An Empirical Examination of War Termination and Leader Change

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Abstract

Does leader change have an effect on the termination of interstate war? The relationship between war termination and leader change is particularly complex, as both are interdependent. Therefore, in order to "partial out" the effect of leader change, the paper uses simple probability theory to calculate the difference in the likelihood of war termination given leader change and given leader continuation. Estimation results consistently show that a change in leadership is likely to end a country's participation in interstate war. When this event is observed early in the conflict, the latter is more likely to end. Nevertheless, once war has progressed and is more firmly entrenched, leader change is less likely to end it. The evidence also shows that, if there is multiple leader change during war, only the first change in leadership will increase the probability of war termination. The study concludes that systemic factors, *realpolitik* variables, and domestic political institutions are not the only determinants of war duration. Individual leaders and their tenure in office are equally important in explaining the end of interstate war.

Introduction

A new era will begin for Russia. The Emperor is dead... A desolate page in the history of the Russian Empire has been completed. A new page is being turned in by the hand of time. What events will the new ruling hand write in it; what hopes will it fulfill?

A. V. Nikitenko, quoted by Walter Moss (2002).

That is why, on my first day in office, I would give the military a new mission: ending this war.

Barack Obama, July 2008.

Both history and empirical research show that leaders play a very important role on the initiation of war. But, do leaders have an impact on the duration of it? Traditional accounts of war duration do not even acknowledge the role of leaders in the termination of hostilities, and instead focus on the role of systemic factors and *realpolitik* variables such as strategy, tactics, terrain, and military effectiveness, among other variables. Any connections to domestic politics are to be found only in national political institutions. This has left the role of leaders on war termination completely unexplored. This paper fills this gap in the literature and proves that leaders matter for the termination of war. Specifically, a change in leadership increases the probability of ending a country's participation in interstate war. However, as war progresses, the effect of leader change fades away. Moreover, if there is multiple leader change during war, only the first change in leadership will increase the probability of war termination. Altogether, this suggests that the power to depose a leader can be interpreted as a foreign policy tool that, in democracies, resides in the hands of citizens. This also confirms that leader-specific punishments, as opposed to negotiation and diplomacy, are effective strategies that can bring interstate war to an end.

[0]I would like to thank Bruce Bueno de Mesquita, Leslie Johns, and Alastair Smith for their invaluable advice and

Theoretical examinations as well as large-N empirical studies have confirmed the stellar role of leaders in war (Bueno de Mesquita, Siverson, and Woller 1992; Bueno de Mesquita and Siverson 1995; McGillivray and Smith 2000 and 2008; Goemans 2000 and 2008; Chiozza and Goemans 2003 and 2004; Bueno de Mesquita et al. 2003 and 2004; Mattes and Morgan 2004). Most research has concentrated on the effect of war on leader survival, and shows that leaders often benefit from the occurrence of interstate conflict. Moreover, since leaders can start a war in order to profit from it—in terms of extending their tenure in office, war initiation and leader duration must be part of a simultaneous relationship. Previous research has addressed this two-way relationship in a framework of crisis initiation and leader tenure (Chiozza and Goemans 2003). Altogether, these investigations have improved our understanding of the role of leaders in the initiation of conflict. Yet, crucial aspects of the relationship between interstate war and leaders remain unexplored, such as the role of leader change in the termination of hostilities. Investigating this side of the relationship is important not only for its implications on domestic and international politics mentioned above, but also because leader change has occurred in 32% percent of all interstate wars. This paper fills this gap in the literature by estimating the partial effect of leader change on the probability of the end of war.

The main contribution of the paper resides in estimating the *partial* effect of leader change on war termination. The word "partial" is key because war termination and leader change are mutually determined. In other words, leader change is not exogenous, but in fact determined by the same process it is supposed to affect: war duration. Thus, in order to "partial out" the effect of leader change in this simultaneous relationship, the paper uses simple probability theory to calculate the difference in the likelihood of war termination given leader change and given leader continuation. The paper compares these conditional probabilities and tests if the difference

patience while going through the different stages of this project. I also thank Neal Beck, Daniel Berger, Sandy Gordon, Mike Laver, Jonathan Nagler, Howard Rosenthal, Shanker Satyanath, and several colleagues at the Department of Politics at NYU for their comments. I remain responsible for all errors. Please do not quote without permission from the author.

between them is statistically significant. Although this framework is not without flaws, it provides an excellent foundation for the empirical analysis of the end of war. As a matter of fact, the evidence consistently shows that leader change increases the probability of war termination. This paper thus contributes to a growing literature that shows that leaders—as opposed to systemic factors, *realpolitik* variables, or domestic institutions—play a major role in international politics.

