# The Political Violence Cycle*

S.P. Harish† Andrew T. Little‡

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*Preliminary version, please do not circulate without permission*

**Abstract**

Do elections cause violence? Some scholars point to higher levels of unrest around elections, especially in developing countries, to assert that elections cause political violence. We develop a formal model to demonstrate that this conclusion is unfounded. In our baseline model, violence is more effective in electoral periods, leading to a spike in fighting surrounding elections. However, the presence of elections also *decreases* violence in other periods, as the prospect of future elections makes fighting less valuable today. So, while we observe a "political violence cycle" that peaks at the election, the overall effect of introducing elections on aggregate levels of violence may be positive or negative. When elections also provide a sufficiently effective non-violent means to contest for power, they unambiguously reduce violence compared to the non-electoral benchmark while still producing a qualitatively similar cycle. Thus observing a spike in violence does not imply a country would be more peaceful in the absence of elections; in fact, it is a symptom of the fact that elections are consequential.

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†Department of Politics, New York University. psr245@nyu.edu

‡Department of Government, Cornell University. andrew.little@cornell.edu.

## Introduction

> "Sick of *elecshun* related violence and terror attacks. Can't wait for *elecshuns* to be over and get non-*elecshun* related violence back." - A (purposefully misspelled) tweet from the satirical and pseudonymous Majorly Profound during the 2013 Pakistani elections.

A prominent argument for democracy centers around the fact that elections allow political groups to compete via ballots rather than bullets. However, elections are often violent affairs. For example, the conflict surrounding the 2007 elections in Kenya led to around 1,500 deaths and left hundreds of thousands displaced (BBC, 2008). Similarly, riots during the April 2011 presidential voting in Nigeria witnessed the deaths of 800 people (Human Rights Watch, 2011). Though recent studies on election-related violence generally focus on Africa (Bekoe, 2012), such violence has been observed all around the world: e.g., in Mexico, Pakistan, India, Cambodia and the Philippines. Indeed, electoral violence is not a new phenomenon nor limited to nascent democracies or ethnically divided societies but a problem "virtually all states have experienced" (Rapoport and Weinberg, 2000, p.42). As the United States and other Western countries at least nominally encourage developing countries to hold elections, the question of whether doing so incites violence is of great practical as well as theoretical importance.

That elections are a necessary condition for electoral violence is tautological. However, ruling regimes and other parties potentially have incentives to commit violence at all times, regardless of whether they contest in (meaningful) elections. Still, recent empirical studies have found that various forms of political violence sometimes *do* spike around elections (e.g., Hafner-Burton, Hyde and Jablonski, 2012; Newman, 2013) and that elections soon after a civil war may increase the chance of a relapse of fighting (Brancati and

Snyder, 2012; Flores and Nooruddin, 2012). Further, recent theoretical work on electoral violence shows how it can be used to augment or even substitute for peaceful campaigning tactics, generally painting a skeptical picture on the claims that elections reduce political violence (e.g., Ellman and Wantchekon, 2000; Chaturvedi, 2005; Collier and Vicente, 2012). A natural conclusion from this research is that elections should be delayed or outright discouraged; in the extreme some have even called elections a 'curse' (EISA, 2010; Economist, 2013).

The central purpose of this paper is to demonstrate that this conclusions is unfounded. Elections not only affect incentives to commit violence leading up and after the voting, but also in times farther from elections. In particular, the presence of an election in the future can decrease incentives to commit violence today. So, when compared to a baseline with no elections, the increase in violence surrounding elections may be more than offset by a decrease in violence further from the voting, leading to less violence on average. In other words, if a differences-in-differences estimator finds more violence in electoral periods, this can be driven by the election increasing violence in electoral periods as well as lowering violence in other periods.

We formalize this argument with a repeated game where an actor chooses a level of violence to further their political objectives in each period. Our central results examine how introducing periodic elections affects patterns in violence. The *inter-temporal* shift in violence can coexist with the *substitution* effect that lowers violence in general by creating non-violent means to contest for power (i.e., the ballots rather than bullets effect). When elections have both an inter-temporal and substitution effect, it is possible for the level of violence in a world with elections to be lower than it would be without elections *in every period*, even if there is still a cycle of violence that peaks around election time.

We first consider a very simple model where two parties compete over spoils from holding office, and the party in opposition commits violence in an attempt to oust the in-

cumbent. We take it as a given that violence is more effective in electoral periods, which stacks the deck against finding a pacifying effect. Consistent with our motivating examples (and not surprisingly given our assumptions) we find that introducing an elections generates a "political violence cycle," where conflict peaks in electoral periods. However, the presence of elections decreases the amount of violence in non-electoral periods compared to a baseline where elections never happen. So, it is often the case that the average level of violence is *lower* in a world with elections than a world without elections. That is, even if we assume the sole effect of elections is to periodically make violence more effective, elections can reduce the aggregate amount of political violence.

Next, we formalize the substitution effect by allowing the opposition to also take non-violent actions to increase their chance of taking office during an election period. Providing this alternative means of contesting for power lowers the level of violence in electoral periods as well as the periods leading up to elections for a similar reason described above; there is less incentive to commit violence leading up to an electoral period when parties can contest for power peacefully. If the relative cost of non-violent political activity is sufficiently low, there will *always* be less violence in a political system with elections; in fact, there may be less violence in *every* period compared to a baseline without elections.

