Voting as a Credible Threat.

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Version 2 – November 28, 2006

Abstract

We offer a rationale for elections that take place in the shadow of power. Factions unhappy with policy can threaten violence, but when they do not share the same beliefs about their chances of victory at arms, mutual overconfidence can precipitate civil war. We argue that elections can clarify the likely consequences of violence, and so facilitate peaceful resolution. Our theory is based on the recognition that both voting and fighting are intrinsically *correlated* actions. We show that even plebiscitory elections that do no select the political decision makers may communicate enough information to avoid civil war.

Introduction

A crucial feature of democracy is the acceptance of loss in the electoral arena. Those who are dissatisfied with the outcome typically retain some recourse to other forms of conflict, including, in extreme cases, civil war. Democracies survive by not pushing their losers over the threshold of armed rebellion. Of course, most elections do not revolve around such significant issues, but occasionally democracies must face momentous choices that inflame passions and divide the public. When such choices must be made elites will bargain towards a solution "in the shadow of power" (Powell, 1999), keeping in sight the importance of not precipitating violent unrest, or in extreme cases, even

*Londregan gratefully acknowledges research support from the Woodrow Wilson School, Vindigni thanks LABORatorio R. Revelli and Fondazione Real Collegio Carlo Alberto (Moncalieri, Turin), and both authors wish to thank without implicating Guido Tabellini and seminar participants at the 2005 Bellagio Center conference on Poverty, Democracy and Clientelism for their useful comments.

civil war. If the relative strengths of the factions in a potential civil war are common knowledge, then the intrinsic costliness of civil war will typically create a feasible set of possible compromises. In contrast, false optimism about the outcome of a potential civil war can provoke such a conflict.

Our point of departure for this paper is a conflict over policy by factions that may attempt to use civil war to impose their policy if they are unable to achieve an acceptable negotiated outcome[1] If the factions' have inconsistent beliefs about victory in the case of armed conflict, and in particular, if there is an excess of optimism (Johnson, 2004) there may be no compromise that can simultaneously satisfy both factions, and threats may be translated into actions. We show how elections might solve this problem by creating a convergence of expectations about the outcome of a conflict.

Our argument will apply if voting and violent struggle are correlated activities. In that case, the election is a sort of bloodless civil war in which the strengths of the two factions are, at least partially, revealed. By dispelling factions' mutual optimism an election can make a negotiated settlement easier to reach, expanding the set of compromises acceptable to both.

The paper proceeds as follows. In the next section we briefly outline our reasons for preferring to model beliefs as heterogeneous. Section 2 sets forth our basic model of civil conflict, and demonstrates the way voting may be used to resolve it. Section 3 connects our model of rational decision makers with models of voting and participation based on psychological theories of behavior. While our central result is the potential for elections to make civil war less likely, there are configurations of parameters, albeit implausible ones, of which an election can actually make civil war more likely, section 4 provides an example of how this can happen. Section 5 connects our paper with some of the related literature. A brief section concludes.

[1]Thus, our view of the political process shares with Weber and (Schmitt 1988, 1996), the recognition that politics centers on fundamental conflicts between opposing factions.

1 Common Knowledge about Uncommon Beliefs

A central assumption of our model is that factions leaders have different beliefs regarding the probability of winning a civil war and that this is common knowledge. That beliefs in a situation of conflict may differ in ways that are common knowledge is hardly a surprise, indeed, in some cases it is a difference in beliefs that produces conflict. Consider religious strife in which people adhere to distinct and mutually contradictory creeds. Proselytizers ensure that the content of the different creeds is common knowledge, yet believers in the Koran do not automatically convert to Christianity upon becoming acquainted with the contents of the Bible, nor *vice versa*. Sometimes public and distinct core beliefs give rise directly to conflicting expectations about the outcome of a conflict. For instance, Johnson (2004) notes that the belief that the leaders of Germany, Russia, France, Britain and Turkey, all shared in 1914, that the war would be quick and easy (and that they would win it), was based on the racialist presumption of that their own race and culture were morally superior to their opponents. This imagined racial and cultural superiority was expected to enable them to overcome any material or numerical advantages of their enemies. These ultra-nationalist beliefs were not secret, the Germans and French each knew of one another's nationalism, but neither were they held in common, each side knew of the other's confidence, and each viewed the other as mistaken. Formal models in which agents have common knowledge about one another's heterogeneous beliefs have been incorporated in the analysis of a variety of strategic settings, including electoral politics Jr. (1993), labor market discrimination Coate and Lowry (1993) and asset trading Morris (1994). Morris (1995) argues that the assumption of heterogeneous beliefs is no less natural than the assumption of heterogeneous preferences.

Morris (1995) contends that the assumption of distinct priors is best suited to settings in which (i) opportunities for learning will reduce the difference between the parties' beliefs, (ii) the parties, update rationally on the basis of new information, and (iii) there are reasons independent of the behavior being explained for believing that beliefs are heterogeneous. Our model exhibits the first two features by construction. The plausibility of our assumption that different groups have distinct beliefs about the outcome of a civil war is enhanced by the lack of opportunities to learn about the likelihood of the event. By its very nature, a civil war is unlikely to be frequently repeated, so that people will not have had much chance to update on the basis of common experience. Moreover, people are notoriously prone to overconfidence about their prowess at armed conflict, and in several other situations. Optimism and unwarranted confidence appear to be rather pervasive in general. Psychological testing has revealed that almost everyone rates themselves as above average, and people underestimate their chances of getting sick or having accidents. Leaders appear to be especially prone to this bias. For instance, Johnson (2004) provides evidence from case studies that overoptimism, triggered by positive illusions was an important cause of international war during the twentieth century. For instance, he shows that many governments, as well as military commanders, were persuaded in 1914 that the first World War would have a quick and victorious end for their country. Similarly, Gilbert (2006) remarks that "In August 1914 the empires of Europe embarked on a war that each of them believed would be swift and victorious." Of course, all of them were wrong, since the war turned out to be longer and more destructive than anyone had imagined. Even the least optimistic of the great powers, the Austro-Hungarian Empire, appears not to have foreseen the possibility that participation in the conflict engulfing Europe in 1914 would lead to their very dissolution.