The rest of the paper proceeds as follows. The first section motivates the study. The second section summarizes previous studies of the role of leaders in war. The third section presents a detailed description of the methods, as well as estimation results. The paper concludes with a discussion on causality and the use of matching techniques.

1 Do Leaders Matter? War Termination and Leader Change

Wars are determined by multiple factors such as military power, existence of alliances, persistent disputes, natural resources, or domestic legitimacy. Yet, many popular and historical accounts of war have focused on the role of leaders and the motivations that led them to wage war against other nations. The assassination of Archduke Franz Ferninand and the specific roles of Kaiser Wilhelm II and Emperor Franz Josef I are considered direct causes of the First World War. The Napoleonic Wars are popularly explained by Napoleon's ambition—and his enmity towards Russian Emperor Alexander I. Hitler's madness is accordingly the main determinant of the most devastating war the planet has ever witnessed; a war that was stopped by an alliance of countries led by Churchill, Roosevelt, and Stalin. Vietnamese leaders Ho Chi Minh and Le Duan are arguably responsible for the outcome of the Vietnam War, while Argentine General Leopoldo Galtieri has been blamed for the disastrous Argentine campaign in the Falklands. In theory, if Saddam Hussein and his sons had accepted George W. Bush's ultimatum, the 2003 Iraq War would have been avoided.

Indeed, leaders often determine the beginning of an international conflict. But do they deter-

mine the end of it? This depends on whether they can hold on to office for the duration of the war. In many cases, the leaders that first started a war govern their countries during the course of the conflict and are witnesses to its termination. Great Britain defeated Argentina in the Falklands War in 1982 under the leadership of Prime Minister Margaret Thatcher. Thatcher not only secured a mayor military victory for Great Britain, but managed to keep the United States neutral in the dispute (the United States was an ally of both Britain and Argentina through NATO and the Inter-American Treaty of Reciprocal Assistance respectively) while politically benefiting from the campaign. Thatcher went on to rule Britain for 8 years after the end of the war, whereas the Argentinean government that first invaded the Falkland was quickly deposed after the defeat.

However, in many other cases, the leaders that initiate war do not get to see the end of it. Wars can indeed outlive the leaders that started it and experience not one, but several changes in leadership. In fact, leader change has occurred in 32% percent of all interstate wars. Some leaders are launched into office—and war—after the sudden loss of a leader, such as President Harry Truman after the death of President Franklin D. Roosevelt; or Sir John McEwen, who took over as Prime Minister of Australia after Harold Holt drowned in a Melbourne beach during Australia's involvement in the Vietnam War. Emperor Alexander II of Russia took over the leadership of his country when his father Nicholas I died at the height of the Crimean War. Yet, other leaders come to office due to elections or other political processes, such as Domingo Santa Maria, who replaced Anibal Pinto as President of Chile once the latter ended his term in office at the middle of the War of the Pacific in the early 1880s. This is also the case of President Barack Obama, who replaced President George W. Bush almost 6 years after the initiation of the Iraq War in 2003. The key question in this paper is whether these and other changes in leadership during war affect the duration of it.

A country's highest office and the responsibility of the war effort are not always a welcome inheritance. For instance, Vice-President Harry Truman only met President Roosevelt a few times

during the latter's time in office and was never briefed about key developments in the war. Truman was so unfamiliar with his new situation that, after the death of Roosevelt, he told reporters: "I felt like the moon, the stars, and all the planets had fallen on me."[1] However, leaders are often well prepared to deal with the responsibility of office and war. In fact, many of these new leaders are elected into office due to their promises of bringing conflicts to an end. In these cases, leader change has an evident influence on a country's participation in war. In 2004, Jose Luis Rodriguez Zapatero was elected Spanish Prime Minister due to a combination of factors that included the unpopular Spanish participation in the 2003 Iraq War, and the government's effort to conceal the true motivations behind a terrorist attack three days before the national elections. In March 2004, Zapatero stated that "The war in Iraq was a disaster, the occupation of Iraq is a disaster."[2] Naturally, Spanish troops pulled out of Iraq approximately one month after Zapatero took office.