Finally, we informally argue that these results likely extend to a more general setting where multiple actors can commit violence with more than one technology, and conclude.

## Extant Work

A large literature examines whether democracy in general is associated with civil conflict and other forms of violence (Hegre et al., 2001; Fearon and Laitin, 2003; Collier and Hoeffler, 2004; Hegre and Sambanis, 2006). However, there is more to democracy than elections, and many elections held in countries that are not coded (and with good reason)

as democratic.

In addition to the anecdotal evidence, more systematically collected data have shown spikes in violence, repression, and terrorism in either individual countries/elections (Hafner-Burton, Hyde and Jablonski, 2012) or cross-nationally (Newman, 2013). While others have found some types of violence may decrease during elections (Davenport, 1997) or null results, this evidence may cast doubt on the notion that elections necessarily have a pacifying effect.

Brancati and Snyder (2012) and Flores and Nooruddin (2012) find that early post-conflict elections may be particularly problematic in terms of recurrence to civil conflict (and preventing economic recovery), though this does not speak to directly to the counterfactual where no elections are held at all.

Many formal models study when parties will use pre- or post-election violence (and related technologies) as a tool to help win elections (e.g., Ellman and Wantchekon, 2000; Chaturvedi, 2005; Collier and Vicente, 2012). Related empirical work examines patterns of when and where electoral violence is particularly bad (e.g., Horowitz, 1993; Wilkinson, 2004; Straus and Taylor, 2009; Höglund, 2009). While we draw on this work in arguing that violence may be more effective or necessary in election periods, these models and empirical tests do not compare to a benchmark without elections, preventing any conclusions about the central question here.

Other recent game theoretic work does compare levels of violence in a game with and without elections, but only in a single period (Cox, 2009; Little, 2012). In many existing formal models, elections always reduce violence as – loosely speaking – voting acts as a substitute for fighting (Fearon, 2011; Przeworski, Rivero and Xi, 2012), the election fully alleviates the uncertainty that can cause bargaining to break down (Cox, 2009), or reducing violence is the benefit to holding elections (or democratizing more generally) and hence will only be done when it serves this end (Acemoglu and Robinson, 2000; Little, 2012).

We assume the opposite – that elections do make violence more effective in the electoral period – not because we disagree with the mechanisms illustrated in these models but to show that even in this "hard case" the offsetting effects of reduced violence away from the electoral period may lead to less aggregate fighting.

Our argument is related to models developed to answer how electoral rules can be obeyed in the shadow of force, which argue that rules can be followed if losers prefer the potential to contest for power again in future elections to fighting today (Przeworski, 1991, 2005; Przeworski, Rivero and Xi, 2012). However, we develop a model where parties contest for power using violent and nonviolent means in equilibrium, as is true in many cases. This allows for more nuanced into the question of how holding elections affects the patterns and aggregate levels of violence.

In sum, our results here suggest that even the "worst" of the existing theoretical empirical evidence regarding elections and conflict does not imply that elections increase violence in aggregate. This does not imply we should ignore studies that provide solid evidence for what types of elections are most likely to turn violent or what can be done to mitigate electoral violence, but it does provide a strong theoretical justification to not conclude from these studies that elections should be discouraged in general on these grounds.

## The Model

We first present a general model of political violence in a repeated setting; elections are incorporated in the following section. Suppose there are two parties competing for office. The game proceeds over $T > 1$ time periods. In each period, one party is the incumbent the other in opposition. The parties are ex ante identical, and to streamline the analysis we assume at the outset that party A and party B behave identically when in the opposition

role, which is the only time when actions are taken.[1] As a result, we refer to actions taken by the incumbent party and opposition party even though the actor in these roles may alternate.

The incumbent takes no actions and accrues a payoff normalized to 1 in each period. The party in opposition in time $t$ chooses violence level $v_t \geq 0$, incurring a cost $-c(v_t)$. Assume $c$ is increasing and convex, with $c'(0) = 0$. That is, the marginal cost of the first unit of violence is "free", and committing more violence is always costlier with an increasing marginal cost. The probability of taking over office is given by $p(v_t; k_t) : \mathbb{R}_+ \times [0,1] \mapsto [0,1]$, where $p$ is strictly increasing and concave in the level of violence $v_t$. The $k_t \in [0,1]$ parameter represents the *effectiveness of violence* in period $t$.[2] To formalize this, assume $\frac{\partial^2 p}{\partial v_t \partial k_t} > 0$. That is, the marginal effect of committing more violence is always increasing in $k_t$.[3]

We allow only the opposition to commit violence to illustrate the argument in a parsimonious fashion. Preliminary results from an extension where the incumbent chooses a level of violence as well are qualitatively similar to those presented here, and we discuss the generality of the results below.

