government can either fight a civil war or accommodate rebels and violently kill defectors (Arriola and Johnson 2014; Bratton and Walle 1997; Chehabi and Linz 1998). In both cases, G's strategies can potentially fail: G may be defeated by R or may fail to kill the defectors. With a militarily capable challenger, G must take risks to consolidate territorial control.

Cases of Low q: R's Military Superiority

Finally, when R is militarily superior, even dire outcomes await G. Backed by military superiority, R accepts only near-complete territorial control. As a result, G must either gamble in a battle for complete control or admit R's near-complete control.

Proposition 4 (Collapse). For $q \in \left(\left(\frac{1}{1+s}\right)\left(\frac{c}{s+c} - d_R\right), \left(\frac{1}{1+s}\right)\left(\frac{c-s^2}{s+c} + s - d_R\right)\right]$, when $q \leq \left(\frac{1}{1+s}\right)\left(\frac{c}{s+c} + d_G\right)$, G offers $x^* = \frac{c}{s+c}$, which R accepts. D defects, and G does not kill the suspect. By contrast, when $q > \left(\frac{1}{1+s}\right)\left(\frac{c}{s+c} + d_G\right)$, G offers $x^* > \frac{c}{s+c}$, which R rejects, and a battle occurs.

Proposition 5 (Collapse). For $q \in \left(-d_R, \left(\frac{1}{1+s}\right)\left(\frac{c}{s+c} - d_R\right)\right]$, G offers $x^* = q + d_R + qs$, which R accepts. D defects, and G does not kill the suspects.

While R's vast military superiority always forces G to accept R's near-complete control (Proposition 5), R may gamble on a battle with a slightly favorable military balance (Proposition 4). However, in both cases, G incurs a greater risk, either by allowing defection or being defeated on a battlefield.

These cases represent the collapse of G's territorial control from the inside (i.e., defection) or outside (i.e., battle losses). The micro-level analog is a commander who must choose to abandon their position or bet on a dire counter-offensive attack. At the macro level, the situation is similar to the so-called state failure or collapse, where internal challengers (i.e., rebels) and defections from the government are rampant (Bates 2008; Jackson 1993; Krasner 2004). In both cases, G's control is on the verge of collapse. Violence against civilians does not occur because G is so weak that it fails to precisely target defectors.

Prediction

In summary, anti-civilian violence occurs in the equilibrium only when military capabilities are relatively balanced, $q \in \left(\left(\frac{1}{1+s}\right)\left(\frac{c-s^2}{s+c}+s-d_R\right), \left(\frac{1}{1+s}\right)\left(\frac{r}{1+r}+s-d_R\right)\right]$, and anti-civilian violence is more efficacious for G than battle, $\tau_{battle} \leq \tau_{violence}$. Even with the balanced military capabilities, G opts for a battle when $\tau_{battle} > \tau_{violence}$. This implies a conditional substitution: when military capabilities are relatively balanced, battle and anti-civilian violence constitute substitutive choices.

Prediction 1: A battle is more likely when military capabilities are balanced and a battle is more efficacious than anti-civilian violence.

Prediction 2: Anti-civilian violence is more likely when military capabilities are balanced and anti-civilian violence is more efficacious than a battle.

These predictions provide useful insights for the assessment of real-world policies. For instance, increasing the cost of violence against civilians can inadvertently result in a larger number of battles, and armed groups can instead attack their adversaries to consolidate territorial control. Thus, while economic sanctions and "naming and shaming" against human rights violations may deter violence against civilians (Hafner-Burton 2008; Hendrix and Wong 2013; Krain 2012; 2016; Peksen 2009; Urtuzuastigui and Koren 2024), they can potentially increase battles between armed groups. Similarly, an increase in the cost of battles can unintentionally result in violence against civilians. As seen in the case of Colombia, while a ceasefire reduces battles between armed groups, it may allow armed groups to kill civilians (Prem et al. 2020).

Implications for Quantitative Analysis

Although Predictions 1 and 2 are less surprising (Azam and Hoeffler 2002), the model also provides more critical insights into quantitative studies of conflict and violence.

Implication 1: Selection Bias

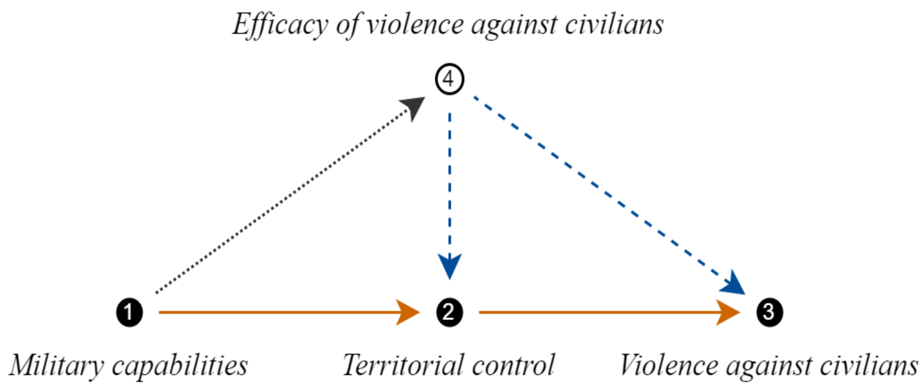
First, in analyzing the effect of territorial control on anti-civilian violence, ignoring the existence of an alternative strategy—battle—can bias the empirical estimates.

> **Implication 1-A (Selection Bias)**. When the low cost of anti-civilian violence increases violence, naïvely regressing anti-civilian violence on the level of territorial control overstates the effects of intermediate territorial control.

> **Implication 1-B (Control for the Bias)**. Controlling for the relative efficacy of anti-civilian violence, the estimated effect of intermediate territorial control on anti-civilian violence should approach zero.

In our model, G and R agree on intermediate control only when their military capabilities are balanced and anti-civilian violence is more efficacious than a battle. Thus, intermediate control is confounded by the efficacy of anti-civilian violence. Because the efficacy of violence increases violence, the naïve regression estimate overstates the effects of intermediate territorial control (Implication 1-A). Figure 5 shows the theoretical relationship in a directed acyclic graph (DAG; Pearl 2009). As shown in Figure 5, without controlling for the efficacy of anti-civilian violence, we cannot distinguish the effect of territorial control on anti-civilian violence ($2 \rightarrow 3$; solid arrow) from the confounding effects of violence efficacy ($2 \leftarrow 4 \rightarrow 3$; dashed arrows).

Figure 5. Directed Acyclic Graph



The figure shows the directed acyclic graph (DAG) derived from the Fearon–Kalyvas model. According to the model, G has an intermediate level of territorial control and uses violence against civilians (2 → 3) when military capabilities are relatively balanced between G and R (1 → 2), and anti-civilian violence is more efficacious than a battle (4 → 2). The effect of intermediate territorial control on violence against civilians (2 → 3), however, cannot be accurately estimated without controlling the efficacy of anti-civilian violence; G is more likely to have an intermediate level of territorial control and use violence against civilians when anti-civilian violence is relatively efficacious (2 ← 4 → 3). Moreover, military capabilities can also influence the efficacy of anti-civilian violence (1 → 4).

One way to address this selection bias is to directly measure and control the efficacy of anti-civilian violence. By controlling for the efficacy of violence against civilians, we can remove bias and, more importantly, adjudicate the Fearon–Kalyvas against Kalyvas's baseline model. Because the Fearon–Kalyvas model predicts that the estimated effect of intermediate territorial control on anti-civilian violence is closer to zero with control for the efficacy of anti-civilian violence (Implication 1-B), we can compare the coefficient estimates with and without the control variable (i.e., the Wald test). A disadvantage of this approach is that, when only imprecise or inaccurate proxies are available for the efficacy of anti-civilian violence measures, we cannot fully control for confounding effects or test the models. Moreover, this approach cannot account for other confounders of territorial control and violence against civilians.

An alternative approach is to focus on exogenous variations in territorial controls. Using natural experiments, instrumental variables, regression discontinuity, or difference-in-differences, researchers can eliminate any confounding bias even without controlling for the efficacy of anti-civilian violence. However, this approach may not allow testing of the Fearon–Kalyvas model against the Kalyvas model. We may compare the estimates with and without these designs, but the difference can be explained by the difference in the estimands (e.g., ATE and LATE) or other confounders. Therefore, empirical scholars should select approaches based on their specific objectives. If they are interested in testing the Fearon–Kalyvas and Kalyvas models, they should measure and control the efficacy of anti-civilian violence. In contrast, if researchers are interested in the causal effect of territorial control on violence, they should use design-based approaches.

Implication 2: Instrumental Variables

One of these design-based approaches is the instrumental variable (IV) design.[21] For example, Liu (2024) uses the distance from a neighboring rebel-sponsoring country as an IV for rebels' territorial control. Our model also has implications specific to IV design.

> **Implication 2 (Violation of Exclusion Restriction)**. When a variable affects the military capabilities of armed groups, using it as an instrumental variable for territorial control may violate the exclusion restriction.

As stated in the definition of $\tau_{violence}$ (p.18 of this manuscript), the efficacy of anti-civilian violence itself depends on G's military capability q (dotted arrow in Figure 5). This implies that the balance of military capabilities can be invalid as an instrumental variable for territorial control (1 → 2 → 3 in Figure 5), not only because military capabilities are potentially endogenous to factors outside of our model (Chadefaux 2011; Debs and Monteiro 2014; Tarar 2013), but also

[21] To the best of our knowledge, no studies have used the other designs (e.g., regression discontinuity) for identifying the effect of territorial control.

because military capabilities affect violence or battles through their effect on the relative efficacy of anti-civilian violence (violation of exclusion restriction; $1 \rightarrow 4 \rightarrow 3$ in Figure 5).

Importantly, this means that even when researchers use more exogenous IVs than military capabilities, the exclusion restriction can be violated if the IVs affect military capabilities (IVs $\rightarrow 1 \rightarrow 4 \rightarrow 3$ in Figure 5). This occurs even when the IVs are exogenous or randomly assigned. In the case of Liu (2022), if the rebels' military capability decreases with distance from their foreign sponsors, the exclusion restriction is violated, and IV estimates can be biased.[22] Thus, it is crucial to check the effect of IVs on military capabilities.

Implication 3: Effects of Military Capabilities

When IVs affect military capabilities, researchers must compromise their conclusions. This is because the effect of military capabilities on battles or violence is complicated, making it difficult to predict the size and direction of the bias.[23]

Implication 3 (Indeterminate Effect of Military Capability). The balance of military capabilities affects the relative efficacy of anti-civilian violence, and the direction and size of the effect depend on specific parameter values.

[22] The outcome variable of Liu (2024) is long-term political development, and hence the exclusion restriction may hold if military capabilities do not affect political development.

[23] Moreover, controlling for military capabilities does not address the problem as it can induce post-IV biases (Glynn et al. 2024).