War can also come to an end in spite of a new leader's intentions to continue it. The Crimean War started in 1853 and ended with the Treaty of Paris in 1856. The Treaty was signed by Emperor Alexander II one year after he became Russia's leader. He had been catapulted to power by the death of his father, Emperor Nicholas I, who started the war. The change in leaders brought new expectations about a conflict that had questioned Russia's ability to secure its territories. According to Moss (2002, 4): "Although some in the streets of St. Petersburg hoped that Alexander II could soon end the war, even if it meant compromise or defeat, others were encouraged by his assurances that Russia would not retreat before its enemies." And indeed the new Emperor tried to continue with the policy of his father even as Austria threatened to join the allies (Wortman 2000). However, the war had taken its toll on Russian forces and after the fall of Sevastopol—the headquarters of Russia's Black Sea Fleet—in late 1855, there were no realistic prospects of improving Russia's position in the war. Russia signed the Treaty of Paris and agreed to keep the Black Sea neutral, as well as to concede part of its territory in the region.

[1] http://www.whitehouse.gov/about/presidents/harrystruman/
[2] http://news.bbc.co.uk/2/hi/europe/3512144.stm

The previous examples suggest that leader change can have an impact on the end of a war. However, leader change can also be relatively inconsequential, particularly when new leaders continue with the policies of their predecessors. This is nicely illustrated by the policies of American President Lyndon B. Johnson and several of Australia's Prime Ministers during the Vietnam War. Like Alexander II, President Lyndon B. Johnson also promised to continue with the war effort. President Johnson, like Emperor Alexander, had inherited a war due to the death of a predecessor. Unlike the Russian Emperor, however, Johnson successfully escalated the war and committed American forces to many more years of fighting in South East Asia. Apparently, this decision was inevitable. Yet, recent research has disqualified the "inevitability" thesis of the escalation of the Vietnam War in 1965, and argued that President Johnson had the opportunity to avoid the escalation. According to Logevall (2004, 102): "At no point from his ascension to the White House in November 1963 through the winter of 1965 was he confined to a certain course of action on Vietnam. He inherited a difficult Vietnam problem from John F. Kennedy, and his choices were few and difficult. But exist the choices did."

Australia was involved in the Vietnam War from 1965 to 1972. In this period of time, there were 5 different Prime Ministers. Some of these Prime Ministers had quite different views about the motivations behind Australia's intervention in the Vietnam War and its links to the great powers involved in the conflict (Edwards 1997). Yet, the policy towards Vietnam did not change during the administrations of Menzies, Holt, and McEwen. The new Gorton administration of 1968 brought new expectations about the war but they did not really materialize. According to Edwards (1997, 191): "As time passed it became increasingly apparent that, while Gorton believed that the policies of Menzies and Holt were no longer working effectively, he had no clear idea of what to put in their place..." It would take another 4 years of war and another Prime Minister to withdraw Australia's forces from the conflict.

As argued in the introduction, traditional research on war duration has not even acknowledged

the role of leaders in war. As it will be explained in a moment, this trend changed and new investigations began to analyze the role of leaders on war initiation. This new research, for example, placed an emphasis on the decisions to initiate a war made by Spanish Prime Minister Jose Maria Aznar, Russian Emperor Nicholas I, American President John F. Kennedy, or Australian Prime Minister Menzies. But this perspective neglects the decisions of Prime Minister Zapatero, Emperor Alexander II, President Lyndon B. Johnson, and Prime Ministers Holt, McEwen, Gorton, and McMahon. The decisions made by leaders that inherit war are crucial because they often determine the end of it. The purpose of the paper is to establish whether leader change in fact predicts war duration.