The value of being in office at the end of the game is $u_I^{\text{end}}$ and the value of ending the game in opposition is $u_O^{\text{end}} < u_I^{\text{end}}$. Players discount time with common rate $\delta$. While the specific values chosen for $u_I^{\text{end}}$ and $u_O^{\text{end}}$ can have a large impact on the equilibrium levels of violence towards the end of the game, when there are many periods (i.e., $T$ is large), the continuation values at the end of the game will have little affect on the behavior for most of the game (see the appendix). In general, we consider long time horizons or set the continuation values to avoid rapid changes in behavior due to the game ending.[4]

[1] This could be derived as a result of the model given the uniqueness of the equilibrium.

[2] Placing $k_t$ on $[0,1]$ is entirely arbitrary, but consistent with the parameterization we use for simulations.

[3] If, further we make an assumption such as $p(0; k_t) = \underline{p}$ for all $k_t$ – i.e., the probability of taking office with no violence is independent of the effectiveness – this will imply $p(v_t; k_t)$ is strictly increasing in $k_t$ for any $v_t > 0$ as well.

[4] That is, the actors behave as they would in an analogous infinite horizon model which proves much

Formally, the period payoff to a party is given by:

$$u_t = \begin{cases} 1 & \text{as incumbent} \\ -c(v_t) & \text{as opposition} \end{cases}$$

and the payoff for the entire game when finishing as party $J$ is $U = \sum_{t=1}^{T} \delta^{t-1} u_t + \delta^T u_J^{\text{end}}$.

Let $v_t^*$ be the equilibrium level of violence in round $t$, and let $u_J^*(t)$ be the continuation value of entering period $t$ as in role $J$ when both parties choose the equilibrium violence level when in opposition. We can then write payoff for the remainder of the game when choosing violence level $v_t$ in period $t$ given the equilibrium level of violence in periods $t+1, ...T$ as:

$$u_O(t, v_t) = -c(v_t) + \delta(p(v_t; k_t) u_I^*(t+1)) + (1 - p(v_t; k_t)) u_O^*(t+1)) \tag{1}$$

A Subgame Perfect Nash Equilibrium of the game is characterized by a sequence of violence choices $v_t^*$ and continuation values of beginning each period as the incumbent ($u_I^*(t)$) or opposition ($u_O^*(t)$) that jointly solve:

$$\begin{aligned} v_t^* &\in \arg\max_{v_t} u_O(t, v_t) \\ u_O^*(t) &= u_O(t, v_t^*) \\ u_I^*(t) &= 1 + \delta(p(v_t; k_t)(u_O^*(t+1)) + (1 - p(v_t; k_t)) u_I^*(t+1)) \end{aligned}$$

where, to use the notation introduced above, $u_J^*(T+1) = u_J^{\text{end}}$.

We solve the model by backward induction. In the last period, the opposition probability of taking office and ending the game as the incumbent is $p(v_T; k_T)$, and they end the game in opposition with probability $1 - p(v_T; k_T)$. So, continuation value for choosing

harder to analyze.

violence level $v_T$ is:

$$u_O(T, v_T) = -c(v_T) + \delta(p(v_T; k_T)u_I^{\text{end}} + (1 - p(v_T; k_T))u_O^{\text{end}})$$

Setting the derivative of the objective function with respect to $v_T$ to 0 gives:

$$\delta p'(v_T; k_T)(u_O^{\text{end}} - u_O^{\text{end}}) = c'(v_T) \tag{2}$$

Since $p$ is concave and $c$ is convex and equal to zero at $v_T = 0$, this equation has a unique solution $v_T^*$ which is a global maximizer.

This gives the continuation value of entering the last period as the incumbent and opposition:

$$u_I^*(T) = 1 + \delta(p(v_T^*; k_T)(u_O^{\text{end}}) + (1 - p(v_T^*; k_T))u_I^{\text{end}})$$
$$u_O^*(T) = -c(v_T^*) + \delta(p(v_T^*; k_T)(u_I^{\text{end}}) + (1 - p(v_T^*; k_T))u_O^{\text{end}})$$

Where $v_T^* \geq 0$ solves by equation 2. Now consider period $T - 1$. The opposition continuation value for choosing violence level $v_{T_1}$ is:

$$u_O(T - 1, v_{T-1}) = -c(v_{T-1}) + \delta(p(v_{T-1}; k_{T-1})u_I^*(T) + (1 - p(v_{T-1}; k_{T-1}))u_O^*(T)).$$

As long as $u_O^*(T) < u_I^*(T)$, this has a unique interior maximizer characterized by:

$$\delta p'(v_{T-1}; k_{T-1})(u_I^*(T) - u_O^*(T)) = c'(v_{T-1})$$

If $u_O^*(T) > u_I^*(T)$, the opposition prefers to stay in opposition and will choose no violence, though this can not happen with the main functional forms we use in the numerical sim-

ulations. For now we ignore this possibility as it seems unrealistic and only necessitates minor caveats to our analytic results.[5]

Reasoning analogously, we can recursively solve for the optimal violence level and hence continuation value of being in either position at any time $t < T$ as:

$$\delta p'(v_t^*; k_t)(u_I^*(t+1) - u_O^*(t+1)) = c'(v_t^*)$$
$$u_I^*(t) = 1 + \delta(k_t v_t^*(u_O^*(t+1)) + (1 - k_t v_t^*)u_I^*(t+1))$$
$$u_O^*(t) = -c(v_t^*) + \delta(k_t v_t^*(u_I^*(t+1)) + (1 - k_t v_t^*)u_O^*(t+1))$$