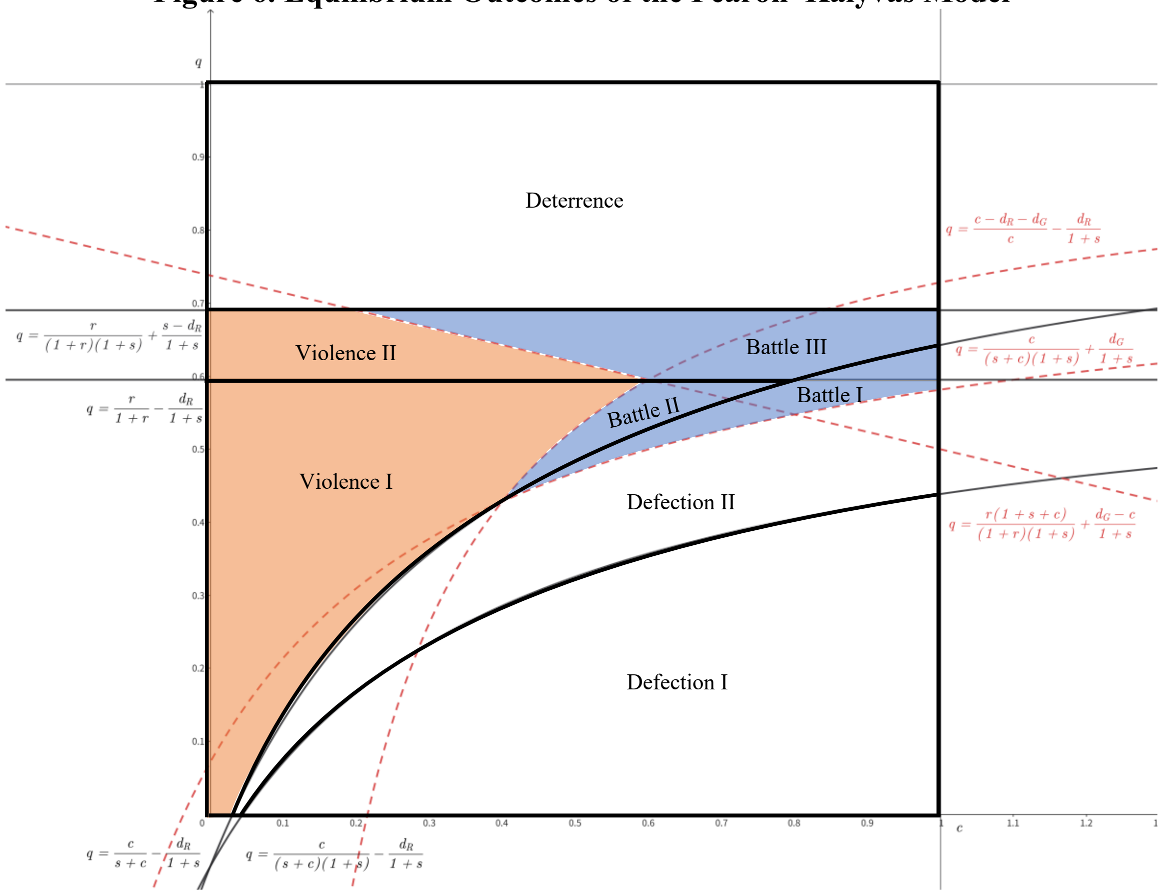
While G's military capability directly raises the efficacy of a battle τ_{battle} (i.e., direct effect),[24] it also strengthens G's bargaining position, allows G's stronger territorial control upon an agreement, and thus increases the efficacy of anti-civilian violence $\tau_{violence}$ (i.e., bargaining effect). Thus, G's military capabilities improve the efficacy of *both* battle and violence against civilians. Depending on the specific parameter values, the direct or bargaining effect outweighs the other effect, making battle or anti-civilian violence more or less likely.

Hence, without specifying other parameters, the effects of military capability on battle and anti-civilian violence are indeterminate. Figure 6 shows the equilibrium outcomes for q and c when $s = 0.4, r = 2, d_R = 0.1,$ and $d_G = 0.1$. When $c = 0.25$, increasing q can change the equilibrium outcome from Violence to Battle. When $c = 0.6$, there is no anti-civilian violence regardless of q. The situation is more complicated with $c = 0.5$, where increasing q can shift the outcome from Battle to Violence, and then Violence to Battle. Figure 6 fixes the values of the other parameters at specific values, and the outcome also changes with their values (see Figure A 3-1 and Figure A 3-2 in Appendix A3 for figures with different values of d_G and r). Given these complexities, we are reluctant to recommend using IVs that affect military capabilities.[25]

[24] G's military capability increases the efficacy of battle by (i) increasing the likelihood of G's victory, and (ii) increasing G's territorial control α after its military victory.

[25] Figure 6 also suggests that violence can occur even with very low q. When the cost of violence c is small, G may almost indiscriminately kill the suspects.

Figure 6. Equilibrium Outcomes of the Fearon–Kalyvas Model



The figure shows the equilibrium outcomes of the Fearon–Kalyvas model (Figure 3) when $s = 0.4, r = 2, d_R = 0.1$, and $d_G = 0.1$. The vertical and horizontal axes are q and c, respectively. The labels of the equilibrium outcomes correspond to those in Appendix A2. "Violence" in the figure refers to violence against civilians.

Replication of Kalyvas and Kocher (2009)

We illustrate Implications 1 by replicating Kalyvas and Kocher (2009), who analyze the effect of territorial control on the Viet Cong's selective violence during the Vietnam War.[26] The sample is a monthly panel of 12,532 hamlets between July and December 1969. Because there are no indicators related to the relative efficacy of violence in the dataset or the study does not use IVs or other research designs, we conduct a sensitivity analysis.

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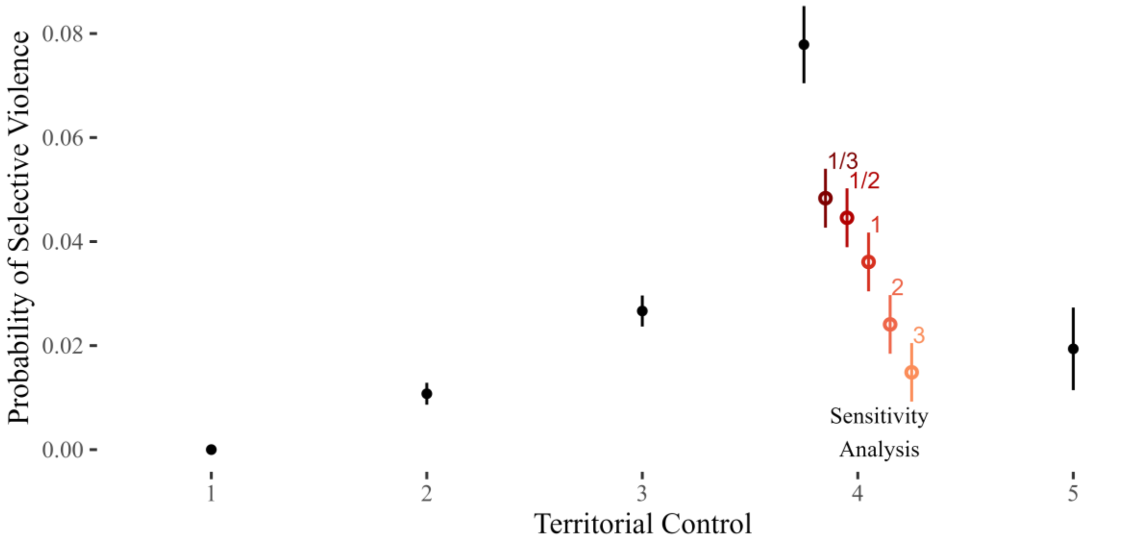
[26] In Appendix A4, we also consider Implications 2 and 3 by replicating Liu (2024).

Specifically, we replicate their main analysis (Model 1 in Table IV, p.347), where the Viet Cong's selective violence is regressed on five categories of territorial control ranging from the government's full control (1) to the Viet Cong's full control (5). Because the Kalyvas model predicts that the Viet Cong's selective violence is the most prevalent under its incomplete control with no difference under other levels of territorial control (see Kalyvas 2006, 204–5), we use the Viet Cong's incomplete control as a main treatment variable, and contested control as a "benchmark" variable (Cinelli and Hazlett 2020). We assume that the effect of the latent confounder—relative efficacy of violence—on the treatment variable is the same as its effect on the benchmark variable. We then vary how many times strongly the confounder correlates with the outcome relative to the correlation between the benchmark and outcome variables. We consider $\{1/3, 1/2, 1, 2, 3\}$ times stronger confounders. For simplicity, we dichotomize the outcome and use a linear model.[27]

As shown in Figure 7, the estimate becomes substantially small when the confounding effect is equal to or larger than the effect of the benchmark variable. That is, as far as the relative efficacy of violence explains the variation of selective violence to the same or larger extent as the contested control, we cannot confidently conclude that selective violence is the most prevalent under the Viet Cong's incomplete control. We surmise that this is a real possibility, as the relative efficacy of violence should more closely correlate with actual violence than contested control. These results imply that even when the relative efficacy of violence is unmeasurable, it is crucial to assess the selection bias via sensitivity and other checks.

[27] This does not alter the original findings. Kalyvas and Kocher (2009) use ordered logit with a trichotomous variable. However, less than 0.5% of the observations take the highest value.

Figure 7. Sensitivity Analysis of Kalyvas and Kocher (2009)



The figure shows a replication and sensitivity check of Kalyvas and Kocher (2009). The horizontal axis indicates territorial control, from government full control (level 1) to Viet Cong's full control (level 5). The vertical axis shows the likelihood of the Viet Cong's selective violence against civilians. Black vertical bars with filled circles ● are the results of the replication (point estimates with 95% confidence intervals). Colored vertical bars with empty circles ○ show the results of sensitivity checks. We assume that the effect of a potential omitted confounder on selective violence equals one-third, one-half, identical to, two times, or three times the effect of the benchmark variable. The benchmark variable is the indicator of contested territorial control (level 3).

Eelam War IV in Sri Lanka

In addition to those empirical implications, one important theoretical insight is that the costs of violence can result in a bargaining failure (Prediction 1). When military capabilities are balanced and battle is more efficacious than anti-civilian violence, an armed group refuses to agree on intermediate territorial control and instead fights for complete control. We illustrate this logic with the case of the Eelam War IV in Sri Lanka (2006–2009). We choose this case as it was an insurgent war with relatively balanced military capabilities (Stokke 2006; Terpstra and Frerks 2017). Moreover, the relative efficacy of battle and anti-civilian violence changed within a short time period, allowing us to explore variation within the case.

The root of the Eelam War can be traced back to the colonial period, where Tamils were privileged as civil servants under British rule. After the independence, the Sinhalese came to power, and the political, economic, and cultural discrimination had been increasingly prevalent against the Tamil (e.g., the policy of standardization). This led to the formation of Tamil New Tigers in 1972, which was later renamed to the Liberation Tigers of Tamil Eelam (LTTE). The LTTE started an insurgent war against the government in 1983. Although the parties agreed on ceasefires in 1987 and 1995, the ceasefires were short-lived. The 2002 ceasefire was the third attempt, but it eventually failed, and the country reverted to full-scale battles in 2006. In the following analysis, we split the case into the periods before and after the resumption of the war in 2006. Table 1 is a summary of the parameter values and outcomes in each period.

Table 1. Parameters and Outcomes Before and After the Eelam War IV

	Before 2006	After 2006
Parameters		
Efficacy of battle relative to violence	Low	High
	↓	↓
Outcomes		
Agreement	Signed	Broken
Battle	Sporadic	Intense
Government territorial control	Incomplete	Complete (after war)
Government violence against civilians	Prevalent & indiscriminate	Limited & selective (after war)

This table summarizes the values of the theoretical parameters and outcomes before and after the Eelam War IV in Sri Lanka.

Before 2006: Ceasefire, Intermediate Control, and Government Repression

By the early 2000s, it became evident that neither the government nor the LTTE could achieve victory. Despite the government offensives and their tentative success (e.g., Operation Riviresa), the LTTE swiftly responded with counteroffensives, regaining the lost territories (e.g., Operation Unceasing Waves). The war became increasingly costly with civilian casualties and economic stagnation. With the waning support for war, a pro-peace party, the United National Front, called for negotiation and won the parliamentary election in December 2001. The new government saw little prospect of continuing the battles and entered negotiations with the LTTE.

With Norwegian mediation, the government and the LTTE signed a ceasefire agreement in February 2002. The parties not only agreed to cease offensive operations, freeze the frontline, and accept the Scandinavian monitoring mission, but also agreed on the freedom of movement. While the LTTE reopened the Jaffna-Kandy road to the government troops, the government allowed the LTTE forces to visit government-controlled areas.[28] This means that the government conceded a certain level of territorial control to the LTTE (Stokke 2006). As Kalyvas (2006) states, the freedom of movement means that the government cannot exclusively rule civilians in its territory (210–201). The government secured peace, but, given the relatively balanced military capabilities, this must come with a concession.