The complexity of this analysis resides in isolating the role of leader change. This is not an easy task because leader change is not exogenous, but in fact determined by the same process it is supposed to affect: interstate war.[3] For instance, short wars are less likely to experience a change in leaders than long wars. Perhaps if the Second World War had not lasted those many years, President Roosevelt would not have died during the war effort. Likewise, it could also be the case that the war itself can cause leader change: Idi Amin, Adolf Hitler, and Greek Prime Minister Eleftherios Venizelos were deposed by events directly related to an armed conflict. For instance, it has been argued that Argentine General Leopoldo Galtieri organized the Falklands War in an effort to politically resuscitate his regime. The campaign turned out to have the opposite effect, and Galtieri and his administration were removed from office after the war was lost to Great Britain. Often, defeat in war could cause more than political deposition and may result in a leader's death (Goemans 2008).

These examples clearly suggest that war termination and leader change are interdependent. When events are intertwined in this particular way it is difficult to estimate their individual effect.

[3]Jones and Olken (2005) have analyzed economic growth as a result of exogenous leader change—defined by the accidental or natural death of a leader. This type of leader deposition does not occur with the same frequency during war. Nevertheless, this paper analyzes the more interesting endogenous leader change and estimates its partial effect on interstate war.

Therefore, in order to calculate the individual influence of leader change in war duration, the paper needs to "partial out" its effect. This means that leader change needs to be purged of the influence of war in the first place in order to discover its true effect on war termination. As argued above, the election of Prime Minister Zapatero was strongly determined by the effect of the Iraq War on Spanish domestic politics. Once Zapatero took office, he withdrew Spanish troops from Iraq. The purpose of the paper is to take the part of Zapatero's election into office that was not related to the Iraq War and establish how this influenced the end of Spain's participation in the conflict. This is called the partial effect of leader change. If this is not carefully done, then the effect of leader change on war is clouded by the same outcome is supposed to determine. The third section of this paper shows how this is accomplished. However, before explaining the methodology, it is necessary to describe previous studies of the effect of leader survival on interstate war.

2 Studies of War Duration and Political Survival

The role of leaders in war has been so evident that most historical accounts of war, as well as early investigations of its causes—not to mention innumerable documentaries—focused on the the specific leaders that led their countries to armed conflict against other nations. In fact, influential studies of international conflict traced the causes of war to the nature of men. Kenneth Waltz described this tradition by saying (2001, 16): "The locus of the important causes of war is found in the nature and behavior of man. Wars result from selfishness, from misdirected aggressive impulses, from stupidity." International relations research first embraced the role of human nature as a potential determinant of international conflict, but later on abandoned it in order to focus on the structure of the international system and the capabilities of the units that inhabit it. This new quest for a more scientific explanation of war was reflected in early studies of war duration, which highlighted the role of systemic characteristics or the influence of *realpolitik* variables.

For instance, Bueno de Mesquita examined the effect of system polarization on war occurrence and war duration (Bueno de Mesquita 1978). Although Bueno de Mesquita's study found that war occurrence and duration were related to changes in systemic tightness (understood as the level of intra-bloc commitments), some of his results were challenged on methodological grounds (Bennett and Stam 1996).[4] Bennet and Stam (1996) improved on the work of Vuchinich and Teachman (1993) and produced an influential study of war duration. Their investigation examined the effect of *realpolitik* variables such as strategy and doctrine, terrain, and capabilities, among others.

Although the work of Bennett and Stam (1996) reflected the field's emphasis on *realpolitik* variables, it also reflected a new interest on the role of domestic institutions on war duration. This was a particularly important issue, as it was clear that the democratic nature of countries played a role on war initiation. Thus, one of the innovations of Bennett's and Stam's study was the inclusion of domestic variables such as repression and the democratic nature of the countries involved in the conflict. Bennett's and Stam's article (1996) shaped the understanding of war duration and functioned as the reference point for future studies of the subject. In a follow up to their work, Goemans (2000) examined the duration of war as a function of *realpolitik* variables and regime type. Based on the same data set up of Bennett and Stam (a single record database where there is one observation per war that combines covariates for participants), Goemans showed that wars with defeated mixed regimes lasted longer than wars with other types of regimes. The author also found that war was not duration dependent, thus replicating the results of Bennett and Stam (1996). Chan (2003) also used Bennett's and Stam's data set up for his analysis of war duration, but instead of using a parametric duration model he presents the results of Boolean analysis. In trying to find a causal effect, Chan finds that massive and intense fighting at the outset of a war is a necessary though insufficient condition for a short war.