Even when picking a $c$ and $p$ that give closed form solutions, these expressions quickly become very complex and generate little insight. Still, there are two important characteristics of the optimal level of violence. First, as expected, it is increasing in the effectiveness of violence $k_t$. Second, it is increasing in the difference between entering the next period in the incumbent and opposition role. This difference is decreasing in the effectiveness in the next period ($k_{t+1}$), as a high effectiveness of violence makes the opposition better off and the incumbent worse off. As a result, the amount of violence committed today is *decreasing* in the effectiveness of violence tomorrow. In fact, by a similar logic the optimal level of violence in period $t$ is decreasing in the effectiveness of violence in *every* future period:

**Proposition 1.** *The equilibrium level of violence in time period $t$ is:*
*i) increasing in $k_t$, and*
*ii) decreasing in $k_{t+1}, k_{t+2}, ...k_T$*

**Proof** See the appendix

So, increasing the effectiveness of violence in periods $t > 1$ has an ambiguous impact on

[5]For example, some strict results become weak; e.g., the level of violence in period $t$ is only weakly increasing in $k_t$.

the aggregate level of violence. Increasing $k_t$ has the obvious direct effect of increasing the level of violence in period $t$, but an indirect effect of *decreasing* violence in periods $1, ..., t-1$. Again, we argue below that this mechanism likely holds in more general settings

## Elections, Pictures

We now apply this general solution to look at how periodic elections affect aggregate levels of violence under the following assumption:

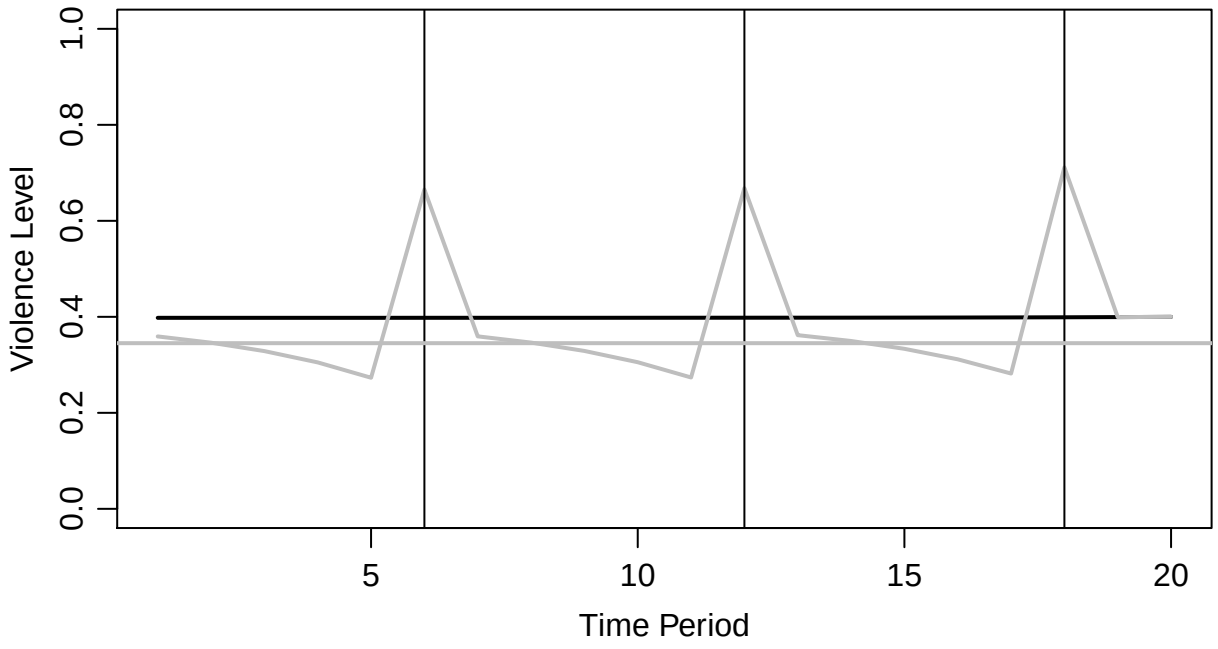
**Assumption 1.** *Suppose that in a world without elections, the effectiveness of violence is $k_t = k_n$ for all periods, and that with elections the effectiveness of violence is $k_e > k_n$ in electoral periods and $k_n$ for other periods*

We make this seemingly unusual assumption for two reasons. First, our primary goal is to show how elections can reduce violence even if fighting peaks around elections. So this assumption constitutes a "hard case" for our aims. Second, we are motivated by the empirical fact that violence often does increase around elections, and this assumption is perhaps the easiest way to have the model match this fact. That is, we are not directly concerned with *why* elections make violence more effective. Writing a model where the effectiveness of violence is micro-founded could certainly provide additional insight, but would be substantially more complex and make our central arguments less transparent.