The freedom of movement allowed the LTTE's infiltration, civilian defection, and terrorism in the government-controlled territories (Manoharan 2007). Indeed, the LTTE infiltrated even the government capital, Colombo, and recruited a civilian for political assassination. For example, on 12 August 2005, after a regular night swim in his private pool, Foreign Minister Lakshman Kadirgamar was shot dead by two gunmen from the neighboring house. Although the assassination itself was executed by the LTTE gunmen, it was assisted by a civilian: Muttiah Sahadevan, a gardener at Kadirgamar's neighbor. In February 2004, Sahadevan was introduced by his friend to an LTTE cadre, Vinothan, in the Viharamahadevi Park at the center of Colombo. Sahadevan was asked for cooperation, being told that "he would face drastic consequences if he

[28] https://web.archive.org/web/20250807011841/https://peacemaker.un.org/sites/default/files/document/files/2024/05/lk020222ceasefireagreementgovernment-liberationtigerstamileelam.pdf (accessed on 12 September 2025).

did not help them."[29] In May 2005, Sahadevan visited the eastern town of Kilinochchi controlled by the LTTE to meet Vinothan and the chief of the LTTE's intelligence unit. Thereafter, Sahadevan helped the LTTE record the video of Kadirgamar's residence, learn his habits (i.e., night swim), duplicate the door key to the neighbor's house, and prepare a tripod for the gunmen. With Sahadevan's assistance, the LTTE successfully killed Kadirgamar.

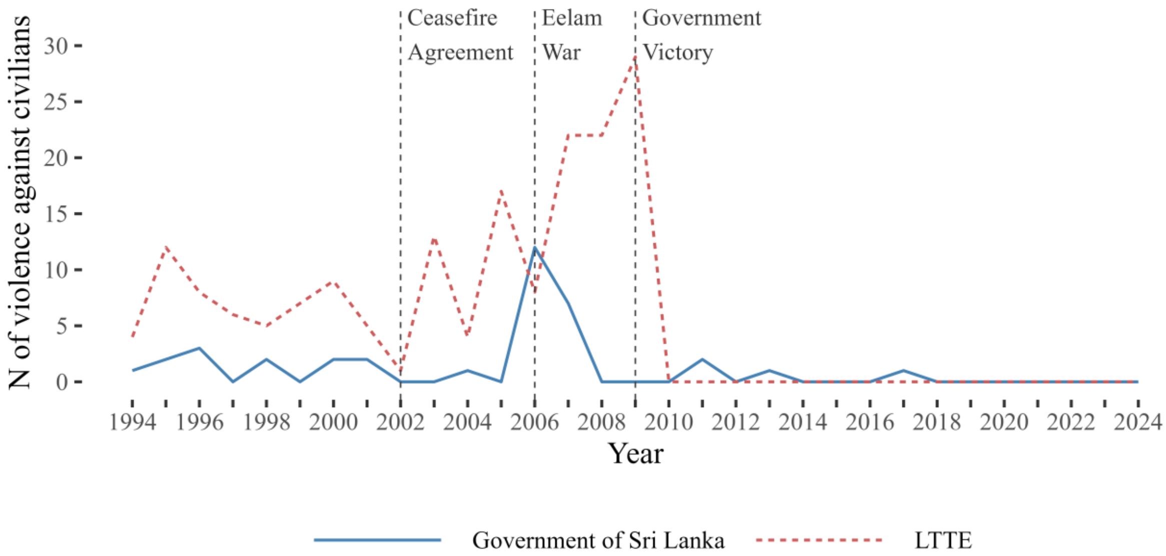
The government's response to the terrorism was the indiscriminate repression of suspects, most notably, the mass arrests of Tamil youth. One day after the assassination of Kadirgamar, the government issued the State of Emergency, enabling unwarranted arrests and detention of civilians. After the suicide attack against Army Commander Sarath Fonseka in April 2006, for example, the government arrested 97 Tamils, even though the attack was conducted by a single woman who camouflaged herself as pregnant.[30] By March 2006, at least 452 persons had been detained under the State of Emergency (the number is based on the government's announcement and can be much larger).[31] Despite the mass arrests, however, the LTTE's terrorism increased for 2002-2006 as shown in Figure 8 (Sundberg et al. 2010).

[29] https://web.archive.org/web/20190805193230/https://www.sundaytimes.lk/050904/news/4.html (accessed on 12 September 2025).

[30] https://www.hrw.org/reports/2007/srilanka0807/7.htm (accessed on 12 September 2025).

[31] Ibid.

Figure 8. Violence against Civilians by the Government of Sri Lanka and LTTE



This figure shows the number of violent events against civilians by the Government of Sri Lanka (solid blue line) and the LTTE (dashed red line). The data source is the UCDP GED (Sundberg et al. 2010).

After 2006: War, Government Victory, and Complete Control

With the increasing number of the LTTE's terrorism, the political landscape had also changed. In March 2004, the Karuna faction splintered from the LTTE, claiming unfavorable treatment of eastern Tamils. The Indian Ocean Tsunami in December 2004 also disproportionally hit the strongholds of the LTTE (Kikuta 2019). On the government side, the stagnant peace process and continuing LTTE's terrorism gave momentum to the hardliners, resulting in the victory of the United People's Freedom Alliance in the 2004 parliamentary election, and subsequently Mahinda Rajapaksa in the 2005 presidential election. The government's mass arrests of Tamils also raised concerns among international communities (Amnesty International 2006). By early 2006, it became evident that the mass arrests were ineffective and costly, and the government needed to eliminate the LTTE in order to secure territorial control over the country.

The war restarted in August 2006 when the government forces attacked the Mawilaru water reservoir controlled by the LTTE. Although the government and the LTTE had been negotiating the status of Mawilaru, the government was no longer interested in negotiation. Indeed, the Nordic peace monitor stated that "[i]t is quite obvious they [the government of Sri Lanka] are not interested in water. They are interested in something else."[32] Rajapaksa himself said;

> "I was compelled to go to war after the LTTE landmine attack on a civilian bus in Kebithogollawa in June 2006 which killed 64 and seriously injured 86, many of them children. Military operations commenced in July 2006 when the LTTE closed the Mawilaru anicut cutting off irrigation water to cultivators in the Trincomalee district and did not stop until the LTTE was completely defeated on 19 May 2009."[33]

The government restarted the war because the ceasefire and resultant incomplete territorial control did not stop and even increased the LTTE's terrorism. While the renewed war drastically increased the LTTE's terrorism for 2006–2009, the terrorism ceased to exist after the government's victory in May 2009. With complete territorial control, the government no longer needed to indiscriminately arrest Tamils and lifted the State of Emergency in August 2011.

Discussion

Overall, the case of the Eelam IV War illustrates the logic of bargaining failure in our model. While the increasing costs of war resulted in the ceasefire agreement in 2002, the equilibrium shifted when the government's anti-civilian violence turned out to be ineffective due to the

[32] http://news.bbc.co.uk/2/hi/south_asia/5249884.stm (accessed on 12 September 2025).

[33] https://www.dailymirror.lk/print/breaking-news/Wartime-President-Mahinda-Rajapaksa-tells-off-UK-for-sanctions-against-military-leaders/108-305257?form=MG0AV3 (accessed on 12 September 2025).

incomplete territorial control. However, a few caveats are in order. First, it might be argued that the government started the war because the rebels' fragmentation and the tsunami weakened the LTTE. However, although the change in power balance certainly influenced the government's decision, it cannot fully explain the resumption of the war. While Karuna's defection and the tsunami occurred in 2004, it took nearly two years before the government restarted the war. As Rajapaksa emphasized, it was the LTTE's terrorism that drove the government to resume the war.

Second, and relatedly, the government's decision was substantially influenced by the LTTE's terrorism, implying possible endogeneity of peace costs to strategic interactions. The LTTE, for instance, might have engaged in terrorism in order to signal its strength in the midst of uncertainty after the fragmentation and tsunami (logic of private information). By doing so, however, the LTTE increased the government's cost of peace and eventually prompted the government to restart the war (logic of our model). Although endogenizing the costs of peace or incorporating private information is beyond the scope of this paper, future studies must extend the Fearon-Kalyvas model to endogenize the relative efficacy of battle and violence.

Conclusion

To the best of our knowledge, this study is the first to integrate two classical theories of conflict: those of Fearon (1995; 2004) and Kalyvas (2006). After formalizing Kalyvas's (2006) theory in a parsimonious manner, we extend the Kalyvas model to a bargaining model and endogenize territorial control to bargaining between armed groups. The Fearon–Kalyvas model points to the crucial role of the relative efficacy of battle and anti-civilian violence. That is, anti-civilian violence is likely to occur when military capabilities are balanced, and *violence against civilians is more efficacious than a battle*. Ignoring relative efficacy can bias empirical estimates;

intermediate territorial control is confounded by the efficacy of anti-civilian violence, resulting in an upward bias in the naïve regression estimates.

These theoretical results provide important insights into conflict studies. First, although Kalyvas's (2006) theory is sometimes considered "tested in a methodologically solid fashion" (Birnir 2007, 1398), it is silent on the strategic dynamics of territorial control, and the empirical analysis overlooks endogeneity. While the importance of shifts in territorial control has been highlighted (Balcells 2010; Kalyvas 2012), directly addressing this issue has been overlooked.[34] As demonstrated, naïvely regressing violence on territorial control fails to rigorously test Kalyvas's (2006) proposition. To identify a causal effect of territorial control, researchers need to account for the confounder–relative efficacy of violence. Thus, similar to democratic peace theory (Imai and Lo 2021; Maoz and Russett 1993; Slantchev et al. 2005), Kalyvas's (2006) theory depends on, at least quantitatively, correlational evidence, and hence is subject to empirical problems. Future studies should address these issues by using better measurement and designs.

More broadly, our model recovers insights from what Kalyvas criticized (2001; 2003; 2006): the literature on "new wars" (Angstrom and Duyvesteyn 2005; Duffield 1998; Gray 2013; Kaldor 2001; Kaplan 1994; Keen 1995; Mueller 2013). Although this literature was excessively normative and lacked logical rigor, it provided field-level reports showing that armed groups often co-opt and cooperate, even during civil wars. However, the debate developed into a less significant discussion about whether "new wars" were truly new (Collier and Hoeffler 2004; Fearon and Laitin 2003; Henderson and Singer 2002; Kaldor 2013; Kalyvas 2001; Melander et al. 2009;

[34] As we have discussed, Liu (2024) is a crucial exception.

Newman 2004), and its insights have been largely forgotten in recent conflict studies.[35] We have reclaimed these insights and formalized them into a model, thereby providing a theoretical foundation for the regrowth of studies on cooperation and co-optation during civil wars (Aponte González et al. 2024; Campbell et al. 2017; Idler 2020; Liu 2022; Raleigh and De Bruijne 2017).[36]

Our model also implies the importance of incorporating civilians into bargaining models. As Kalyvas (2006) argues, armed groups cannot simply divide a territory such as cutting a birthday cake (Brams 1996); they must govern the people residing in their territories. Unlike classical bargaining models (Fearon 1995; 2004), our model indicates that armed groups' utility does not smoothly increase with territorial control, suggesting the importance of civilians for specifying utility functions in bargaining models. We must consider the strategic dynamics *both* between and within armed groups (Wagner 2007).

A crucial task for future studies is to extend the Fearon–Kalyvas model to incorporate other features of armed conflict and violence against civilians. The first area of extension is to incorporate the "third" choices of armed groups. Although we consider only battles and anti-civilian violence, armed groups may also consolidate territorial control through non-violent campaigns (Cunningham 2013b; Chenoweth and Cunningham 2013; Cunningham et al. 2017) and

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[35] Kaldor (2001) is cited even more frequently than Fearon (1995) or Kalyvas (2006). However, Kaldor (2001) is far less cited, for instance, in the *Journal of Conflict Resolution* after 2010.