Just as religious believers do not automatically abandon their faith upon learning the details of another creed, so too factional leaders do not necessarily abandon their confidence upon learning that their opponents also expect to win. Whether their belief in victory is alloyed with a sense of nationalism or of ideological superiority, faction leaders appear willing to attribute the other side's optimism to incorrect prior beliefs. Rather than reasoning that if the Nationalists were so confident of victory, then perhaps resistance was indeed doomed, the Spanish Republicans of 1936 seem to have concluded that their opponents willingness to fight was simply another manifestation of the misguided beliefs that led the Nationalists to prefer fascism.

2 A Model of Civil Conflict Resolution

We consider two competing models of policy selection. In both models there is disagreement about the best policy, with individuals divided between two conflicting groups, L and R. In the "authoritarian" version of our model faction R controls policy. After taking the possible reaction of faction L into account, faction R chooses policy. Faction L can then acquiesce, or it can opt to wage a costly civil war. The winners of the civil war can choose whatever policy they like without the threat of further rebellion.

In the second "democratic" version of our model, there is an election to choose which of the two groups, L or R should be allowed to select policy. The winning faction then selects a policy option. The losing faction can either accept this, or, as in the "authoritarian" version of the model, it can wage a costly war, whose winners can dictate policy.

A key assumption of our model is that the probability of a faction winning if civil war breaks out is an increasing function of the number of adherents willing to fight for that side. In this framework we show that elections reduce the probability of civil war for two reasons. Firstly elections dispel some of

the uncertainty about which side is likely to win a civil war, and in most plausible cases[2] this leads beliefs about the outcome of a civil war to converge towards one another. Secondly, majoritarian election will bring to power the side with an advantage in a civil war.

2.1 An Authoritarian Model of Policy Choice

Our model of "authoritarian" pre-conflict bargaining closely resembles the model of bargaining in the shadow of conflict developed by Powell (1999) chapter 3. Suppose that society must choose the location of a policy variable $x \in \mathbb{R}$. The utility derived from a policy outcome x for and individual with a preferred policy outcome of θ is:

$$U(x|\theta) = -d(x, \theta) \tag{1}$$

where $d(a, b)$ is an increasing function of the distance[3] between a and b. To keep matters simple, we assume that $\theta \in \{x_L, x_R\}$ where $x_R > x_L$. Thus, there are only two types of individuals in this model[4].

For illustrative purposes we shall consider the example in which individuals have quadratic preferences:

$$U(x|\theta) = -(x - \theta)^2 \tag{2}$$

Suppose further that faction R is in control, so that after anticipating the reaction of faction L the leadership of faction R unilaterally sets official policy. At this stage, the leader of faction L can either acquiesce or launch a civil war to overthrow the leadership of faction R. If the civil war occurs, the winning faction pays a cost C from fighting the war, and implements

[2] See the appendix for an example of an exceptional case.

[3] That is, $d : \mathbb{R} \times \mathbb{R} \to \mathbb{R}$, $d(a, b) = d(b, a) > 0, \forall a \neq b$, $d(a, b) > d(a', b') \Rightarrow |a - b| > |a' - b'|$ and $d(a, a) = 0, \forall a$.

[4] Naturally the leader of faction L has a preferred policy of x_L, while the faction R leader prefers a policy of x_R.

it's preferred policy $x^W \in \{x_L, x_R\}$. The losing side must endure the policy chosen by the winning side, and it incurs a cost $D \geq C$.

Up to this point, our model of elite bargaining has been isomorphic to that of Powell (1999), however, we incorporate uncertainty in a slightly different manner; whereas Powell models bargainers as being uncertain about one another's costs of bargaining, we treat them as being uncertain about the probability of winning an armed conflict.

The probability faction L wins if civil war breaks out is p_L, while the victory probability for R is $p_R = 1 - p_L$. These probabilities are linked to the participation decisions of individuals fighting on behalf of each faction according to the following simple technology:

$$p_L = \frac{n_L}{n_L + n_R} \tag{3}$$

Here n_ξ represents the number of people fighting on the side faction $\xi \in \{L, R\}$. While the total population N is known to everyone, we assume that p_L, the fraction of these individuals who are of type L, is not known[5].

Beliefs about p_L for the leadership of faction $\phi \in \{L, R\}$ are characterized by the density $\pi_\phi(p_L)$ which has support everywhere on the interval $[0, 1]$.

For the sake of illustration, it is useful to consider the example in which $\pi_\phi(p_L)$ corresponds to the beta density with parameters α_ϕ and β_ϕ. We assume that the leadership of faction L know that the beliefs of faction R are characterized by $\pi_R(p_L)$ (for example this may correspond to the beta distribution with parameters α_R and β_R) and likewise that faction R knows that faction L has beliefs characterized by $\pi_L(p_L)$. As noted in the introductory section, we nevertheless allow that $\pi_L(p_L) \neq \pi_R(p_L)$, as would occur if either $\alpha_L \neq \alpha_R$ or $\beta_L \neq \beta_R$ in the context of uncertainty characterized by beta distributions.

[5]Recall that everyone who is not type L will be of type R.

Now consider the decision of a type L individual to participate in the fighting if civil war breaks out. To make our results for the authoritarian model easier to compare with those for the democratic model we will analyze we assume that the total number of citizens is odd. Let m be defined by $N \equiv 2m + 1$. If an individual does not participate in the fighting, then we see from equation (3) that a type L person with prior beliefs characterized by $\pi_L(p_L)$ will expect that if the other $2m$ individuals all fight the probability that a type L wins the civil war is:

$$\hat{p}_L^e = \int_0^1 p\pi_L(p)dp$$

If the individual decides to fight, the expected fraction of individuals fighting for side L rises from $\hat{p}_L^e$ to $\hat{p}_L^e + \frac{1-\hat{p}_L^e}{2m+1}$, and with it, the probability of a victory for faction L also rise by $\frac{1-\hat{p}_L^e}{2m+1}$. The expected utility from not fighting would thus be:

$$\hat{p}_L^e\big((x_R - x_L)^2 + D - C\big) - \big((x_R - x_L)^2 + D\big) \tag{4}$$

whereas if he joins the fight, his utility will be:

$$(\hat{p}_L^e + \frac{1-\hat{p}_L^e}{2m+1})\big((x_R - x_L)^2 + D - C\big) - \big((x_R - x_L)^2 + D\big) \tag{5}$$

the increment to the individual's payoff from fighting is:

$$\frac{1-\hat{p}_L^e}{2m+1}\big((x_R - x_L)^2 + D - C\big) > 0 \tag{6}$$

This will be positive unless the individual is certain that everyone in society is of type L, in which case, there would be no possibility of conflict. Thus, even if a type L individual believes that everyone else will fight, he will prefer to fight as well[6]. Similar calculations establish that the incentive for a type R individual to fight when everyone else is fighting is given by:

[6]If the type L individual believes that not everyone else will fight, his impact on the outcome will be further magnified, and so he will be even more willing to fight.

$$\frac{\hat{p}_L^{\mathfrak{R}}}{2m+1})\big((x_R - x_L)^2 + D - C\big) > 0 \tag{7}$$

Thus, once civil war is under way, it is a Nash equilibrium for every individual to fight for his faction[7]

Thus, the victory probabilities for the two factions correspond to the population shares of their adherents. Integrating over the beliefs of the leader of faction L we find that her estimate of the expected probability that she prevails in case of war is:

$$\hat{p}_L^{\mathfrak{L}} = \int_0^1 p_L \pi_L(p_L) dp_L$$

While the faction R leader expects the victory probability for faction L to be:

$$\hat{p}_L^{\mathfrak{R}} = \int_0^1 p_L \pi_R(p_L) dp_L$$

In the case that $\pi_L(p_L)$ and $\pi_R(p_R)$ are beta, we would have:

$$\hat{p}_L^{\mathfrak{L}} = \frac{\alpha_L}{\alpha_L + \beta_L} \quad \text{and} \quad \hat{p}_L^{\mathfrak{R}} = \frac{\alpha_R}{\alpha_R + \beta_R} \tag{8}$$

The "individual rationality" constraint that must be satisfied if faction L does not resort to civil war is that it's utility from accepting the peaceful settlement x exceeds the expected utility of war:

$$-d(x, x_L) \geq -\hat{p}_L^{\mathfrak{L}} C - (1 - \hat{p}_L^{\mathfrak{L}})\,(d(x_R, x_L) + D) \tag{9}$$

Let x_L^* be the rightmost value for x that satisfies the inequality (9).

Likewise, the individual rationality constraint that must be satisfied if faction R is willing to propose a policy is[8]:

$$-d(x, x_R) \geq -\hat{p}_L^{\mathfrak{R}}\,(d(x_R, x_L) + D) - (1 - \hat{p}_L^{\mathfrak{R}})C \tag{10}$$

[7]Indeed, it is straightforward to show that this is the *only* Nash equilibrium.

[8]Notice that the probability estimates that determine the "individual rationality" constraint for faction R in (10) are calculated using the beliefs of faction R

Let x^*_R be the leftmost value for x satisfying inequality (10).

The threat of civil war guarantees that any peaceful settlement, represented by a policy x^*, must simultaneously satisfy (9) and (10), that is, it must satisfy:

$$x^*_R \leq x^* \leq x^*_L \tag{11}$$

Let $\mathfrak{S}$ denote the set of offers satisfying condition (11). This will correspond to the interval $[x^*_R, x^*_L]$ when $x_L \geq x_R$, otherwise it will be the empty set.

Returning to our example of quadratic preferences and beta beliefs, equation (10) implies that the leftmost policy that faction R will accept rather than risk civil war is:

$$x^*_R = X_R - \sqrt{\frac{\alpha_R}{\alpha_R + \beta_R}(x_R - x_L)^2 + \left(\frac{\alpha_R D + \beta_R C}{\alpha_R + \beta_R}\right)} \tag{12}$$

while the rightmost policy that faction L would be willing to accept is:

$$x^*_L = X_L + \sqrt{\frac{\beta_L}{\alpha_L + \beta_L}(x_R - x_L)^2 + \left(\frac{\alpha_L C + \beta_L D}{\alpha_L + \beta_L}\right)} \tag{13}$$

If both sides share the same beliefs about the outcome of a potential armed conflict then civil war will be avoidable. To be precise: given that civil war is costly, and that losing one is no less costly than winning, and given that neither side is risk loving, the set of possible peaceful bargains will not be empty. We formalize this result as Claim 1.

Claim 1: If $d(x+y, x)$ is convex in y, so that neither side is risk loving with respect to policy outcomes, and if losing a war is not intrinsically advantageous, so that $D \geq C \geq 0$, then if both sides share the same beliefs about p_L, so that $E_L\{p_L\} = E_R\{p_L\}$, it follows that the set of possible peaceful bargains $\mathfrak{S}$ is nonempty, and corresponds to the interval $[x^*_R, x^*_L]$.

Proof: See Appendix A.

The example of quadratic preferences and beta beliefs is an example of this regularity. Suppose that $\alpha_L = \alpha_R = \alpha$ and that $\beta_L = \beta_R = \beta$, so that both groups have the same beliefs about a potential civil war. Substituting into equation 12 we have:

$$\begin{aligned}
x_R^* &= x_R - \sqrt{\frac{\alpha}{\alpha+\beta}(x_R - x_L)^2 + \left(\frac{\alpha D + \beta C}{\alpha+\beta}\right)} \\
&\leq x_R - \sqrt{\frac{\alpha}{\alpha+\beta}(x_R - x_L)^2} \quad \blacktriangleleft \\
&= \left(1 - \sqrt{\frac{\alpha}{\alpha+\beta}}\right)x_R + \sqrt{\frac{\alpha}{\alpha+\beta}}x_L \\
&\leq \frac{\beta}{\alpha+\beta}x_R + \frac{\alpha}{\alpha+\beta}x_L \quad \diamondsuit \\
&\leq \left(1 - \sqrt{\frac{\beta}{\alpha+\beta}}\right)x_L + \sqrt{\frac{\alpha}{\alpha+\beta}}x_R \quad \diamondsuit \\
&= x_L - \sqrt{\frac{\beta}{\alpha+\beta}(x_R - x_L)^2} \\
&\leq x_L + \sqrt{\frac{\beta}{\alpha+\beta}(x_R - x_L)^2 + \left(\frac{\alpha C + \beta D}{\alpha+\beta}\right)} \quad \blacktriangleleft \\
&= x_L^* \quad (14)
\end{aligned}$$

If $\alpha D + \beta C > 0$ then the inequalities on the lines marked with a $\blacktriangleleft$ are strict, while if $\alpha > 0$ and $\beta > 0$ then the inequalities on the lines marked with a $\diamondsuit$ are strict.