As demonstrated by proposition 1, introducing elections will increase the level of violence in electoral periods but decrease the level of violence in all periods prior to the final electoral period. To gain intuition for which of these effects is larger, we present some illustrative cases. For all of these simulations, $c(v_t) = -v_t^2$ and $p(v_t; k_t) = k_t(1 - (1 + v_t)^{-1})$:

Figure 1 presents the first numerical example. Without elections, let $k_t = .3$ for all periods. Consider a 20 period model there are elections in periods 6 and 12, and 18, where $k_t = .9$. In the figure, the solid line is the violence level with no elections, and the grey

Figure 1: Comparison of violence levels without (black line) and with (grey curve) elections




curve is the electoral case.[6] The vertical lines denote the election periods, and the grey line the average violence level with elections. The grey line is below the black line, indicating that there is less violence on average with elections.

Analytic solutions for when there will be less aggregate elections prove very difficult. So, we present some numerical solutions that get at two patterns we believe hold in general. First, elections do more to reduce violence when they are *consequential*: that is, when $k_e$ is high. Second, when it is possible for elections to reduce the level of violence, the average violence level will be minimized when the frequency of elections is intermediate. The intuition behind this is that if elections are too close together then the "in-between" periods are not long enough to offset the increase in violence during election periods, but if elections are very far apart they will not affect the average level of violence at all.

[6] Again, we select a $u_I^{\text{end}}$ and $u_I^{\text{end}}$ such that the level of violence is nearly constant without elections, avoiding an artificial effect induced by the game ending.

Figure 2: The effect of making elections more consequential on average levels of violence

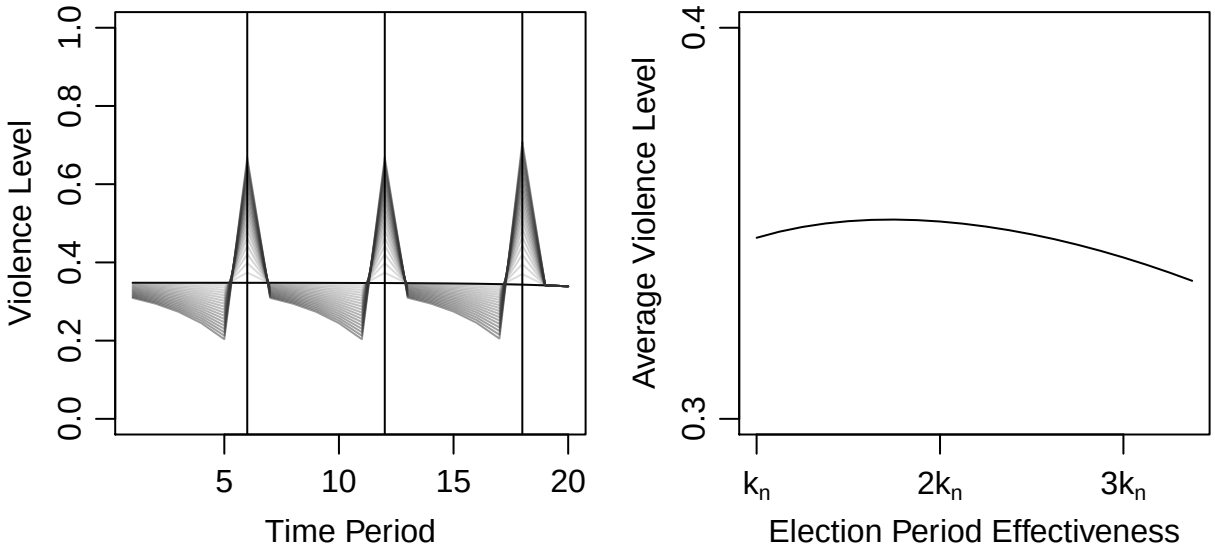
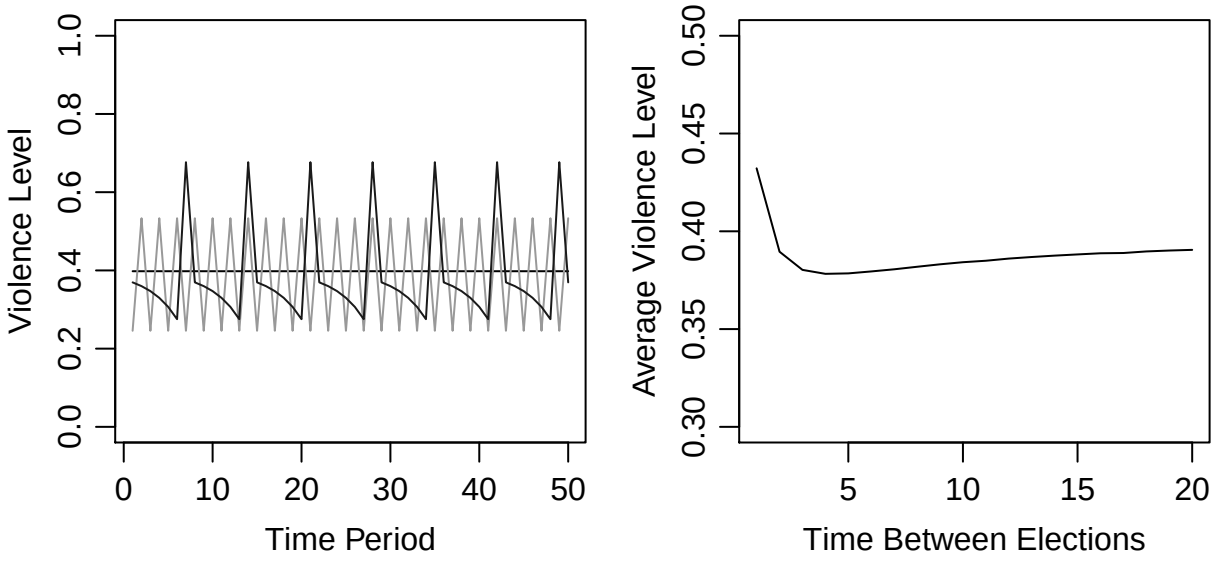