[36] See also studies on alliance during civil wars (Bapat and Bond 2012; Blair, Horowitz, et al. 2022; Blair, Chenoweth, et al. 2022; Gade et al. 2019) and on relationships between states and criminal groups (Barnes 2017; Blattman et al. 2025; Blume 2022; Cruz and Durán-Martínez 2016; Lessing 2021; Magaloni et al. 2020; Skarbek 2011).

the provision of social services (Albert 2022; Arjona 2014; Arjona et al. 2015; Breslawski 2021; Mampilly and Stewart 2021; Loyle et al. 2023; Stewart 2018). With these choices, armed groups may refrain from battles or anti-civilian violence even when our model predicts such behavior. Thus, future studies should incorporate armed groups' non-violent strategies to capture the dynamics of civil war more precisely.

Second, it is crucial to model the potential complementarity between battles and violence against civilians (Dorff et al. 2023; Metelits 2009; Wood and Kathman 2014; 2015). Our model treats battle and anti-civilian violence as substitutive choices; however, they can also be complementary. Specifically, the model indicates that substitution occurs mainly under relatively balanced military capabilities. Moreover, battles may involve violence against civilians—or vice versa—hence, they may be complementary. Future studies should incorporate stalemates and intermediate battle outcomes (Aronson et al. 2024) and explore how armed groups allocate resources (e.g., soldiers) to battle and violence.

Third, it is equally important to endogenize military capabilities to territorial control. While territorial control depends on bargaining and hence military capabilities, it also provides resources for armed groups (i.e., labor and taxes), thereby allowing them to maintain and expand their militaries. One way to incorporate these possibilities is through a repeated game where military capability and territorial control become mutually endogenous over time (Powell 2012). Additionally, the model can incorporate collective action (McLauchlin 2015; Olson 1971; Rubin 2020; Tarrow 2011), three or more armed groups (Cunningham 2013a; Findley and Rudloff 2012; Kydd and Walter 2002; Morrow 2000; Wolford 2015), and private information (Fearon 1995; Yoder and Haynes 2025). Moreover, this study deliberately omitted Kalyvas's (2006) discussion of local dynamics from the model (e.g., denunciations; see p.7 of this manuscript) and presented a reduced form of his argument. Our model is not the end but the beginning of a unified theory of battles and anti-civilian violence.

Reference List

Acharya, Avidit, and Alexander Lee. 2018. "Economic Foundations of the Territorial State System." *American Journal of Political Science* 62 (4): 954–66. https://doi.org/10.1111/ajps.12379.

Acharya, Avidit, and Alexander Lee. 2022. *The Cartel System of States: An Economic Theory of International Politics*. Oxford University Press.

ACLED. 2019. "Armed Conflict Location and Event Data Project (ACLED) Codebook." https://acleddata.com/acleddatanew/wp-content/uploads/dlm_uploads/2019/01/ACLED_Codebook_2019FINAL.docx.pdf.

Albert, Karen E. 2022. "What Is Rebel Governance? Introducing a New Dataset on Rebel Institutions, 1945–2012." *Journal of Peace Research* 59 (4): 622–30. https://doi.org/10.1177/00223433211051848.

Albrecht, Holger, and Kevin Koehler. 2018. "Going on the Run: What Drives Military Desertion in Civil War?" *Security Studies* 27 (2): 179–203. https://doi.org/10.1080/09636412.2017.1386931.

Amnesty International. 2006. *Sri Lanka: A Climate of Fear in the East*. ASA 37/001/2006. https://www.amnesty.org/en/documents/ASA37/001/2006/en.

Anders, Therese. 2020. "Territorial Control in Civil Wars: Theory and Measurement Using Machine Learning." *Journal of Peace Research* 57 (6): 701–14. https://doi.org/10.1177/0022343320959687.

Anderson, T. W., and Herman Rubin. 1949. “Estimation of the Parameters of a Single Equation in a Complete System of Stochastic Equations.” *The Annals of Mathematical Statistics* 20 (1): 46–63. https://doi.org/10.1214/aoms/1177730090.

Angstrom, Jan, and Isabelle Duyvesteyn. 2005. *Rethinking the Nature of War*. Routledge.

Aponte González, Andrés F., Daniel Hirschel-Burns, and Andres D. Uribe. 2024. “Contestation, Governance, and the Production of Violence Against Civilians: Coercive Political Order in Rural Colombia.” *Journal of Conflict Resolution* 68 (4): 616–41. https://doi.org/10.1177/00220027231177591.

Arjona, Ana. 2014. “Wartime Institutions: A Research Agenda.” *Journal of Conflict Resolution* 58 (8): 1360–89. https://doi.org/10.1177/0022002714547904.

Arjona, Ana, Nelson Kasfir, and Zachariah Mampilly, eds. 2015. *Rebel Governance in Civil War*. Cambridge University Press.

Aronson, Jacob, Kyosuke Kikuta, Michael Findley, and James Igoe Walsh. 2024. “The Tyranny of Supply: Natural Resources and Rebel Territorial Control in Civil Conflicts.” *International Studies Quarterly* 68 (3): sqae093. https://doi.org/10.1093/isq/sqae093.

Arriola, Leonardo R., and Martha C. Johnson. 2014. “Ethnic Politics and Women’s Empowerment in Africa: Ministerial Appointments to Executive Cabinets.” *American Journal of Political Science* 58 (2): 495–510. https://doi.org/10.1111/ajps.12075.

Asal, Victor, and R. Karl Rethemeyer. 2008. “The Nature of the Beast: Organizational Structures and the Lethality of Terrorist Attacks.” *The Journal of Politics* 70 (2): 437–49. https://doi.org/10.1017/S0022381608080419.

Azam, Jean-Paul, and Anke Hoeffler. 2002. “Violence Against Civilians in Civil Wars: Looting or Terror?” *Journal of Peace Research* 39 (4): 461–85. https://doi.org/10.1177/0022343302039004006.

Balcells, Laia. 2010. “Rivalry and Revenge: Violence against Civilians in Conventional Civil Wars.” *International Studies Quarterly* 54 (2): 291–313. https://doi.org/10.1111/j.1468-2478.2010.00588.x.

Balcells, Laia, and Jessica A. Stanton. 2021. “Violence Against Civilians During Armed Conflict: Moving Beyond the Macro- and Micro-Level Divide.” *Annual Review of Political Science* 24 (1): 45–69. https://doi.org/10.1146/annurev-polisci-041719-102229.

Bapat, Navin A., and Kanisha D. Bond. 2012. “Alliances between Militant Groups.” *British Journal of Political Science* 42 (4): 793–824. https://doi.org/10.1017/S0007123412000075.

Bar-El, Ronen. 2009. “Dictators, Development, and the Virtue of Political Instability.” *Public Choice* 138 (1): 29–44. https://doi.org/10.1007/s11127-008-9337-3.

Barnes, Nicholas. 2017. “Criminal Politics: An Integrated Approach to the Study of Organized Crime, Politics, and Violence.” *Perspectives on Politics* 15 (4): 967–87. https://doi.org/10.1017/S1537592717002110.

Bates, Robert H. 2008. “State Failure.” *Annual Review of Political Science* 11: 1–12. https://doi.org/10.1146/annurev.polisci.11.060606.132017.

Beber, Bernd, and Christopher Blattman. 2013. “The Logic of Child Soldiering and Coercion.” *International Organization* 67 (1): 65–104. https://doi.org/10.1017/S0020818312000409.

Berman, Eli, Jacob N. Shapiro, and Joseph H. Felter. 2011. “Can Hearts and Minds Be Bought? The Economics of Counterinsurgency in Iraq.” *Journal of Political Economy* 119 (4): 766–819. https://doi.org/10.1086/661983.

Bhavnani, Ravi, Dan Miodownik, and Hyun Jin Choi. 2011. “Three Two Tango: Territorial Control and Selective Violence in Israel, the West Bank, and Gaza.” *Journal of Conflict Resolution* 55 (1): 133–58. https://doi.org/10.1177/0022002710383663.

Birnir, Johanna Kristin. 2007. “Book Review: Kalyvas, S. N. (2006). The Logic of Violence in Civil War. Cambridge, UK: Cambridge University Press.” *Comparative Political Studies* 40 (11): 1395–98. https://doi.org/10.1177/0010414007306860.

Blair, Christopher W., Maria Ballesteros, Igor Kolesnikov, and Austin L. Wright. 2024. “Territorial Control in Civil Wars.” Preprint, July 31. https://doi.org/10.2139/ssrn.4912415.

Blair, Christopher W., Erica Chenoweth, Michael C. Horowitz, Evan Perkoski, and Philip B. K. Potter. 2022. “Honor Among Thieves: Understanding Rhetorical and Material Cooperation Among Violent Nonstate Actors.” *International Organization* 76 (1): 164–203. https://doi.org/10.1017/S0020818321000114.

Blair, Christopher W., Michael C. Horowitz, and Philip B. K. Potter. 2022. “Leadership Targeting and Militant Alliance Breakdown.” *The Journal of Politics* 84 (2): 923–43. https://doi.org/10.1086/715604.

Blattman, Christopher, Gustavo Duncan, Benjamin Lessing, and Santiago Tobón. 2025. “Gang Rule: Understanding and Countering Criminal Governance.” *The Review of Economic Studies* 92 (3): 1497–531. https://doi.org/10.1093/restud/rdae079.

Blume, Laura R. 2022. “Collusion, Co-Optation, or Evasion: The Politics of Drug Trafficking Violence in Central America.” *Comparative Political Studies* 55 (8): 1366–402. https://doi.org/10.1177/00104140211066218.

Brams, Steven J. 1996. *Fair Division: From Cake-Cutting to Dispute Resolution*. Cambridge University Press.

Bratton, Michael, and Nicholas van de Walle. 1997. *Democratic Experiments in Africa: Regime Transitions in Comparative Perspective*. Cambridge University Press.

Breslawski, Jori. 2021. "The Social Terrain of Rebel Held Territory." *Journal of Conflict Resolution* 65 (2–3): 453–79. https://doi.org/10.1177/0022002720951857.

Bueno de Mesquita, Ethan. 2013. "Rebel Tactics." *Journal of Political Economy* 121 (2): 323–57. https://doi.org/10.1086/670137.

Callahan, Mary P. 2005. *Making Enemies: War and State Building in Burma*. Cornell University Press.

Calle, Luis de la, and Ignacio Sánchez-Cuenca. 2015. "How Armed Groups Fight: Territorial Control and Violent Tactics." *Studies in Conflict & Terrorism* 38 (10): 795–813. world.

Campbell, Susanna P., Michael G. Findley, and Kyosuke Kikuta. 2017. "An Ontology of Peace: Landscapes of Conflict and Cooperation with Application to Colombia." *International Studies Review* 19 (1): 92–113. https://doi.org/10.1093/isr/vix005.

Carter, David B. 2015. "When Terrorism Is Evidence of State Success: Securing the State against Territorial Groups." *Oxford Economic Papers* 67 (1): 116–32. https://doi.org/10.1093/oep/gpu041.

Chadefaux, Thomas. 2011. "Bargaining over Power: When Do Shifts in Power Lead to War?" *International Theory* 3 (2): 228–53. https://doi.org/10.1017/S175297191100008X.

Chadefaux, Thomas. 2020. "What the Enemy Knows: Common Knowledge and the Rationality of War." *British Journal of Political Science* 50 (4): 1593–607. https://doi.org/10.1017/S0007123418000261.

Chakravarti, Sudeep. 2008. *Red Sun: Travels in Naxalite Country*. Penguin Global.

Chehabi, Houchang E, and Juan José Linz. 1998. *Sultanistic Regimes*. Johns Hopkins University Press.