Successive empirical studies of war were further influenced by a strong and clear trend that

[4]Bennett's and Stam's criticism of Bueno de Mesquita (1978) is not completely correct, as Bueno de Mesquita in fact uses a non-parametric method to establish a relationship between systemic polarization and war duration.

highlighted the role of domestic politics in international relations (Fearon 1994, Schultz 1998 and 2001, Smith 1998a). These studies suggested that democratic governments face larger audience costs than autocracies. Therefore, democratic governments tend to engage in conflicts they are likely to win, since engaging in conflicts they are likely to lose only leads to electoral defeat. Giving the importance of victory, democracies tend to fight shorter wars than autocracies, as democratic governments, unlike their autocratic counterparts, must endure lack of public support for the war (Bennett and Stam and 1998). Bueno de Mesquita et al. (2004) further show that, if fighting protracts, countries with larger-coalition systems (countries that resemble democracies) increase their effort to achieve victory by pouring more resources into the war while smaller coalition combatants do not.

The interpretation of war as a bargaining process also contributed to hypotheses on war duration (Wittman 1979; Smith 1998b; Werner 1998; Wagner 2000; Filson and Werner 2002 and 2004; Slantchev 2003; Mattes and Morgan 2004). Part of the innovation of this research resides in considering war outcomes as a result of a bargaining process: wars are not necessarily won or lost, but can end in a negotiated settlement over a disputed issue, such as territory. War comes to an end–and hence the connection to war duration–when participants find a settlement that is preferred to the continuation of war. For instance, according to Filson and Werner (2002), information issues determine the duration of war: "war ends when the attacker's and the defender's beliefs about the defender's power converge sufficiently for the attacker to make a proposal acceptable to the defender."

The most important development in the explanation of war took place in research on political survival. This tradition began approaching war and other policies from a methodological perspective based on leaders as units of analysis. Unlike previous work on the role of leaders and war, this new approach systematically explained the actions of leaders from a game theoretic perspective that highlighted duration in office as the ultimate goal in politics (Bueno de Mesquita et al. 2003).

In this framework, war was no longer understood in terms of systemic characteristics, *realpolitik* variables, or simple domestic political institutions. Interstate war was a carefully designed policy implemented in order to increase leaders' tenure in office (Bueno de Mesquita, Siverson, and Woller 1992; Bueno de Mesquita and Siverson 1995; Goemans 2000 and 2008; Chiozza and Goemans 2003 and 2004; Bueno de Mesquita et al. 2003 and 2004; Mattes and Morgan 2004). These studies often found that leaders who win conflicts were much more likely to survive in office than leaders who lose wars. Furthermore, Chiozza and Goemans (2004) showed that war was not necessarily ex-post inefficient: the societal costs of war generally did not translate into political costs for leaders.

Research on leader-specific punishments also began to question whether individual leaders affected not only relationships marked by conflict, but also by cooperation (McGillivray and Smith 2000 and 2008). As eloquently described by McGillivray and Smith (2000, 809):

> ...above and beyond the rhetorical effect, the identity of the target [of a policy] creates substantive differences in how nations interact. Adopting policies that specify individuals, rather than the nation as a whole, as the target of punishment can bolster trust, reduce the fragility of cooperation, and prevent festering relations by providing a mechanism for restoring cooperation.

The empirical evidence demonstrated that leaders had a significant impact on war. However, the argument on war and leader survival had a crucial logical implication that escaped early investigations: if leaders organize wars to maximize tenure in office, then wars and tenure in office had to be interdependent. In other words, leader tenure affected war, but war also affected leader tenure, as illustrated by the example of the Argentinean invasion of the Falklands and the fate of the regime that organized the invasion. In light of these and other examples, it followed that leaders had to select which wars to fight. As suggested by Chiozza and Goemans (2003, 447): "Because the outcome of an international conflict can affect a leader's time in office, leaders have

incentives to initiate or participate in wars that increase their time in office and avoid wars that could decrease their time in office." In order to address this issue, Chiozza and Goemans (2003) estimated a system of equations and found that the probability of losing office determined—and was determined by—the probability of crisis occurrence. Boehmke, Morey, and Shannon (2006) estimated a duration model with selection, where the selection equation was given by the occurrence of war and the duration equation was given by leader tenure. Yet, in spite of the careful selection of a war, the latter is likely to have an impact on leader duration. Unexpected loss of life, continued depletion of resources, and the results of battles, among other factors, are likely to affect the resources necessary to keep the loyalty of a winning coalition (Bueno de Mesquita et al. 2003). That is why leaders manipulate their war effort according to political institutions (Bueno de Mesquita et al. 2004).