However, if both sides do not share common beliefs about a civil war, the situation becomes more dangerous. Notice that the right hand side of equation (9) is decreasing[9] in $\hat{p}_L^e$, that is, the more optimistic faction L becomes about it's prospects in a civil war, the less they will be willing to compromise.

[9]Substituting $\hat{p}_L^e$ into equation (9) and differentiating we have: $C - d(x_R, x_L) - D$ which is guaranteed to be less than zero as $C \leq D$ while $d(x_R, x_L)$ is positive.

Claim 2a: The more likely party L believes victory will be, the farther to the left will be the rightmost policy compromise it is willing to tolerate rather than fight: $\frac{\partial x_L^*}{\partial p_L^{\mathfrak{L}}} < 0$

Proof: See Appendix A.

Likewise, the more pessimistic party R is about its prospects in a civil war, the less closely the peaceful settlement must approximate x_R to satisfy equation (10).

Claim 2b: The more likely party R believes victory will be for faction L, the farther to the left will be the leftmost policy compromise it is willing to tolerate rather than fight: $\frac{\partial x_R^*}{\partial p_L^{\mathfrak{R}}} < 0$

Proof: See Appendix A.

In the context of our example of quadratic preferences and beta beliefs, if we substitute from (8) into equations (13) and (12) we find that:

$$\frac{\partial x_L^*}{\partial p_L^{\mathfrak{L}}} = \frac{C - D - (x_R - x_L)^2}{2\sqrt{p_L^{\mathfrak{L}} C + (1 - p_L^{\mathfrak{L}})\big((x_R - x_L)^2 + D\big)}} < 0 \tag{15}$$

and,

$$\frac{\partial x_R^*}{\partial p_L^{\mathfrak{R}}} = \frac{C - D - (x_R - x_L)^2}{2\sqrt{p_L^{\mathfrak{R}}\big((x_R - x_L)^2 + D\big) + (1 - p_L^{\mathfrak{R}})C}} < 0 \tag{16}$$

As faction L's beliefs that it will win become stronger, it becomes less willing to compromise, while if party R becomes more pessimistic, then it will be more willing to accommodate party L.

The trouble sets in when both factions' leaders are optimistic. Increased optimism by R will push x_R^* rightward, making R less willing to compromise, while greater optimism on the part of L will move x_L^* leftward. When both parties become more optimistic the bargaining set will shrink; with enough optimism, it may be empty, with the result being civil war. Johnson (2004) provides evidence from case studies that overoptimism, triggered by positive

illusions, was an important cause of international war during the twentieth century (including World War I and the Vietnam War), while Gilbert (2006) argues that "In August 1914 the empires of Europe embarked on a war that each of them believed would be swift and victorious.".

While an outbreak of mutual pessimism would have a pacific effect, this would require both sides to genuinely hold negatively biased beliefs. Moreover, if one party appointed a leader who was known to be pessimistic, the other side's best response would be to choose an optimistic leader to gain a bargaining advantage. However, if $\mathfrak{p}_L$ could be set equal to $\mathfrak{p}_R$, so that both sides shared the same beliefs about the outcome of a civil war, both factions could avoid the possibility that $\mathfrak{S} = \emptyset$, and hence avoid civil war. In fact, it will often be enough for $E_L\{\mathfrak{p}_L\}$ and $E_R\{\mathfrak{p}_L\}$ to be merely close to one another. But given the enormous temptations of mutual deception how are such commonly held beliefs to be attained?

In the quadratic case with beta beliefs, if the optimism of side L exceeds the pessimism of side R by a sufficiently wide margin, the bargaining interval will be empty. If we measure the optimism of side L as $\frac{\alpha_L}{\beta_L}$ while we calibrate the pessimism of faction R using $\frac{\alpha_R}{\beta_R}$ then war will break out if:

$$\frac{\alpha_L}{\beta_L} - \frac{\alpha_R}{\beta_R} > \Omega > 0$$

where Ω is larger the greater the costs of fighting and of losing[10]. This means that we may encounter an irreconcilable conflict if the optimism of one side exceeds the pessimism of the other by a wide enough margin.

[10]Formally we have:

$$\Omega = \frac{1}{\beta_L \beta_R}\Big((\alpha_L + \beta_L)(\alpha_R D + \beta_R C) + (\alpha_R + \beta_R)(\alpha_L C + \beta_L D) + \sqrt{(\alpha_R + \beta_R)\Big(\beta_L\big((x_R - x_L)^2 + D\big) + \alpha_L C\Big) + (\alpha_L + \beta_L)\Big(\alpha_R\big((x_R - x_L)^2 + D\big) + \beta_R C\Big)}\Big)$$

In this authoritarian setting, faction R is in control, and it can select the rightmost element of the interval $[x_R^*, x_L^*]$ provided that a peaceful settlement is possible. Nevertheless, while R is in an advantaged position to choose policy, it will only be able to avoid civil war if $x_R^* < x_L^*$.

2.2 A Democratic Model of Policy Choice

In the democratic model everyone is given the opportunity to vote in a fair and public election for the faction they prefer. The faction receiving the most votes then sets policy, taking into account the possible reaction of the election losers. If the losers of the election are unhappy with the outcome they can resort to civil war. If that occurs the winner of the conflict sets policy and incurs a cost of C, while the losers must endure the winner's policies, and they incur costs of D, just as in the case of a civil war that erupts in the authoritarian model. The probability faction L prevails in the civil conflict is given by equation (3).