Figure 2 shows how the effectiveness of violence in electoral periods affects the average level of violence. The left panel of figure 2 illustrates the per period violence levels with increasingly opaque lines as $k_e$ increases from .3 (i.e., the case with no elections) to 1. Increasing the effectiveness of violence in the electoral periods leads to bigger spikes of violence during the election, but also larger decreases in violence in non-electoral periods. The right panel shows how this affects the average levels of violence. While making violence slightly more effective in electoral periods increases the average amount of violence, making violence much more effective leads to less violence overall. However, note these changes is the average violence level are not large: on the whole the spikes in violence in electoral periods and decreases in non-electoral periods largely cancel out.

Still, this example is interesting in light of empirical findings that competitive elections outside of consolidated democracies tend to be particularly violent (e.g., Straus and Taylor, 2009). If the competitiveness is reflected in violence becoming much more effective in the electoral period, then the model predicts such large spikes. However, it is precisely the

Figure 3: Comparison of violence level by frequency of elections




competitiveness of the election that depresses violence before the election: there is less of an incentive to commit violence today if the opposition has a real chance to take office in an upcoming election.

Figure 3 shows how changing the frequency of elections affects aggregate levels of violence. The left panel compares a case with frequent elections (lighter curve) to one with rarer elections (darker curve) compared to no elections (flat line). When elections are more rare, they are associated with a larger spike in violence. However, it also means there is a longer between-election period to reap the benefits of less violence. The left panel plots the average level of violence as a function of how many periods there are between elections. For this parameterization, overly frequent elections are bad, as this leads to more violent electoral periods without enough time in-between elections to balance this effect out. The optimal election timing is intermediate: violence is minimized when elections are held every 5 periods. That is, if elections are too rare, they can not greatly affect the average incidence of violence.

Additional numerical simulations seem to support the general conclusions reached by examining figures 2 and 3. These suggest that elections do the most to reduce average violence when they are (1) consequential, and (2) moderately frequent.

## Bullets and Ballots

In this section we present an extension to the model analyzed above that combines the canonical argument that elections reduce violence by providing an alternative means to contest for power with the inter-temporal effects described above. In short, we find that this substitution effect can coexist with the spikes in violence around elections. Unlike the previous section where introducing elections have an ambiguous and generally small effect on aggregate levels of violence, in the model in this section we find large decreases in conflict with elections while still observing cycles of violence that peak at or around the electoral periods.

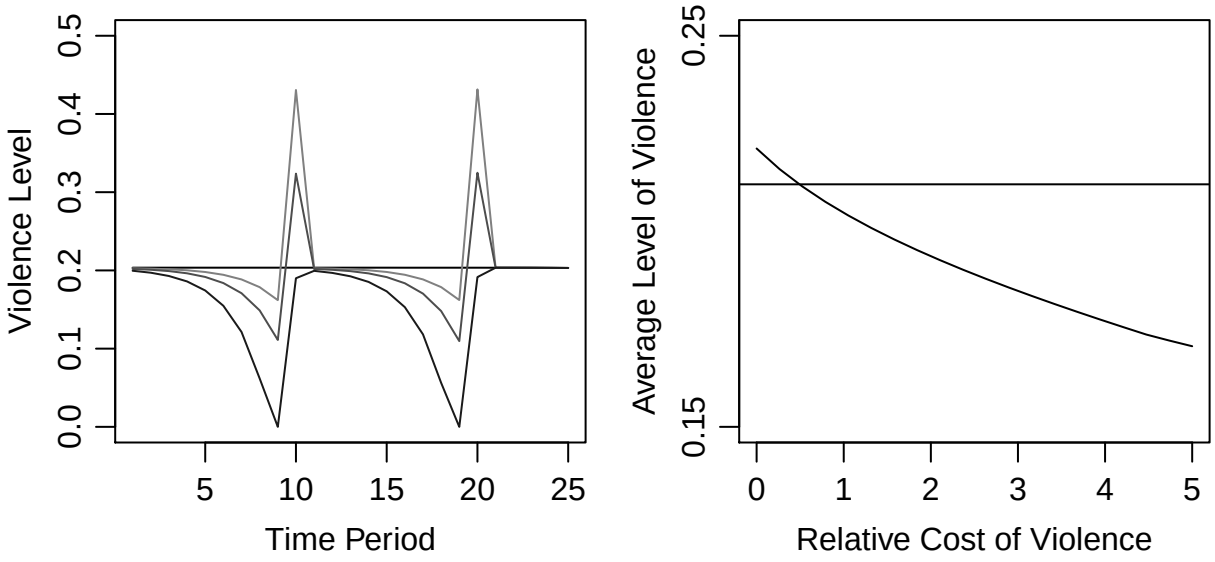
To formalize this, suppose that in an electoral period, the opposition party can also choose to take nonviolent actions to increase their probability of winning. Denote the amount of nonviolent political action taken in period $t$ with $x_t$, and let the probability of taking office in an electoral period is given by $p_e(x_t + v_t; k_t)$ with the same functional form assumptions as above.[7] So, now the $k_t$ parameter reflects the increased effectiveness of political activity in general. For simplicity, we assume that nonviolent political action is not available or ineffective in non-electoral periods.