In sum, the studies that recently highlighted the role of politicians unequivocally demonstrated that leaders matter *only* for the initiation of war. Indeed, these investigations were devoted to show that war was initiated to increase time in office, and that leaders carefully selected the wars they fight. As argued before, this has left the relationship between war termination and leader tenure completely unexplored. Evidently, the administrations of Napoleon, Hitler, Pol Pot, Emperor Hiroito, George W. Bush, or Anthony Eden had a role in the initiation of interstate conflict. But what is the role of the end of an administration in the termination of war? As argued in the previous section, this is a crucial issue, particularly because a large number of administrations have ended during war time. The purpose of the paper is to empirically show that these events also matter for the termination of hostilities. The paper finds that a change in administration increases the probability of war termination. This implies that war duration is not only determined by systemic characteristics, *realpolitik* variables, or simple domestic political institutions. War termination—just like war initiation—is strongly tied to leader tenure. The following section describes the methodology that produced this result.

3 The Conditional Probability of War Termination

Leader change has occurred in 32% percent of all interstate wars. As suggested above, leader change is not exogenous, but in fact determined by the same process it is supposed to affect: interstate war. Simultaneity is therefore a crucial issue because the probability of war termination conditional on leader change depends on the joint probability of war termination *and* leader change. Recall that for two random variables Y_1 and Y_2, the conditional probability of Y_1 given Y_2 is $p(y_1|y_2) = \frac{p(y_1,y_2)}{p(y_2)}$. This simple relationship is the basis of the empirical investigation of this paper. Moreover, this paper estimates the following conditional probability:

$$p(\text{war termination}|\text{ leader change}) = \frac{p(\text{war termination, leader change})}{p(\text{leader change})}. \tag{1}$$

The core of the paper is devoted to comparing relevant conditional probabilities and testing if the difference between them is statistically significant.

Evidently, the probability of the end of a war depends on how long the war has lasted, whereas the probability of leader change is strongly determined by tenure in office. Consequently, in estimating equation 1, it is necessary to account for the effect of time. When time is added to the equation, the analysis of conditional failure becomes an analysis of survival time (Beck, Katz, and Tucker 1998). This logic applied to two different subjects yields a bivariate discrete survival model, which essentially estimates the joint hazard rate of two different units.[5] One such model is the bivariate probit (Van de Ven and Van Pragg 1981; Maddala 1983; Petersen 1995; Greene

[5]The literature in statistics and political science has taken important steps towards a functioning continuous bivariate survival model (Hays and Kachi 2009; Quiroz Flores 2008 and 2009). Yet, these models are not ready to take into account time-varying covariates (TVCs). The bivariate probit model can be easily estimated in the presence of TVCs.

2003). The bivariate probit model to be estimated in this paper is the following (Greene 2003).

$$
\begin{aligned}
y_1^* = x_1'\beta_1 + \epsilon_1, \quad y_1 = 1 \text{ if } y_1^* > 0, 0 \text{ otherwise;} \\
y_2^* = x_2'\beta_2 + \epsilon_2, \quad y_2 = 1 \text{ if } y_2^* > 0, 0 \text{ otherwise;} \\
E[\epsilon_1|x_1, x_2] = E[\epsilon_2|x_1, x_2] = 0; \\
Var[\epsilon_1|x_1, x_2] = Var[\epsilon_2|x_1, x_2] = 1; \\
Cov[\epsilon_1, \epsilon_2] = \rho.
\end{aligned}
$$

The key to this model resides on the interdependence between the two failure processes, which is given by the association parameter ρ. This model is equivalent to the seemingly unrelated regressions in the linear model: if the covariance between the disturbances is equal to zero, then the survival processes are independent from each other—and therefore they can be estimated separately. Standard econometric software produces the necessary tests for the null $\rho = 0$.