Policy preferences are as in the authoritarian model, as is the number of individuals $N = 2m+1$ in society. If everyone votes, an individual will cast a decisive vote when the other $2m$ people divide their votes equally between the two factions. If in equilibrium everyone else is voting for the faction to which they belong, then a potential voter of type L believes that the probability of casting a decisive vote is:

$$\int_0^1 \binom{2m}{m} p^m (1-p)^m \pi_L(p)\, dp \tag{17}$$

while a voter sharing the beliefs and preferences of faction R believes that his vote will be decisive with a probability of:

$$\int_0^1 \binom{2m}{m} p^m (1-p)^m \pi_R(p)\, dp \tag{18}$$

If people have beta beliefs, these probabilities become:

$$\frac{\binom{\alpha_L+\beta_L-1}{\alpha_L}}{\binom{\alpha_L+\beta_L+2m-1}{\alpha_L}} \tag{19}$$

for members of group L, while for members of group R the subjective probability of casting a decisive vote is:

$$\frac{\binom{\alpha_R+\beta_R-1}{\alpha_R}}{\binom{\alpha_R+\beta_R+2m-1}{\alpha_R}} \tag{20}$$

However, the prospect of revolution creates additional incentives to vote. If party L wins it will implement x_L^* unless this is to the left of x_L. In this case, each individual assesses his impact on x_L^* when deciding whether to vote. Similarly if party R wins, individuals assess their impact on x_R^*.

A quick look at equations (9) and (10) reveals that x_L^* depends on $p_L^{\mathfrak{L}}$ while the value of x_R^* hinges on $p_L^{\mathfrak{R}}$:

$$\frac{\partial x_L^*}{\partial p_L^{\mathfrak{L}}} = \frac{C - D - d(x_R, x_L)}{d_1(x_L^*, x_L)} < 0 \quad \text{and} \quad \frac{\partial x_R^*}{\partial p_L^{\mathfrak{R}}} = \frac{D + d(x_R, x_L) - C}{d_1(x_R^*, x_R)} < 0 \tag{21}$$

The impact on $p_L^{\mathfrak{L}}$ and $p_L^{\mathfrak{R}}$ of a type L individual voting for party L when the other $2m$ are voting is:

$$\Delta_L^{\mathfrak{L}} = \frac{1 - p_L^{\mathfrak{L}}}{2m+1} > 0 \quad \text{and} \quad \Delta_L^{\mathfrak{R}} = \frac{1 - p_L^{\mathfrak{R}}}{2m+1} > 0 \tag{22}$$

while the effect of a type R individual voting for party R when the other $2m$ are voting is:

$$\Delta_R^{\mathfrak{L}} = -\frac{p_L^{\mathfrak{L}}}{2m+1} < 0 \quad \text{and} \quad \Delta_R^{\mathfrak{R}} = -\frac{p_L^{\mathfrak{R}}}{2m+1} < 0 \tag{23}$$

Putting all of this together we find that the payoff increase for a type L person voting for party L when the other $2m$ people in society are voting is approximately:

$$q_L^{\mathfrak{L}} d_1(x_L^*, x_L) \frac{\partial x_L^*}{\partial p_L^{\mathfrak{L}}} \Delta_L^{\mathfrak{L}} + \int_0^1 \binom{2m}{m} p^m (1-p)^m \pi_R(p) dp \left(D - C + (x_R - x_L)^2\right) \quad (24)$$

where $q_L^{\mathfrak{L}}$ is L's estimate of the probability that L wins and that $x_R^* > x_L$. In this case voting for L will move the implemented policy leftward. We define $q_R^{\mathfrak{R}}$ analogously. The payoff increase for a type R person voting for R is approximately:

$$\int_0^1 \binom{2m}{m} p^m (1-p)^m \pi_R(p) dp \left(D - C + (x_R - x_L)^2\right) + q_R^{\mathfrak{R}} d_1(x_R^*, x_R) \frac{\partial x_R^*}{\partial p_L^{\mathfrak{R}}} \Delta_R^{\mathfrak{R}} > 0 \quad (25)$$

Thus it is an equilibrium for all individuals to vote.

In this equilibrium the parties only count the votes they receive, so party L keeps track of how many people vote for L, and assumes that the remaining individuals will vote for party R, and *vice versa*. This means that voters who opposed the victorious party would have been indifferent about whether to vote had they know for certain that their side would lose, which they could not have done before the election.

The outcome of the voting reveals exactly how many people there are of each type, and so the post-election expectations of each set of leaders about the outcome of a civil war are identical. Our results in the previous subsection establish that when both sides share the same beliefs about conflict, civil war can be avoided. The election winner knows exactly how far the other side can be pushed, and moreover, he is willing to accept that policy rather than launch a civil war[11], *e.g.* $x_L^* > x_R^*$.

[11]The incentives to fight for individuals if an off the equilibrium path civil war occurs are essentially

Thus, as a byproduct of the election to choose the policy maker, enough information is revealed to preclude civil war. Nevertheless, the threat of civil war constrains the set of policies the election winner can implement.

2.3 Authoritarian Plebiscites

An institution sometimes used by authoritarian regimes is the plebiscite. In this framework the authoritarian regime calls an election, but then implements whatever policy it likes. This institution is generally viewed as a sham intended to disguise the regimes authoritarian nature, though it would seem to fool no one. Our model indicates that while the authoritarian intentions of autocratic governments that hold such plebiscites are indeed transparent, the elections may nevertheless have an effect.

Here we modify our authoritarian model to allow the regime, which has the preferences of party R, to call a non-binding plebiscite before deciding what to policy to implement. For verisimilitude we assume that while the leaders of party R observe an accurate tally of the election, no one else does. Examples of such elections include the popular elections held in France under Napoleon III, the 1978 plebiscite in Chile, and perhaps the contested 1988 Mexican presidential election, in which it is widely alleged that the PRI stole the election[12]. Notice that our assumptions are met even by elections in

the same as for people in a civil war arising out of the authoritarian model, save that they assess their impact on the result a little differently, as they now know how many n_L people will fight for faction L and how many n_R for faction R. The incentive for a type L individual to fight in case civil war breaks out is no longer given by equation (6) but instead it becomes:

$$\frac{n_R}{(n_R + n_L - 1)(n_R + n_L)}\left((x_R - x_L)^2 + D - C\right) > 0$$

while the incentives for a type R person toi fight in case of civil war are captured by:

$$\frac{n_L - 1}{(n_R + n_L - 1)(n_R + n_L)}\left((x_R - x_L)^2 + D - C\right) > 0$$

instead of equation (7).