Chenoweth, Erica, and Kathleen Gallagher Cunningham. 2013. "Understanding Nonviolent Resistance: An Introduction." *Journal of Peace Research* 50 (3): 271–76. https://doi.org/10.1177/0022343313480381.

Cinelli, Carlos, and Chad Hazlett. 2020. "Making Sense of Sensitivity: Extending Omitted Variable Bias." *Journal of the Royal Statistical Society Series B: Statistical Methodology* 82 (1): 39–67.

Coe, Andrew J. 2018. "Containing Rogues: A Theory of Asymmetric Arming." *The Journal of Politics* 80 (4): 1197–210. https://doi.org/10.1086/698845.

Collier, Paul, and Anke Hoeffler. 2004. "Greed and Grievance in Civil War." *Oxford Economic Papers* 56 (4): 563–95. https://doi.org/10.1093/oep/gpf064.

Cruz, José Miguel, and Angélica Durán-Martínez. 2016. "Hiding Violence to Deal with the State: Criminal Pacts in El Salvador and Medellin." *Journal of Peace Research* 53 (2): 197–210. https://doi.org/10.1177/0022343315626239.

Cunningham, Kathleen Gallagher. 2013a. "Actor Fragmentation and Civil War Bargaining: How Internal Divisions Generate Civil Conflict." *American Journal of Political Science* 57 (3): 659–72. https://doi.org/10.1111/ajps.12003.

Cunningham, Kathleen Gallagher. 2013b. "Understanding Strategic Choice: The Determinants of Civil War and Nonviolent Campaign in Self-Determination Disputes." *Journal of Peace Research* 50 (3): 291–304. https://doi.org/10.1177/0022343313475467.

Cunningham, Kathleen Gallagher, Marianne Dahl, and Anne Frugé. 2017. "Strategies of Resistance: Diversification and Diffusion." *American Journal of Political Science* 61 (3): 591–605. https://doi.org/10.1111/ajps.12304.

Davis, Jason Sanwalka. 2023. "War as a Redistributive Problem." *American Journal of Political Science* 67 (1): 170–84. https://doi.org/10.1111/ajps.12623.

De la Calle, Luis. 2017. "Compliance vs. Constraints: A Theory of Rebel Targeting in Civil War." *Journal of Peace Research* 54 (3): 427–41. https://doi.org/10.1177/0022343316686823.

Debs, Alexandre, and Hein E. Goemans. 2010. "Regime Type, the Fate of Leaders, and War." *American Political Science Review* 104 (03): 430–45. https://doi.org/10.1017/S0003055410000195.

Debs, Alexandre, and Nuno P. Monteiro. 2014. "Known Unknowns: Power Shifts, Uncertainty, and War." *International Organization* 68 (1): 1–31. https://doi.org/10.1017/S0020818313000192.

Dorff, Cassy, Max Gallop, and Shahryar Minhas. 2023. "Network Competition and Civilian Targeting during Civil Conflict." *British Journal of Political Science* 53 (2): 441–59. https://doi.org/10.1017/S0007123422000321.

Duffield, Mark. 1998. "Post-modern Conflict: Warlords, Post-adjustment States and Private Protection." *Civil Wars* 1 (1): 65–102. https://doi.org/10.1080/13698249808402367.

Fearon, James D. 1995. "Rationalist Explanations for War." *International Organization* 49 (3): 379–414. https://doi.org/10.1017/S0020818300033324.

Fearon, James D. 2004. "Why Do Some Civil Wars Last So Much Longer than Others?" *Journal of Peace Research* 41 (3): 275–301. https://doi.org/10.1177/0022343304043770.

Fearon, James D. 2018. "Cooperation, Conflict, and the Costs of Anarchy." *International Organization* 72 (3): 523–59. https://doi.org/10.1017/S0020818318000115.

Fearon, James D., and David D. Laitin. 2003. "Ethnicity, Insurgency, and Civil War." *American Political Science Review* 97 (1): 75–90.

Findley, Michael, and Peter Rudloff. 2012. "Combatant Fragmentation and the Dynamics of Civil Wars." *British Journal of Political Science* 42 (4): 879–901. https://doi.org/10.1017/S0007123412000099.

Gade, Emily Kalah, Michael Gabbay, Mohammed M. Hafez, and Zane Kelly. 2019. "Networks of Cooperation: Rebel Alliances in Fragmented Civil Wars." *Journal of Conflict Resolution* 63 (9): 2071–97. https://doi.org/10.1177/0022002719826234.

Gamba, Virginia, and Richard Cornwell. 2000. "Arms, Elites, and Resources in the Angolan Civil War." In *Greed and Grievance: Economic Agendas in Civil Wars*, edited by Mats Berdal and David M. Malone. Lynne Rienner Publishers. https://doi.org/10.1515/9781685850012-004.

Gates, Scott. 2002. "Recruitment and Allegiance: The Microfoundations of Rebellion." *Journal of Conflict Resolution* 46 (1): 111–30. https://doi.org/10.1177/0022002702046001007.

Glynn, Adam N., Miguel R. Rueda, and Julian Schuessler. 2024. "Post-Instrument Bias in Linear Models." *Sociological Methods & Research* 53 (4): 1829–45. https://doi.org/10.1177/00491241231156965.

Gray, Chris Hables. 2013. *Postmodern War: The New Politics of Conflict*. Routledge. https://doi.org/10.4324/9781315870519.

Hafner-Burton, Emilie M. 2008. "Sticks and Stones: Naming and Shaming the Human Rights Enforcement Problem." *International Organization* 62 (4): 689–716.

Hartzell, Caroline, and Matthew Hoddie. 2003. "Institutionalizing Peace: Power Sharing and Post-Civil War Conflict Management." *American Journal of Political Science* 47 (2): 318–32. https://doi.org/10.1111/1540-5907.00022.

Hartzell, Caroline, Matthew Hoddie, and Donald Rothchild. 2001. "Stabilizing the Peace After Civil War: An Investigation of Some Key Variables." *International Organization* 55 (1): 183–208. https://doi.org/10.1162/002081801551450.

Hazen, Jennifer M. 2013. *What Rebels Want: Resources and Supply Networks in Wartime*. Cornell University Press.

Henderson, Errol, and J. Singer. 2002. "'New Wars' and Rumors of 'New Wars.'" *International Interactions* 28 (2): 165–90. https://doi.org/10.1080/03050620212098.

Hendrix, Cullen S., and Wendy H. Wong. 2013. "When Is the Pen Truly Mighty? Regime Type and the Efficacy of Naming and Shaming in Curbing Human Rights Abuses." *British Journal of Political Science* 43 (3): 651–72. https://doi.org/10.1017/S0007123412000488.

Idler, Annette. 2020. "The Logic of Illicit Flows in Armed Conflict: Explaining Variation in Violent Nonstate Group Interactions in Colombia." *World Politics* 72 (3): 335–76. https://doi.org/10.1017/S0043887120000040.

Imai, Kosuke, and James Lo. 2021. "Robustness of Empirical Evidence for the Democratic Peace: A Nonparametric Sensitivity Analysis." *International Organization* 75 (3): 901–19. https://doi.org/10.1017/S0020818321000126.

Intriligator, Michael D., and Dagobert L. Brito. 1988. "A Predator-Prey Model of Guerrilla Warfare." *Synthese* 76 (2): 235–44. https://doi.org/10.1007/BF00869590.

Jackson, Matthew O., and Massimo Morelli. 2009. "Strategic Militarization, Deterrence and Wars." *Quarterly Journal of Political Science* 4: 279–313. https://doi.org/10.1561/100.00009047.

Jackson, Robert H. 1993. *Quasi-States: Sovereignty, International Relations and the Third World*. Cambridge University Press.

Kaldor, Mary. 2001. *New and Old Wars*. Stanford University Press.

Kaldor, Mary. 2013. "In Defence of New Wars." *Stability: International Journal of Security and Development* 2 (1): 1. http://www.stabilityjournal.org/index.

Kalyvas, Stathis N. 2001. "'New' and 'Old' Civil Wars: A Valid Distinction?" *World Politics* 54 (1): 99–118. https://doi.org/10.2307/25054175.

Kalyvas, Stathis N. 2003. "The Ontology of Action and Identity in Civil Wars." *Perspectives on Politics* 1 (3): 475–94. https://doi.org/10.1017/S1537592703000355.

Kalyvas, Stathis N. 2006. *The Logic of Violence in Civil War*. Cambridge University Press.

Kalyvas, Stathis N. 2012. "Micro-Level Studies of Violence in Civil War: Refining and Extending the Control-Collaboration Model." *Terrorism and Political Violence* 24 (4): 658–68. https://doi.org/10.1080/09546553.2012.701986.

Kalyvas, Stathis N., and Matthew Adam Kocher. 2009. "The Dynamics of Violence in Vietnam: An Analysis of the Hamlet Evaluation System (HES)." *Journal of Peace Research* 46 (3): 335–55. https://doi.org/10.1177/0022343309102656.

Kaplan, Robert D. 1994. "The Coming Anarchy." *Atlantic Monthly* 273 (2): 44–76.

Keen, David. 1995. "When War Itself Is Privatized: The Twisted Logic That Makes Violence Worthwhile in Sierra Leone." *Times Literary Supplement*, no. 4839: 13–14.

Kikuta, Kyosuke. 2019. "Postdisaster Reconstruction as a Cause of Intrastate Violence: An Instrumental Variable Analysis with Application to the 2004 Tsunami in Sri Lanka." *Journal of Conflict Resolution* 63 (3): 760–85. https://doi.org/10.1177/0022002717753919.

Krain, Matthew. 2012. “J’accuse! Does Naming and Shaming Perpetrators Reduce the Severity of Genocides or Politicides?” *International Studies Quarterly* 56 (3): 574–89. https://doi.org/10.1111/j.1468-2478.2012.00732.x.

Krain, Matthew. 2016. “The Effect of Economic Sanctions on the Severity of Genocides or Politicides.” *Journal of Genocide Research* 19 (1): 88–111. https://doi.org/10.1080/14623528.2016.1240516.

Krasner, Stephen D. 2004. “Sharing Sovereignty: New Institutions for Collapsed and Failing States.” *International Security* 29 (2): 85–120.

Kydd, Andrew H., and Barbara F. Walter. 2002. “Sabotaging the Peace: The Politics of Extremist Violence.” *International Organization* 56 (2): 263–96. https://doi.org/10.1162/002081802320005487.

Lessing, Benjamin. 2021. “Conceptualizing Criminal Governance.” *Perspectives on Politics* 19 (3): 854–73. https://doi.org/10.1017/S1537592720001243.

Liu, Shelley. 2022. “Control, Coercion, and Cooptation: How Rebels Govern after Winning Civil War.” *World Politics* 74 (1): 37–76. https://doi.org/10.1017/S0043887121000174.

Liu, Shelley. 2024. “Coercive Legacies: From Rebel Governance to Authoritarian Control.” *The Journal of Politics* 86 (4): 1129–45. https://doi.org/10.1086/729947.

Loyle, Cyanne E., Kathleen Gallagher Cunningham, Reyko Huang, and Danielle F. Jung. 2023. “New Directions in Rebel Governance Research.” *Perspectives on Politics* 21 (1): 264–76. https://doi.org/10.1017/S1537592721001985.

Magaloni, Beatriz, Edgar Franco-Vivanco, and Vanessa Melo. 2020. “Killing in the Slums: Social Order, Criminal Governance, and Police Violence in Rio de Janeiro.” *American Political Science Review* 114 (2): 552–72. https://doi.org/10.1017/S0003055419000856.

Mampilly, Zachariah, and Megan A. Stewart. 2021. "A Typology of Rebel Political Institutional Arrangements." *Journal of Conflict Resolution* 65 (1): 15–45. https://doi.org/10.1177/0022002720935642.

Manoharan, Nagaioh. 2007. *Sri Lanka: Five Years of the Ceasefire Agreement*. No. 2219. Institute of Peace and Conflict Studies. https://www.ipcs.org/comm_select.php?articleNo=2219.