The database used for estimation takes advantage of precise information on the dates of leader change and war initiation and termination. The database is organized by country-war-month-leader in a multiple-record base: there is one observation per country per war per month per leader. For instance, for the Greco-Turkish War of 1897, there are 4 observations for Greece and 4 for Turkey, since the war started in February 1897 and ended in May of the same year. When there is a change in leader, the observation for the particular month in which leader change takes place is broken down in two, as there are two leaders in the same month. For instance, the are two observations for the American participation in the Second World War for April 1945, as both Roosevelt and Truman occupied the presidency during the same month.

Notice that this data organization stands apart from the data organization of previous empirical studies of war duration (Bennett and Stam 1996; Goemans 2000; Chan 2003). Previous work analyzed war duration, not war duration per country. This is a crucial difference. First, war duration

is different for different war participants. For instance, according to the coding of Bennett and Stam (1996), the Franco-Prussian War of 1870-1871 lasted 10 months, or close to 300 days. However, the Franco-Prussian War involved Germany, France, Baden, Bavaria, and Wurtenburg. Germany and France were engaged for 223 days, while Baden, Bavaria, and Wurtenburg were engaged for 127, 120, and 130 days respectively. Data organization in previous studies of war neglects the nuances of war duration. This paper focuses on war duration by country, thus addressing war in a more detailed manner. Second, previous work on war duration combines the characteristics of the participants in a single measure that is then included in a parametric survival model. This setup masks the effects of individual countries' characteristics on overall war duration (that is, war duration per war, not war duration by country) and war duration by country. This paper analyzes the duration of war by country, and thus it examines the effect of individual countries on the extent of war involvement.

The first dependent variable is *War End*, and it covers the years from 1849 to 2004. This variable is equal to 0 if a country is involved in war, and equal to 1 when the country terminates its war participation. The variable was obtained from the database on Inter-State War Participants from the Correlates of War Project version 3.0 (Sarkees 2000). The second dependent variable is *Leader Change*. This variable is equal to 0 if a leader is still in office, and equal to 1 at the time she loses office. This variable was obtained from from *Archigos* version 2.2.[6] There are 214 country-wars. There is at least one change in leader in 69 of these interstate wars.[7] Table 1 presents the duration of interstate wars by type of war.

This is a key table. Median war duration for all wars is only 6 months. However, once wars are classified according to leader change, a large variation in duration emerges. An unsuspecting

[6]The data is available online at http://mail.rochester.edu/ hgoemans/

[7]Some countries experience several changes in leader during war. This paper only analyzes the first change in leader. Multiple leader change will be addressed in future work. The causes of leader change analyzed in this paper are varied: 27 (39%) leaders lost power through regular means, 6 (9%) leaders died of natural causes while in power, 1 (1%) leader lost office as a result of ill health, 1 (1%) leader lost office as a result of suicide, 19 (28%) leaders lost power through irregular means, and 15 (22%) leaders were deposed by another state.

Table 1: War Duration by Type of War (Months)

Variable	N	Median	Std. Err.	Max
All Wars	214	6	.914	126
Wars without Leader Change	145	4	.374	96
Wars with Leader Change	69	37	3.63	126
Duration After Leader Change	69	5	2.07	120

analysis of this table would suggest that leader change produces longer wars, as wars that experience leader change are longer than wars that do not experience leader change. It is true that wars that experience a change in leadership protract longer than wars that do not experience a change in leadership. Nevertheless, this does not mean that leader change increases war duration. In fact, it could be the case that leader change only occurs at the end of a long war—and is in fact caused by a long war. This is confirmed by the last row in table 1, which shows the duration of the wars that experienced leader change *after* leader change has taken place. Indeed, median war duration after leader deposition is only 5 months. However, notice the median's large standard error: this suggests that leader change may have a very small or very large effect on war duration. The purpose of the paper is to explain this large variation and how it depends on leader change.