In addition to the $c(v_t)$ paid to take violent actions, the opposition also pays a partial cost $c(x_t)/\beta$ for the nonviolent actions, for some $\beta > 0$. So, $\beta$ reflects the relative cost of violent political activity: when $\beta > 1$ violent activity is more efficient and when $\beta < 1$ nonviolent action is more efficient.[8]

[7] That is, $p_e$ is increasing and concave in it's first argument, and the cross partial with respect to the two arguments is positive.

[8] Using the inverse is mostly to make calculations straightforward, as the $\beta \to 0$ case equals the case

Figure 4: The effect of introducing nonviolent technologies on the level of violence




Following typical optimization procedures, the first order condition for the opposition's choice in period $t$ is now:

$$\delta(u_I^*(t+1) - u_O^*(t+1))p_e'(x_t^* + v_t^*; k_t) = c'(v_t^*)$$
$$\delta(u_I^*(t+1) - u_O^*(t+1))p_e'(x_t^* + v_t^*; k_t) = c'(x_t^*)/\beta$$

This implies $c'(v_t^*) = c'(x_t^*)/\beta$, which by the convexity of $c$ ensures a unique pair $(x_t, v_t)$ meeting these conditions.

Analogous to above, we present a numerical simulation where $c(v_t) = -v_t^2$ and $p_e(v_t + x_t; k_t) = k_t(1 - (1 + v_t + x_t)^{-1})$. Figure 4 illustrates the impact of nonviolent activity on how much violence is chosen in equilibrium. As before, the flat line in the left panel represents the level of violence with no elections. The grey curve with the highest peaks represents the level of violence chosen where – as in the past section – violence is more

where violence is the incumbent's only choice.

effective in the electoral periods but there is no nonviolent technology to use. The curve with the next highest peaks introduces a nonviolent technology, but one which is costly relative to violence (low $\beta$). There is still a spike in violence in the electoral period in this case, but violence is lower overall as (1) the incumbent uses slightly less violence in the electoral period due to the presence of the non-violent technology, and (2) the presence of the non-violent technology during the electoral period gives an incentive to "wait" until the election when both technologies are available *and* more effective.

In the lowest curve, the non-violent technology is very cheap (high $\beta$), and as a result the level of violence is lower in *every* period than it would be without elections. The substitution effect is so large that violence peaks after the election, when the non-violent technology is not available, but the next election is far enough away that it is worth committing violence to try and take over office. So, post-election violence may be particularly prevalent not only as a direct response to the outcome or conduct of the election, but because this is the point where the losers have to wait the longest time in order to contest for power again.

The right panel of figure 4 plots the average level of violence as a function of the relative cost of violent actions ($\beta$). Unlike the previous graphs, making the nonviolent action cheaper (higher $\beta$) has an unambiguous and large effect in decreasing the average levels of violence. In this parameterization, elections would lead to more violence in the absence of a nonviolent technology ($\beta \to 0$), but as long as the nonviolent technology is less than twice as expensive as violence the presence of elections will decrease the average level of violence.

Formalizing these observations:

**Proposition 2.** *i. The average level of violence is strictly decreasing in the relative cheapness of nonviolent technology ($\beta$),*

*ii. if the average level of violence is higher with elections and no nonviolent technology (i.e., as*

*$\beta \to 0$), then there exists a $\overline{\beta}$ such that the average level of violence is lower with elections if and only if $\beta > \overline{\beta}$, and*

*iii. There exists a $\overline{\overline{\beta}}$ such that if $\beta > \overline{\overline{\beta}}$ then there is less violence in* every *period when there are elections.*

**Proof** See the appendix.

## Generalizing The Results

The models analyzed above make many objectionable assumptions. While we do not want to over-claim how robust the analysis is without formal results, before concluding we discuss why we believe the general mechanisms highlighted by our simple model likely translate to more complex and realistic settings. For example, we assume that only one actor – the opposition – takes violent actions, while ruling parties and others can and do commit violence to achieve political objectives as well. Our model also focuses on violence used to take control of the government (and a single, unspecified technology of violence), while much if not most political violence has more modest aims.

In a more general setting, multiple actors have multiple violent and nonviolent technologies they can use to affect political outcomes. The political outcome in period $t$ is affected by these actions as well as the status quo (i.e., the outcome in period $t-1$). So, when actors commit violence, it is not only to affect the political status quo tomorrow, but in later periods as well. The tighter the link between the outcome tomorrow and the day after tomorrow and the future in general, the more the actors will be willing to take costly (violent) actions to affect this change.