[12]This election would fit the framework if one believes that the PRI controlled the vote count, and that the PRI were unwilling to recognize electoral defeat, converting the "election" into a *de facto* non-binding plebiscite.

which the ruling party falsely reports the results as long as its leaders can infer the actual vote total.

This model has multiple equilibria. It is certainly a Nash equilibrium for the voters to cast ballots randomly, and for the government to ignore the election results. But there is also an equilibrium in which the choices on the ballot are identified as choices in favor of faction R or faction L, and in which the R voters cast sincere ballots, while the government updates its beliefs about x_L^* on the basis of the election results.

In the informative equilibrium the first event is a plebiscite in which one option is associated with a vote for L, while the other is tantamount to a vote for R. In equilibrium every person of type R casts a ballot for the R option, while the government interprets a vote in favor or R as indicating the individual is of type R and any other behavior as an indication that the person is of type L. The type L voters are thus indifferent about whether to vote for L or to abstain, while each of the R individuals strictly prefers to vote for R. The leadership of party R, who set policy, observe the vote outcome, and update their beliefs about x_L^*. The party R leaders then set policy.

When there is a real threat of civil war, as occurs when $x_L^* < x_R$, each voter will have an effect, albeit a small one, on party R's perception of x_L^*, and there is an incentive to vote. In this case the payoff increase for a type L person voting for party L when the other $2m$ people in society are each voting for their preferred outcome is approximately:

$$d_1(x_R^*, x_L)\frac{\partial x_R^*}{\partial p_L^{\mathfrak{R}}}\Delta_L^{\mathfrak{R}} > 0 \tag{26}$$

while the corresponding probability for a type R person is approximately:

$$d_1(x_R^*, x_R)\frac{\partial x_R^*}{\partial p_L^{\mathfrak{R}}}\Delta_R^{\mathfrak{R}} > 0 \tag{27}$$

Thus it is an equilibrium for all type R individuals to vote, thereby revealing the distribution of preferences in the population to the government. All that is needed is that there is even a small probability that the votes of other individuals will lead the party R leadership to believe that $\chi_L^* < \chi_R$ will create a positive incentive for each individual to vote[13], even in a controlled election in which only the party R leaders ever learn the actual vote count.

Of course, elections in an authoritarian setting in which only the government has a count that it can trust will not cause the type L people to update their forecasts, and so only the government will change its beliefs as a result of the election. This need not cause convergence of expectations, but it will at least reduce falsely based optimism on the part of the government.

3 Behavioral Models

A central feature of the analytical models set forth in the preceding section is that the small but positive benefits of voting or of fighting for one's cause are compared with the costlessness of such actions, as is done in equations (6) and (7) and in (24) and (25). Of course, in practice voting, and especially fighting are costly undertakings. Various behavioral models have attempted to reconcile people engaging in various publicly directed activities (such as voting or fighting for a cause) with the small individual benefits from taking such actions.

3.1 The Voting Decision

For example, many authors have noted the juxtaposition of the minuscule probability an individual vote influences the result of an election (Barzel and Silberberg, 1973, Beck, 1975, Margolis, 1977, Chamberlin and Rothschild,

[13]Only if the voters had no *ex ante* doubt but that $\chi_L^* > \chi_R$, leaving faction R is unconstrained by the threat of insurrection by type L individuals would it not make sense to participate in the election.

1981, Gelman, King and Boscardin 1998) against the small but real costs of casting a ballot[14].

Finkel, Miller and Opp (1989) note that given the contrast between the small but palpable costs of voting and the negligible impact of an individual's vote on the election outcome, it is irrational to cast a ballot. Never the less, they argue that we might observe mobilization if individuals acted upon their sense of duty rather than with the direct aim of changing the election outcome. Indeed, this sense of duty can be heightened by various social sanctions and rewards, as non-voters are left off of invitation lists, and off of the short list of people being interviewed for jobs. It is easy to extend their argument to encompass people taking the costly action of fighting, despite their infinitesimal impact on the outcome of a war. Quattrone and Tversky (1986) describe what they call "magical thinking" leading people to mistake actions that are diagnostic of an outcome, such as casting a vote for the winning side, for actions that have a causal impact. In such circumstances magical thinkers might vote or even fight. Kahneman (1982) notes that individuals tend to overestimate the probabilities of very unlikely events. Such an overestimate could lead them to mistakenly believe that they are likely to be decisive in an election, or a war.

In each of these models, individuals compare the expected benefits of participating in an election, or a war, with the expected costs. If the benefits, whether they come as the result of societal pressure or from an exaggerated sense of one's impact on macro-level events, outweigh the costs, whether in the form of having to stand in a long line at a polling place, or whether they involve the much more costly risks of engaging in military conflict, then individuals will vote, and fight, for their cause, just as they do in the stylized model of the preceding section.

[14]One could posit that the act of voting itself is somehow enjoyable (Riker and Ordeshook, 1968), but this "explanation" has a somewhat circular flavor. Moreover, if one's impact on the result was not important, and if the mere act of casting a ballot was enjoyable to so many people, why not stage non-binding elections every day?

3.2 Combat and Politics

While the link between a willingness to vote for a cause, and one's motivation to fight for it may seem self evident, it is not without empirical support. Soldiers' discretion about how aggressively to contribute to combat is undoubtedly very substantial. Lynn (1984) argues that it was the commitment of citizen soldiers to fight that allowed the armies of revolutionary France to deploy large numbers of skirmishers operating on their own initiative. Until the British managed to copy this innovation, which requires combat motivated troops, it gave the French army an important advantage (Keegan, 1993). Costa and Kahn (2003) remark that the Civil War caused the death of one every five combatants. Yet, a soldier deserting would have faced only a 40% chance of being caught, and a minuscule risk of execution in that event (Linderman, 1987). Given the negligible impact of each individual enlisted man on the course of the war, desertion would have thus been the rational behavior of a self-interested soldier, yet over 90% of all Union Army soldiers did not do so.