Maoz, Zeev, and Bruce Russett. 1993. "Normative and Structural Causes of Democratic Peace, 1946-1986." *The American Political Science Review* 87 (3): 624–38. https://doi.org/10.2307/2938740.

Mason, T. David. 2009. "International Relations Theory and How Civil Wars End." *International Interactions* 35 (3): 341–51. https://doi.org/10.1080/03050620903084885.

McLauchlin, Theodore. 2015. "Desertion and Collective Action in Civil Wars." *International Studies Quarterly* 59 (4): 669–79. https://doi.org/10.1111/isqu.12205.

Meirowitz, Adam, and Anne E. Sartori. 2008. "Strategic Uncertainty as a Cause of War." *Quarterly Journal of Political Science* 3 (4): 327–52.

Melander, Erik, Magnus Öberg, and Jonathan Hall. 2009. "Are 'New Wars' More Atrocious? Battle Severity, Civilians Killed and Forced Migration Before and After the End of the Cold War." *European Journal of International Relations* 15 (3): 505–36. https://doi.org/10.1177/1354066109338243.

Mesquita, Ethan Bueno De, and Mehdi Shadmehr. 2023. "Rebel Motivations and Repression." *American Political Science Review* 117 (2): 734–50. https://doi.org/10.1017/S0003055422000600.

Metelits, Claire M. 2009. "The Consequences of Rivalry: Explaining Insurgent Violence Using Fuzzy Sets." *Political Research Quarterly* 62 (4): 673–84.

Monteiro, Nuno P., and Alexandre Debs. 2020. "An Economic Theory of War." *The Journal of Politics* 82 (1): 255–68. https://doi.org/10.1086/705814.

Morrow, James D. 2000. "ALLIANCES: Why Write Them Down?" *Annual Review of Political Science* 3 (1): 63–83. https://doi.org/10.1146/annurev.polisci.3.1.63.

Mueller, John. 2013. *The Remnants of War*. Cornell University Press. https://doi.org/10.7591/9780801459863.

Newman, Edward. 2004. "The 'New Wars' Debate: A Historical Perspective Is Needed." *Security Dialogue* 35 (2): 173–89.

Nygård, Håvard Mokleiv, and Michael Weintraub. 2014. "Bargaining Between Rebel Groups and the Outside Option of Violence." *Terrorism and Political Violence* 27 (3): 557–80. https://doi.org/10.1080/09546553.2013.829459.

Olson, Mancur. 1971. *The Logic of Collective Action Public Goods and the Theory of Groups*. Harvard University Press.

Pearl, Judea. 2009. *Causality*. Cambridge University Press.

Peksen, Dursun. 2009. "Better or Worse? The Effect of Economic Sanctions on Human Rights." *Journal of Peace Research* 46 (1): 59–77.

Powell, Robert. 1993. "Guns, Butter, and Anarchy." *American Political Science Review* 87 (1): 115–32. https://doi.org/10.2307/2938960.

Powell, Robert. 2012. "Persistent Fighting and Shifting Power." *American Journal of Political Science* 56 (3): 620–37. https://doi.org/10.1111/j.1540-5907.2011.00575.x.

Powell, Robert. 2013. "Monopolizing Violence and Consolidating Power." *The Quarterly Journal of Economics* 128 (2): 807–59. https://doi.org/10.1093/qje/qjt003.

Prem, Mounu, Santiago Saavedra, and Juan F. Vargas. 2020. "End-of-Conflict Deforestation: Evidence from Colombia's Peace Agreement." *World Development* 129 (May): 104852. https://doi.org/10.1016/j.worlddev.2019.104852.

Prunier, Gérard. 2008. *Africa's World War: Congo, the Rwandan Genocide, and the Making of a Continental Catastrophe*. Oxford University Press.

Qiu, Xiaoyan. 2022. "State Support for Rebels and Interstate Bargaining." *American Journal of Political Science* 66 (4): 993–1007. https://doi.org/10.1111/ajps.12694.

Raleigh, Clionadh, and Kars De Bruijne. 2017. "Where Rebels Dare to Tread: A Study of Conflict Geography and Co-Option of Local Power in Sierra Leone." *Journal of Conflict Resolution* 61 (6): 1230–60. https://doi.org/10.1177/0022002715603767.

Reiter, Dan. 2003. "Exploring the Bargaining Model of War." *Perspectives on Politics* 1 (1): 27–43. https://doi.org/10.1017/S1537592703000033.

Reno, William. 2000. "Shadow States and the Political Economy of Civil Wars." In *Greed and Grievance: Economic Agendas in Civil Wars*, edited by Mats Berdal and David M. Malone. Lynne Rienner Publishers. https://doi.org/10.1515/9781685850012-004.

Rubin, Michael A. 2020. "Rebel Territorial Control and Civilian Collective Action in Civil War: Evidence from the Communist Insurgency in the Philippines." *Journal of Conflict Resolution* 64 (2–3): 459–89. https://doi.org/10.1177/0022002719863844.

Rueda, Miguel R. 2017. "Popular Support, Violence, and Territorial Control in Civil War." *Journal of Conflict Resolution* 61 (8): 1626–52. https://doi.org/10.1177/0022002715626250.

Schutte, Sebastian. 2017. "Violence and Civilian Loyalties: Evidence from Afghanistan." *Journal of Conflict Resolution* 61 (8): 1595–625. https://doi.org/10.1177/0022002715626249.

Simpson, John. 1994. *In the Forests of the Night*. Random House.

Siqueira, Kevin, and Petros G. Sekeris. 2012. “Politics and Insurgencies.” *Economics & Politics* 24 (2): 157–81. https://doi.org/10.1111/j.1468-0343.2012.00396.x.

Skarbek, David. 2011. “Governance and Prison Gangs.” *American Political Science Review* 105 (4): 702–16. https://doi.org/10.1017/S0003055411000335.

Slantchev, Branislav L. 2012. “Borrowed Power: Debt Finance and the Resort to Arms.” *American Political Science Review* 106 (4): 787–809.

Slantchev, Branislav L., Anna Alexandrova, and Erik Gartzke. 2005. “Probabilistic Causality, Selection Bias, and the Logic of the Democratic Peace.” *American Political Science Review* null (03): 459–62. https://doi.org/10.1017/S0003055405051786.

Smith, Martin J. 1999. *Burma: Insurgency and the Politics of Ethnicity*. Zed Books.

Staniland, Paul. 2012. “States, Insurgents, and Wartime Political Orders.” *Perspectives on Politics* 10 (2): 243–64. https://doi.org/10.1017/S1537592712000655.

Stewart, Megan A. 2018. “Civil War as State-Making: Strategic Governance in Civil War.” *International Organization* 72 (1): 205–26. https://doi.org/10.1017/S0020818317000418.

Stewart, Megan A., and Yu-Ming Liou. 2017. “Do Good Borders Make Good Rebels? Territorial Control and Civilian Casualties.” *The Journal of Politics* 79 (1): 284–301. https://doi.org/10.1086/688699.

Stokke, Kristian. 2006. “Building the Tamil Eelam State: Emerging State Institutions and Forms of Governance in LTTE-Controlled Areas in Sri Lanka.” *Third World Quarterly* 27 (6): 1021–40.

Sundberg, Ralph, Mathilda Lindgren, and Ausra Padskocimaite. 2010. "UCDP GED Codebook Version 1.0-2011." *Department of Peace and Conflict Research, Uppsala University*. http://ucdp.uu.se/downloads/ged/ucdp-ged-polygons-v-1-1-codebook.pdf.

Tarar, Ahmer. 2013. "Military Mobilization and Commitment Problems." *International Interactions* 39 (3): 343–66. https://doi.org/10.1080/03050629.2013.782304.

Tarrow, Sidney. 2011. *Power in Movement: Social Movements, Collective Action and Politics*. Cambridge University Press.

Terpstra, Niels, and Georg Frerks. 2017. "Rebel Governance and Legitimacy: Understanding the Impact of Rebel Legitimation on Civilian Compliance with the LTTE Rule." *Civil Wars* 19 (3): 279–307. world. https://doi.org/10.1080/13698249.2017.1393265.

Tyson, Scott A., and Alastair Smith. 2018. "Dual-Layered Coordination and Political Instability: Repression, Co-Optation, and the Role of Information." *The Journal of Politics* 80 (1): 44–58. https://doi.org/10.1086/693986.

Uribe, Andres, and Sebastian van Baalen. 2024. "Governing the Shadows: Territorial Control and State Making in Civil War." *Comparative Political Studies* 58 (10): 2095–129. https://doi.org/10.1177/00104140241290200.

Urtuzuastigui, Jerry, and Ore Koren. 2024. "Targeted Sanctions, Resource Substitution, and Violence against Civilians: Localized Evidence from African States." *World Development* 179 (July): 106606. https://doi.org/10.1016/j.worlddev.2024.106606.

Valentino, Benjamin A. 2014. "Why We Kill: The Political Science of Political Violence against Civilians." *Annual Review of Political Science* 17 (1): 89–103. https://doi.org/10.1146/annurev-polisci-082112-141937.

Wagner, R. Harrison. 2007. *War and the State: The Theory of International Politics*. University of Michigan Press.

Walter, Barbara F. 1999. "Designing Transitions from Civil War: Demobilization, Democratization, and Commitments to Peace." *International Security* 24 (1): 127–55. https://doi.org/10.1162/016228899560077.

Walter, Barbara F. 2009. "Bargaining Failures and Civil War." *Annual Review of Political Science* 12: 243–61. https://doi.org/10.1146/annurev.polisci.10.101405.135301.

Wang, Xuran, Yang Jiang, Nancy R. Zhang, and Dylan S. Small. 2018. "Sensitivity Analysis and Power for Instrumental Variable Studies." *Biometrics* 74 (4): 1150–60. https://doi.org/10.1111/biom.12873.

Weber, Max. 1946. "Politics as a Vocation." In *From Max Weber: Essays in Sociology*, edited by H. H. Gerth and C. Wright Mills. Oxford University Press.

Weber, Sigrid. 2024. "Controlling a Moving World: Territorial Control, Displacement and the Spread of Civilian Targeting in Iraq." *Journal of Peace Research* 62 (2): 211–29. https://doi.org/10.1177/00223433231202823.

Weinstein, Jeremy M. 2006. *Inside Rebellion: The Politics of Insurgent Violence*. Cambridge University Press.

Welsh, Blair. 2023. "Your Space or Mine? Competition, Control, and the Spatial Profile of Militant Violence against Civilians." *Journal of Peace Research* 60 (4): 557–72. https://doi.org/10.1177/00223433221091597.

West, F. J. Jr. 1985. *The Village*. University of Wisconsin Press.

Wolford, Scott. 2015. *The Politics of Military Coalitions*. Cambridge University Press.

Wood, Reed M., and Jacob D. Kathman. 2014. "Too Much of a Bad Thing? Civilian Victimization and Bargaining in Civil War." *British Journal of Political Science* 44 (3): 685–706. https://doi.org/10.1017/S000712341300001X.

Wood, Reed M., and Jacob D. Kathman. 2015. "Competing for the Crown: Inter-Rebel Competition and Civilian Targeting in Civil War." *Political Research Quarterly* 68 (1): 167–79. https://doi.org/10.1177/1065912914563546.

Yoder, Brandon, and Kyle Haynes. 2025. "Endogenous Preferences, Credible Signaling, and the Security Dilemma: Bridging the Rationalist–Constructivist Divide." *American Journal of Political Science* 69 (1): 268–83. https://doi.org/10.1111/ajps.12844.

Zhukov, Yuri M. 2013. "An Epidemic Model of Violence and Public Support in Civil War." *Conflict Management and Peace Science* 30 (1): 24–52. https://doi.org/10.1177/0738894212456936.