If elections allow for rapid change in political outcomes, then they will weaken the degree to which the outcome in period $t$ affects the outcomes in later periods. As illustrated in the models here, this will be the case if elections provide violent or non-violent means

to affect the political status quo. In general, as long as the presence of an election makes *any* violent or non-violent technology more effective, the mechanisms we propose should hold.[9]

As a result, elections weaken incentives to commit violence in non-electoral periods. In other words, any gains from committing violence may be reversed in an election, giving an incentive to "wait" until the electoral period to take costly political action. This effect is stark in our model, but should hold in any setting where (1) the political status quo is "sticky" across periods, and (2) elections allow for a more rapid change in the political status quo.

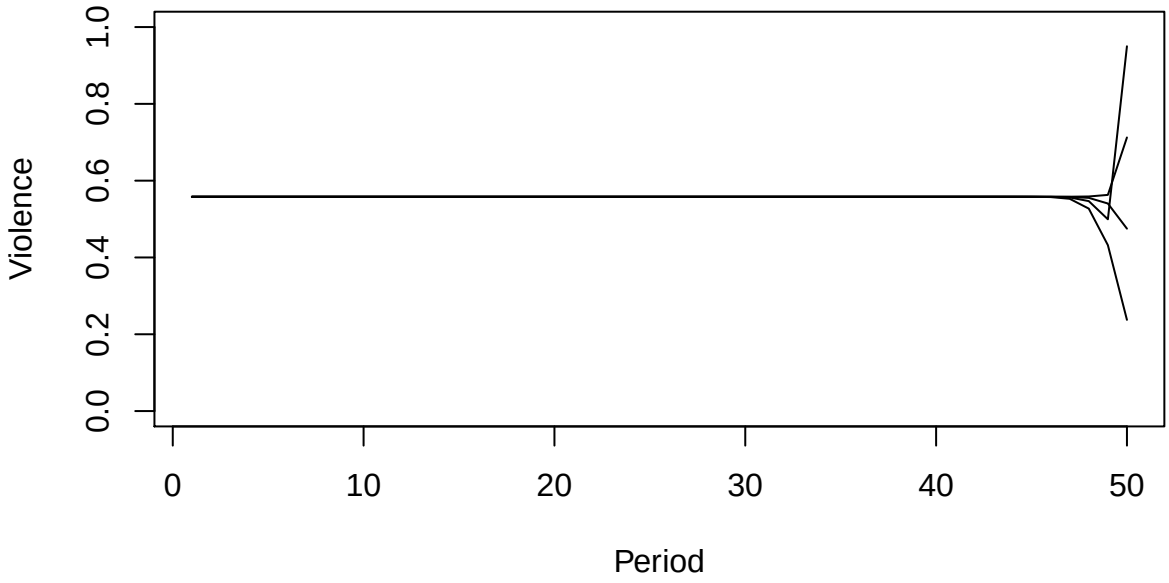
## Conclusion

Elections play an important role in democracies but they are often accompanied by violence against both candidates and voters. We have shown that the spike in conflict levels around elections does not necessarily imply that elections cause more political violence in general. When elections are the central means to contest for political power, they may also become the most effective times to use political violence. It is the precisely the expectation of the ability to use violence effectively in a future electoral period that results in relatively lower levels of violence in non-electoral periods. However, the extension where elections also provide a non-violent means to contest for power shows that high levels of violence during elections is not inevitable. Elections can be peaceful for two reasons: either they are not a serious means to contest for power, or they provide such an effective non-violent means to contest for power that violence is no longer a useful tool.

[9]This could explain why elections can not only affect the *magnitude* of violence across time, but the *kinds* of violence used across time.

## Appendix

As long as we consider a large number of periods how we set these continuation value parameters $u_I^{\text{end}}$ and $u_O^{\text{end}}$ has no qualitative impact on the behavior for most of the game. The following figure shows how patterns in violence in a 50 period model (with $k_t = .5$ and $\delta = .95$, and $u_0^{\text{end}} = 1$) change as $u_I^{\text{end}}$ changes. When $u_I^{\text{end}}$ is high there is a big uptick in violence in the last period, and when $u_I^{\text{end}}$ is very low violence drops off towards the end of the game. However, for the first 90% of the game the levels of violence are indistinguishable:




In general, to avoid these quirks we will set the continuation values at "moderate" levels where the impending end of the game does not dramatically change behavior.

**Proof of proposition 1**

Part i follows from implicitly differentiating the FOC. For part ii, take any $t' > t$. Substituting gives $u_I^*(t') - u_O^*(t')$ is decreasing in $k_{t'}$, which by induction implies $u_I(t'') - u_O^*(t'')$ is decreasing in $k_{t'}$ for all $t'' < t'$. By the FOC in period $t$, this implies $v_t^*$ is decreasing in $k_{t'}$. ∎

**Proof of Proposition 2**

(Sketch) Part i follows from implicitly differentiating the equilibrium condition. The equilibrium conditions imply that as $\beta \to \infty$, $v_t^* \to 0$ in electoral periods, and the level of violence committed in non-electoral periods is strictly decreasing in $\beta$ as well. So the average level of violence is continuous and decreasing in $\beta$, and when $\beta$ is sufficiently large is below the average level of violence without elections, completing parts ii-iii.

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