Some have contended that larger motives fade in combat. One German soldier captured during the Second World War[15] remarked that ideology "begins ten miles behind the front" (Shils and Janowitz, 1948). Yet it is widely recognized "...that belief in a cause is the foundation of the aggressive will in battle." (Marshall, 1947) p.162. Moreover, it appears that the *casus belli* is especially important in motivating fighters in a civil war. McPherson (1997) notes the importance of ending slavery as a motive for US troops, while the resolve of rebel soldiers was strengthened by the conviction that they were defending "liberty". Dollard (1944) interviewed Republican fighters from the Spanish Civil war and found that their ideologically based "hatred of fascism"

[15]Even Shils and Janowitz, prominent skeptics about the role of ideology and patriotism in motivating combat troops, note that their sample of German POWs contained few professional NCOs and fewer fanatical Nazi junior officers: both groups spurned surrender and fought effectively.

was an important motivating factor in combat. Because of the decentralized control of guerrilla fighters, we believe that combat motivation is at least as important for informal combatants in civil conflicts as it is for soldiers in regular armies.

4 How Elections Can Make War More Likely

While the usual effect of more information is to promote similar beliefs, there are some pathological cases in which some additional information may actually remove the possibility of a negotiated settlement. This will arise when both sides begin believing that the weaker party, without loss of generality let's assume that this is party R, is likely to win. If party R is strongly attached to this belief, while the party that is actually stronger, party L, is not very attached to its prior beliefs, then post election beliefs can create conflict as party L updates to hold substantially more optimistic beliefs, while party R only slightly tones down its overly optimistic priors.

An example serves to illustrate the issues. To keep things very simple, suppose that the probability faction L prevails if there is armed conflict is simply equal to the probability that a randomly chosen individual votes for party L:

$$p(\xi) = p_L^{\alpha}(\xi)$$

and that party L's beliefs about ξ are such that it has a prior density over $p_L(\xi)$ of $\mathtt{beta}(\alpha_L, \beta_L)$, while the prior beliefs of party R about ξ correspond to a prior density of $\mathtt{beta}(\alpha_R, \beta_R)$ over $p_R(\xi)$. suppose further that

$$d(a, b) = |a - b| \text{ while } x_L = -\frac{1}{2} \ , \ x_R = \frac{1}{2} \ , \ C = \frac{1}{8} \text{ and } D = \frac{1}{4}$$

Let $\alpha_L = 10^{-6}$ and $\beta_L = 3 \times 10^{-6}$ while $\alpha_R = 10^6$ and $\beta_R = 3 \times 10^6$. So, if there is no election the peaceful settlement interval[16] will be:

$$\mathfrak{S} = [x_R^*, x_L^*] = [\frac{3}{32}, \frac{15}{32}]$$

Now suppose that both leaders observe a free and fair election in which party L garners 1500 votes while party R earns 500. the posterior beliefs for party L will be beta with parameters $\alpha_L^* = 10^{-6} + 1500$ and $\beta_L^* = 3 \times 10^{-6} + 500$, while party R will have posterior beliefs that are beta with $\alpha_R^* = 10^6 + 1500$ and $\beta_R = 3 \times 10^6 + 500$. In this case, the rightmost settlement party L is willing to accept will be:

$$x_{L,post}^* = -\frac{1}{2} + \frac{\alpha_L^*}{\alpha_L^* + \beta_L^*} C + \frac{\beta_L^*}{\alpha_L^* + \beta_L^*}(D + 1) \approx -\frac{3}{32}$$

while the leftmost settlement party R will accept will be:

$$x_{R,post}^* = \frac{1}{2} - \frac{\alpha_L^*}{\alpha_L^* + \beta_L^*}(D + 1) - \frac{\beta_L^*}{\alpha_L^* + \beta_L^*} C \approx \frac{3}{32}$$

After the election there is no point which both parties would be simultaneously willing to accept instead of going to war. What has happened is that party L has learned its strength, and so it has abandoned its pessimistic prior expectations, while party R continues to cling to its overly optimistic prior beliefs. This is possible because party R is much more attached to its optimistic beliefs than party L is to its pessimistic ones, hence their beliefs converge towards the sample relative frequency at very different rates. Nevertheless, with a sufficiently large electorate, the evidence would become so clear that even the stubbornly optimistic leaders of party R would accept

[16] Consulting equation (9) we see that:

$$x_L^* = -\frac{1}{2} + \frac{\alpha_L}{\alpha_L + \beta_L} C + \frac{\beta_L}{\alpha_L + \beta_L}(D + 1) = \frac{15}{32}$$

while substituting our hypothesized settings into equation (10) we have:

$$x_R^* = \frac{1}{2} - \frac{\alpha_R}{\alpha_R + \beta_R}(D + 1) + \frac{\beta_R}{\alpha_R + \beta_R} C = \frac{3}{32}$$

party L's greater likelihood of winning, and a peaceful settlement would be possible.

5 Comparison with the Literature

The potential connection between voting and the willingness to fight has been discussed for millennia. Condorcet cites Aristotle as noting that at councils in ancient Sparta citizens made their vote known by banging their spears against their shields, and argues that majoritarian voting allows the side with the most force to choose policy. Most of the subsequent literature emphasizing the linkage between the electoral franchise and military service tends to treat voting rights as an implicit transfer–the vote is either seen as a payment to individuals who have fought on behalf of society, as for example in Weber (1982), or as a payment to individuals not to rebel, as in the discussion by Aristotle and Condorcet of the Spartans. In contrast, in our analysis a key avenue by which voting serves to forestall conflict is informational. Even a non-binding election held by an authoritarian government can convey information that can help to forestall a costly civil war.

Przeworski and Sprague (1986) acknowledge a potential parallel between voting and fighting "at the barricades", likening ballots to "paper stones" in the hands of workers. However, their focus is on explaining the electoral strategies adopted by Socialist parties in various countries. From the standpoint of our model, Socialists' difficulty in obtaining electoral majorities probably curbed their optimism about the prospects for victory at the barricades, and so may have prevented a series of armed civil conflicts.