Online Appendix of

"Fearon-Kalyvas Model:

Toward a Unified Model of Battles and Violence in Civil War"

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A1. Proof of the Kalyvas Model

A backward induction was performed. First, G kills a suspect if and only if $\alpha \times \alpha + (1-\alpha)(\alpha - s - c) > \alpha - s \Leftrightarrow \alpha > \frac{c}{s+c}$; Otherwise, G releases the suspect. Second, when G releases the suspect, D defects if and only if $r \geq 0$. This always holds since $r \in (0, 1)$. When G kills a suspect, D defects if and only if $-\alpha + (1-\alpha)r \geq 0 \Leftrightarrow \alpha \leq \frac{r}{1+r}$. Thus, when $\frac{c}{s+c} < \frac{r}{1+r} \Leftrightarrow c < sr$, the SPE are those stated in Proposition 1. When $c \geq sr$, D defects and G releases the suspect for $\alpha \in \left[0, \frac{c}{s+c}\right]$, and D does not defect and G kills the suspect for $\alpha \in \left(\frac{c}{s+c}, 1\right]$.

A2. Proof of the Fearon–Kalyvas Model

Appendix A1 provides proof of the subgame equilibrium of the Kalyvas model. After G's victory $\mathbf{K}(\alpha = 1)$, the G and R's payoffs are $(1 - d_G, -d_R)$. After R's victory $\mathbf{K}(\alpha = 0)$, the corresponding payoffs are $(-s - d_G, 1 + s - d_R)$. Thus, the expected payoffs of battle are $(q - s + qs - d_G, 1 + s - q - qs - d_R)$. After a negotiated settlement $\mathbf{K}(\alpha = x)$, the optimal behavior and payoffs depend on the value of x (Proposition 1). When $x \in \left[0, \frac{c}{s+c}\right]$, the payoffs are $(x - s, 1 - x + s)$. When $x \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$, the expected payoffs are $(x - s - c + sx + cx, 1 + s - x - sx)$. When $x \in \left(\frac{r}{1+r}, 1\right]$, the payoffs are $(x, 1 - x)$.

Given the subgame equilibrium, R either accepts or rejects G's offer. When $x \in \left[0, \frac{c}{s+c}\right]$, R accepts $x \leq q + d_R + qs \equiv \hat{x}$ and rejects otherwise. When $x \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$, R accepts $x \leq \frac{q+d_R+qs}{1+s} \equiv \check{x}$ and rejects otherwise. When $x \in \left(\frac{r}{1+r}, 1\right]$, R accepts $x \leq q + d_R + qs - s \equiv \tilde{x}$. Since $s \in (0,1)$ by definition, $\check{x} < \hat{x}$ always holds. $\tilde{x} < \check{x}$ also always holds because this equality reduces to $q + d_R < 1 + s(1-q)$, which holds under Assumption 2. Thus, the configuration of the three thresholds, $\tilde{x} < \breve{x} < \hat{x}$ is given exogenously. Accordingly, we must consider G's optimal offer in the following five cases:

Case 1. $\hat{x} \in \left[0, \frac{c}{s+c}\right]$.

- For $x \in \left[0, \frac{c}{s+c}\right]$, R accepts $x \leq q + d_R + qs$ and rejects otherwise. G's best payoff is $x - s = q + d_R + qs - s$.
- For $x \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$, R always rejects the offer. G's best payoff is $q - s + qs - d_G$.
- For $x \in \left(\frac{r}{1+r}, 1\right]$, R always rejects the offer. G's best payoff is $q - s + qs - d_G$.

Thus, G offers $x^* = \hat{x}$, which R accepts (**Defection I**). The equilibrium condition is $\hat{x} \leq \frac{c}{s+c} \Leftrightarrow q + d_R \leq \frac{c}{s+c} - qs$.

Case 2. $\hat{x} > \frac{c}{s+c}$ and $\breve{x} \leq \frac{c}{s+c}$.

- For $x \in \left[0, \frac{c}{s+c}\right]$, R always accepts the offer. G's best payoff is $\frac{c}{s+c} - s$.
- For $x \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$, R always rejects the offer. G's best payoff is $q - s + qs - d_G$.
- For $x \in \left(\frac{r}{1+r}, 1\right]$, R always rejects the offer. G's best payoff is $q - s + qs - d_G$.

(i) When $\frac{c}{s+c} - s \geq q - s + qs - d_G$, G offers $x^* = \frac{c}{s+c}$, which R accepts (**Defection II**).

The equilibrium conditions are as follows:

- $\hat{x} > \frac{c}{s+c}$ and $\breve{x} \leq \frac{c}{s+c} \Leftrightarrow q + d_R \in \left(\frac{c}{s+c} - qs, \frac{c(1+s)}{s+c} - qs\right]$;
- $q - d_G \leq \frac{c}{s+c} - qs$.

Given Assumption 2 that $q + d_R < 1$, $\frac{q+d_R+qs}{1+s} \leq \frac{c}{s+c} \Leftrightarrow q + d_R < \frac{c(1+s)}{s+c} - qs < 1$ must hold. This reduces to $c < \frac{1+qs}{1-q}$.

(ii) When $\frac{c}{s+c} - s < q - s + qs - d_G$, G offers any $x^* \in \left(\frac{c}{s+c}, 1\right]$, which R rejects (**Battle I**).

The equilibrium conditions are as follows:

- $\hat{x} > \frac{c}{s+c}$ and $\check{x} \leq \frac{c}{s+c} \Leftrightarrow q + d_R \in \left(\frac{c}{s+c} - qs, \frac{c(1+s)}{s+c} - qs\right]$;
- $q - d_G > \frac{c}{s+c} - qs$.

Case 3. $\check{x} \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$.

- For $x \in \left[0, \frac{c}{s+c}\right]$, R always accepts the offer. G's best payoff is $\frac{c}{s+c} - s$.
- For $x \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$, R accepts if $x \leq \check{x}$. G's best payoff is $q + d_R + qs - s - c + \frac{q+d_R+qs}{1+s}c$ or $q - s + qs - d_G$.
- For $x \in \left(\frac{r}{1+r}, 1\right]$, R always rejects the offer. G's best payoff is $q - s + qs - d_G$.

Note that $q + d_R + qs - s - c + \frac{q+d_R+qs}{1+s}c = (1 + s + c)\frac{q+d_R+qs}{1+s} - s - c >$ $(1 + s + c)\frac{c}{s+c} - s - c = \frac{c}{s+c} - s$. Thus, offering $x \in \left[0, \frac{c}{s+c}\right]$ is dominated by offering $x \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$ and never chosen in an equilibrium. This means that we have to compare $q + d_R + qs - s - c + \frac{q+d_R+qs}{1+s}c$ and $q - s + qs - d_G$.

(i) When $q + d_R + qs - s - c + \frac{q+d_R+qs}{1+s}c \geq q - s + qs - d_G$, G offers $x^* = \check{x}$, which R accepts. (**Violence I**). The equilibrium conditions are as follows:

- $\check{x} \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right] \Leftrightarrow q + d_R \in \left(\frac{c(1+s)}{s+c} - qs, \frac{r(1+s)}{1+r} - qs\right]$;
- $q - d_G \leq q + d_R - c + \frac{q+d_R+qs}{1+s}c$.

(ii) When $q + d_R + qs - s - c + \frac{q+d_R+qs}{1+s}c < q - s + qs - d_G$, because $q - d_G > q + d_R - c + \frac{q+d_R+qs}{1+s}c > \frac{c}{s+c} - s$, G offers $x^* > x^* = \frac{q+d_R+s}{1+s}$, which R rejects (**Battle II**).

The equilibrium conditions are as follows:

- $\check{x} \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right] \Leftrightarrow q + d_R \in \left(\frac{c(1+s)}{s+c} - qs, \frac{r(1+s)}{1+r} - qs\right]$;
- $q - d_G > q + d_R - \mathrm{c} + \frac{q+d_R+qs}{1+s}c$.

Case 4. $\check{x} > \frac{r}{1+r}$ and $\tilde{x} \leq \frac{r}{1+r}$.

- For $x \in \left[0, \frac{c}{s+c}\right]$, R always accepts the offer. G's best payoff is $\frac{c}{s+c} - s$.
- For $x \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$, R always accepts the offer. Given this, G offers $x = \frac{r}{1+r}$. G's best payoff is $\frac{r(1+s+c)}{1+r} - c - s$.
- For $x \in \left(\frac{r}{1+r}, 1\right]$, R always rejects the offer. G's best payoff is $q - s + qs - d_G$.

$\frac{r(1+s+c)}{1+r} - c - s > \frac{c}{s+c} - s \Leftrightarrow (c + 1 + s)(c - sr) < 0$ holds when $-1 - s < c < sr$, which is consistent with Assumption 1. Thus offering $x \in \left[0, \frac{c}{s+c}\right]$ is not optimal. This means that we have to compare $\frac{r(1+s+c)}{1+r} - c - s$ and $q - s + qs - d_G$.

(i) When $\frac{r(1+s+c)}{1+r} - c - s \geq q - s + qs - d_G$, G offers $x^* = \frac{r}{1+r}$, which R accepts (**Violence II**). The equilibrium conditions are as follows:

- $\check{x} > \frac{r}{1+r}$ and $\tilde{x} \leq \frac{r}{1+r} \Leftrightarrow q + d_R \in \left(\frac{r(1+s)}{1+r} - qs, \frac{r}{1+r} - qs + s\right]$;
- $q - d_G \leq \frac{r(1+s+c)}{1+r} - c - qs$.

(ii) When $q - s + qs - d_G > \frac{r(1+s+c)}{1+r} - c - s$, G offers $x^* > \frac{r}{1+r}$, which R rejects (**Battle III**): The equilibrium conditions are as follows:

- $\check{x} > \frac{r}{1+r}$ and $\tilde{x} \leq \frac{r}{1+r} \Leftrightarrow q + d_R \in \left(\frac{r(1+s)}{1+r} - qs, \frac{r}{1+r} - qs + s\right]$;
- $q - d_G > \frac{r(1+s+c)}{1+r} - c - qs.$

Note that $q + d_R \leq \frac{r}{1+r} + s(1-q) < \frac{q+d_R+qs}{1+s} + s(1-q) \Rightarrow q + d_R < \frac{q+d_R+qs}{1+s} + s(1-q)$.From $q + d_R < 1$ (Assumption 2), this holds when $d_R < (1-q)(1-s^2)$.

Case 5. $\tilde{x} \in \left(\frac{r}{1+r}, 1\right)$.