Our argument differs from the rationale for holding elections offered by Weber (1982), and others after him, and made more formally by (Ticchi and Vindigni, 2003a, 2003b) that expanding the suffrage is a way to pay the public for its military service. Instead, the key feature of our analysis is the role of

elections in credibly signaling information about the likely consequences of a civil war fought to resolve the issues at stake in the election. In doing so, the election returns facilitate bargaining among factions, and so make civil war less likely.

Our analysis also departs from that of several other scholars. Ellman and Wantchekon (2000) analyze how potential social unrest influences political competition and policy outcomes in unconsolidated democracies, and show that threat of explosion of social unrest may in some circumstances induce the implementation of a relatively moderate policy. However, their result emerges as the outcome of spatial political competition, very different from the learning process on which our own model is based.

Taking the analysis of the rule of law by Weingast (1997) as his point of departure, Fearon (2006) offers an informational rationale for elections as a means for citizens to coordinate their collective action against a ruler violating the "social contract", rather than as a means for competing factions within society to learn their relative strength should social institutions break down.

Przeworski (1991) models competitive elections as exogenously random events, rather than as endogenous indicators about the likely outcome of conflict. The political parties in his model care about holding office–and as long as the chances of eventually getting into power outweigh the prospect of initiating an armed rebellion, out of power parties in Przeworski's model bide their time.

Mario Chacón and Torvik (2006) have also recently investigated the connection between democratic politics and the fighting of civil wars. We briefly discuss their model in relation to ours. Chacon, *et al* assume, as we do, that voting and fighting are connected acts, in the sense that people who vote for a party are also likely to fight for the same party. Hence, weak electoral support is likely to come along with a small probability of winning a civil

war. Their central claim is that power asymmetries reduce the probability of conflict, whereas our central result is that asymmetric information can exacerbate conflict. A crucial difference between our framework and theirs is that in our model election winners operate under the threat of a potential revolt by the election losers, whereas in their framework, engaging in electoral competition entails giving up forever the possibility of revolt. This means that the threat of revolt does not constrain the winners of elections, hence the prospect of electoral defeat is more forbidding to the potential losers in their model, making civil war relatively more attractive, especially to larger minorities. We find their assumption that the losers of elections cannot resort to post-electoral violence to be at variance with much of the historical record.

6 Conclusions

In this paper we develop a model that illustrates the way in which fair elections, by revealing the relative fighting strength of the factions, create a shared set of expectations about the consequences of a potential civil war. If beliefs converge sufficiently there will exist a set of compromises that both factions will prefer *ex ante* to civil war. Somewhat surprisingly, we find that even rigged elections in which the government is guaranteed to win in the officially reported vote tally can convey valuable information, by way of the actual vote count, to an authoritarian government that enable it to avoid provoking insurrection. Our analysis stresses the importance of the information conveyed by electoral results and contrasts with t other analyses of the link between elections and violence that stress the extension of the franchise as a means of compensation, either for having fought for the government, or for not fighting against it.

A Proofs

Proof of Claim 1: The result is an immediate consequence of Lemma 1 and Lemma 2.

Lemma 1: If $d(x+y,x)$ is convex in y, so that both sides are risk averse about policy outcomes, and if war fighting is costly, so that $D \geq C > 0$, then if both sides share the same beliefs about p_L, so that $E_L\{p_L\} = E_R\{p_L\} = p_L^0$, it follows that $x_L^* > p_L^0 x_L + (1-p_L^0)x_R$.

Proof of Lemma 1: By convexity of $d(x+y,x)$ in y we know that :

$$d(p_L^0 x_L + (1-p_L^0)x_R, x_L) \leq p_L^0 d(x_L,x_L) + (1-p_L^0)d(x_R,x_L) = (1-p_L^0)d(x_R,x_L)$$
$$< (1-p_L^0)d(x_R,x_L) + p_L^0 C + (1-p_L^0)D = d(x_L^*,x_L) \quad (28)$$

But $d_1(y,x_L)(y-x_L) > 0$ for $y \neq x_L$, hence, $x_L^* > p_L x_L + (1-p_L)x_R$ $\square$.

Lemma 2: If $d(x+y,x)$ is convex in y, so that both sides are risk averse about policy outcomes, and if war fighting is costly, so that $D \geq C > 0$, then if both sides share the same beliefs about p_L, so that $E_L\{p_L\} = E_R\{p_L\}$, it follows that $x_R^* < p_L x_L + (1-p_L)x_R$.

Proof of Lemma 2: By convexity of $d(x+y,x)$ in y we know that :

$$d(p_L^0 x_L + (1-p_L^0)x_R, x_R) \leq p_L^0 d(x_L,x_R) + (1-p_L^0)d(x_R,x_R) = p_L^0 d(x_L,x_R)$$
$$< p_L^0 d(x_R,x_L) + p_L^0 C + (1-p_L^0)D = d(x_R^*,x_R) \quad (29)$$

But $d_1(y,x_R)(y-x_R) > 0$ for $y \neq x_R$, hence, $x_R^* < p_L^0 x_L + (1-p_L^0)x_R$ $\square$.

Proof of Claim 2a: Noting that[17] $x_L^* > x_L$, so that $d_1(x_L^*,x_L) > 0$, *e.g.* rightward movement of policy from x_L^* increases its distance from x_L, we can implicitly differentiate equation (9) with respect to p_L^g to obtain:

$$\frac{\partial x_L^*}{\partial p_L^g} = \frac{C - D - d(x_R,x_L)}{d_1(x_L^*,x_L)} < 0$$

[17] If $x_L^* = x_L$ then faction L is unwilling to compromise at all.

because $C \leq D$, $d(x_R, x_L) > 0$ and $d_1(x_L^*, x_L) > 0$. $\square$

Proof of Claim 2b: Noting that[18] $x_R^* < x_R$, so that $d_1(x_R^*, x_R) < 0$, *e.g.* rightward movement of policy from x_L^* reduces its distance from x_L, we can implicitly differentiate equation (9) with respect to p_L^g to obtain:

$$\frac{\partial x_R^*}{\partial p_L^g} = \frac{D + d(x_R, x_L) - C}{d_1(x_L^*, x_L)} < 0$$

because $D \geq C$, $d(x_R, x_L) > 0$ and $d_1(x_R^*, x_R) < 0$. $\square$

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