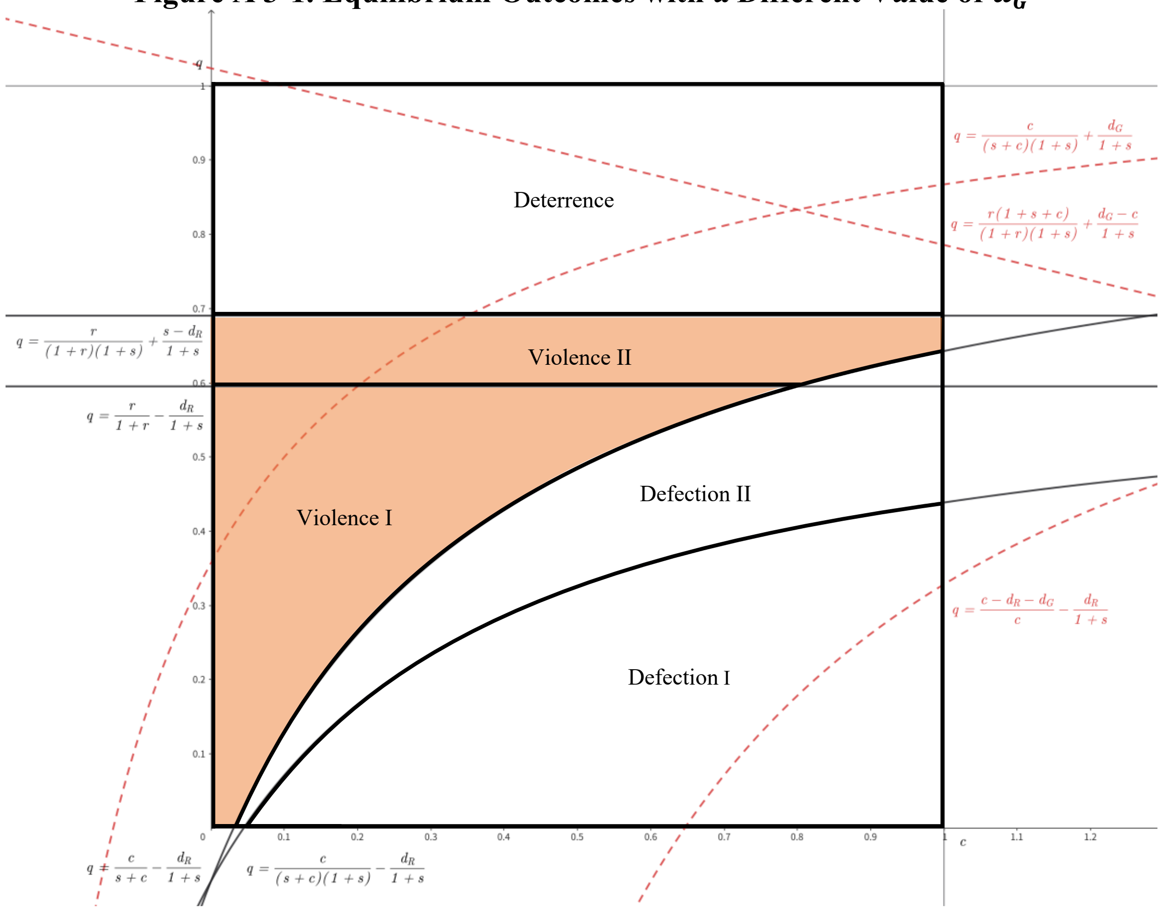
- For $x \in \left[0, \frac{c}{s+c}\right]$, R always accepts the offer. G's best payoff is $\frac{c}{s+c} - s$.
- For $x \in \left(\frac{c}{s+c}, \frac{r}{1+r}\right]$, R always accepts the offer. G's best payoff is $\frac{r(1+s+c)}{1+r} - c - s$.
- For $x \in \left(\frac{r}{1+r}, 1\right]$, R accepts $x \leq q + d_R + qs - s$. G's best payoff is $q + d_R + qs - s$.

As seen in Case 4, $\frac{r(1+s+c)}{1+r} - c - s > \frac{c}{s+c} - s$ holds by Assumption 1. G prefers offering $x = \tilde{x}$ to doing $x = \frac{r}{1+r}$ when $q + d_R > \frac{r(1+s+c)}{1+r} - c - qs$. This always holds when $\tilde{x} \in \left(\frac{r}{1+r}, 1\right) \Leftrightarrow q + d_R \in (\frac{r}{1+r} - qs + s, 1 - qs + s)$ since $\frac{r(1+s+c)}{1+r} - c - qs < \frac{r}{1+r} - qs + s \Leftrightarrow \frac{r}{1+r} < 1$ always holds. Thus, G offers $x^* = q + d_R + qs - s$, which R accepts (**Deterrence**).

The equilibrium condition is $q + d_R \in \left(\frac{r}{1+r} - qs + s, 1 - qs + s\right)$.

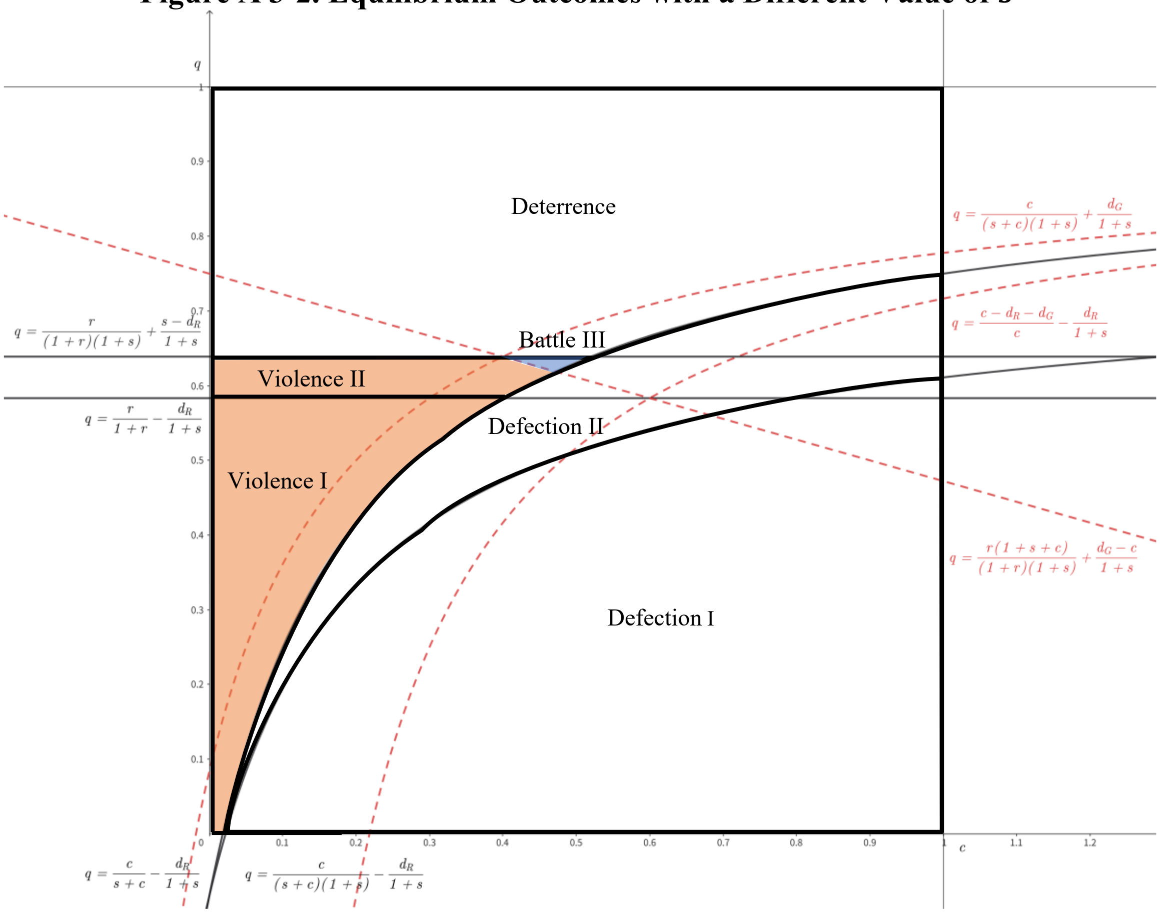
A3. Equilibrium Outcomes with Different Parameter Values

Figure A 3-1. Equilibrium Outcomes with a Different Value of d_G



The figure shows the equilibrium outcomes of the Fearon–Kalyvas model (Figure 3) when $s = 0.4, r = 2, d_R = 0.1$, and $d_G = 0.5$. The vertical and horizontal axes are q and c, respectively. The labels of the equilibrium outcomes correspond to those in Appendix A2.

Figure A 3-2. Equilibrium Outcomes with a Different Value of *s*



The figure shows the equilibrium outcomes of the Fearon–Kalyvas model (Figure 3) when $s = 0.2, r = 2, d_R = 0.1$, and $d_G = 0.1$. The vertical and horizontal axes are q and c, respectively. The labels of the equilibrium outcomes correspond to those in Appendix A2.

A4. Replication of Liu (2024)

We illustrate Implications 2 and 3 by replicating Liu (2024). As we noted in footnote 22 of the manuscript, the outcome of Liu (2024) is not anti-civilian violence, but we do not find other studies that use instrumental variables or other research designs to test the Kalyvas model. Thus, we replicate Liu (2024) to illustrate how we can address possible violations of the exclusion restriction.

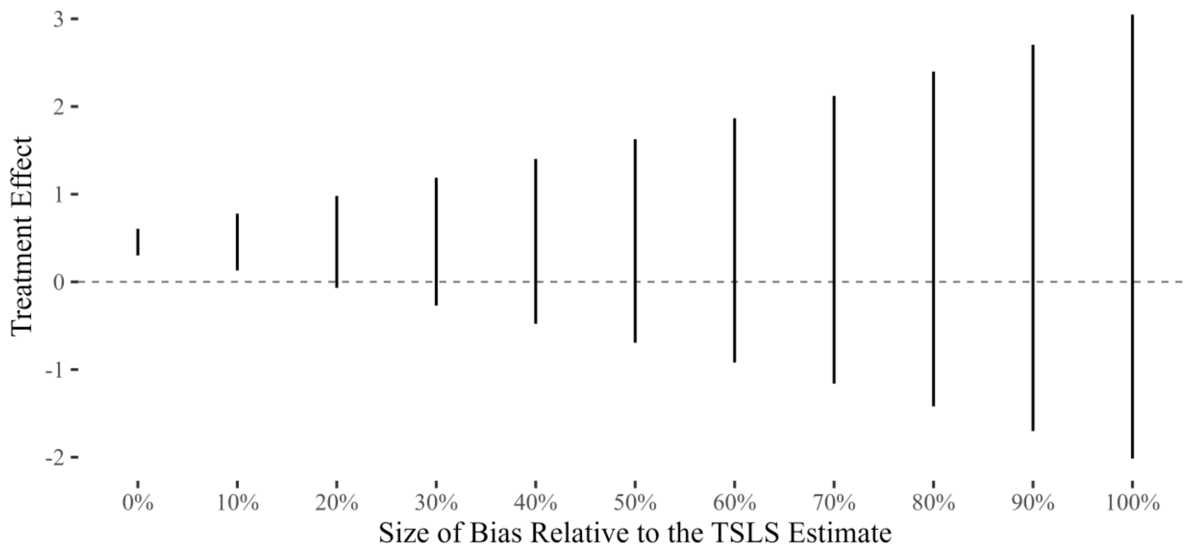
Liu (2024) analyzes the effect of wartime territorial control on postwar political development in Zimbabwe. The sample contains 2,917 respondents in rounds 1-7 of Afrobarometer surveys. We focus on their main outcome variable—participation in formal political channels. The treatment variable is the territorial control by the Zimbabwe African

National Union (ZANU) during the Zimbabwe War of Independence (1964–1979). Although the variable takes five unique values, Liu (2024) uses it as a continuous variable. To address concerns of possible endogeneity, Liu (2024) instruments it with the logarithmic distance to ZANU's foreign sponsor, Mozambique, while admitting that exclusion restriction is "a difficult proposition in this political context" (1141).

We replicate her main estimate (Model 1 in Table 1, p.1141) and check how robust the estimate is to possible violation of the exclusion restriction (Anderson and Rubin 1949; Wang et al. 2018). We vary the size of bias from 10% to 100% of the estimated effect of ZANU's control. Although we fail to exactly replicate her findings in R, the estimates and statistical significance are nearly identical to those in the original study.

As shown in Figure A 4-1, the estimated effect becomes indistinguishable from zero when the bias constitutes at least 30% of the estimate. This means that when the distance to Mozambique affects the outcome through its effect on ZANU's military capability, and this effect is at least 30% of the estimate, we cannot conclude that ZANU's territorial control facilitated political participation. Although the effect of military capability on political participation is theoretically (i.e., Implication 3) and substantively unclear, the biases may nullify the finding of Liu (2024).

Figure A 4-1. Sensitivity Analysis of Liu (2024)



The figure shows the effect of ZANU's wartime territorial control on participation in formal politics in Zimbabwe. The size of bias range from 0% or 100% of the TSLS estimate. The vertical bars are the 95% confidence intervals (Anderson-Rubin intervals).