The previous discussion suggests that war duration may have an effect on leader change, and that leader tenure may have an effect on war termination. In order to account for the effect of time, the database uses the natural logarithm of the number of months that a war has lasted, as well as the natural logarithm of the number of months that a leader has occupied office. Carter and Signorino (2009) have presented a thorough discussion on the modelling of time dependence in binary data and argue that a cubic polynomial outperforms other methods. In this paper, the empirical results with the natural logarithm and the cubic polynomial are equivalent. However, since the natural logarithm is easier to interpret, the paper only presents results for this specification.[8]

The independent variables constitute the most important determinants of war duration and

[8]It is important to mention that the count for the duration of leader starts at the beginning of the war. For instance, when the United States got involved in the Second World War, President Roosevelt had been in office for 106 months. Thus, the count for leader tenure for WWII starts at 106 months.

leader tenure. This paper is particularly interested in examining the partial effect of leader change on war termination. Since leader change is not exogenous, this paper uses a bivariate probit model to estimate the joint probability of war termination and leader change. Yet, due to a simple manipulation of the probabilities, leader change can be added as an "independent" variable in the war termination equation in the spirit of a recursive system of equations. In the same light, an additional variable in the war termination equation is whether a leader has inherited the conflict. The variable (*Inherit*) is a dummy variable equal to 1 if a leader took office after the war started and equal to 0 otherwise. Other independent variables for the war termination equation are the natural logarithm of total population (*ln(Population)*), the composite indicator of national capabilities (*Capabilities*), the initiation of war (*Initiate War*), the number of participants in a specific war (*Participants*), the average number of deaths per month (*Mean Deaths*), and the result of the war (*Win*), which indicates if the country was part of the winning faction in the conflict. The independent variables in the equation for leader change reflect the effect of institutions and the provision of goods, which are essential determinants of leader tenure (Bueno de Mesquita et al. 2003 and 2004). The independent variables for the leader change equation are the size of the winning coalition (*W*), the natural logarithm of energy consumption per capita (*ln(Energy Cons. pc)*), and its annual change (Δ*ln(Energy Cons. pc)*). Evidently, both equations share some covariates such as *W*, the mean number of deaths *Mean Deaths*, the result of the war *Win*, and population. The variables *ln(Population)*, *Capabilities*, *Initiate War*, *Participants*, *Mean Deaths*, *Win*, *ln(Energy Cons. pc)*, and Δ*ln(Energy Cons. pc)* were obtained from the database of Inter-State War Participants from the Correlates of War Project version 3.0 (Sarkees 2000). The variable *W* was obtained from the database of Bueno de Mesquita et al. (2003). Table 2 presents summary statistics.

As explained above, this paper estimates a bivariate probit model. In this model, there are two dependent variables: the end of a war and the end of a tenure in office. Both are measured by dummy variables equal to 1 at the time the event occurs, and hence the suitability of a bivariate probit model. As mentioned before, a key parameter in the model is ρ, which measures

Table 2: Summary Statistics

Variable	Mean	Std. Dev.	N
War End	0.0507	0.2195	4218
Leader Change	0.0296	0.1696	4218
Inherit	0.3228	0.4676	4229
ln(Population)	9.9841	1.4353	4218
Capabilities	0.0422	0.0673	4218
Initiate War	0.2188	0.4135	4218
W	0.467	0.3221	4218
Participants	12.3469	9.7373	4229
Mean Deaths	251.325	771.366	4218
Win	0.4091	0.4917	4229
ln(Energy Cons. pc)	-0.7958	2.3561	3036
Δln(Energy Cons. pc)	28.5174	1139.0062	3036
ln(War Duration)	2.8866	1.0447	4218
ln(Leader Duration)	3.613	1.306	4218

the existence—and degree—of interdependence between the failure processes. Tables 3 and 4 presents estimation results for three different models. Model 1 is a baseline recursive system of equations that includes the second dependent variable *Leader Change* in the specification for the war equation. A simple manipulation of probabilities allows for this type of specification (Greene 2003). Model 2 includes the same variables as Model 1, but does not include the second dependent variable *Leader Change* in the war equation—thus, model 2 is the SUR version of model 1. This paper will show that models 1 and 2 are essentially the same. Model 3 includes the effect of the number of participants in an interstate war, as well as the average number of deaths per month for the specific country involved. Tables 5 and 6 present results for Model 4, which includes the effect of inheriting a war. This last model is particularly important because it examines the subtle effects of multiple leader change during war time.

Table 3: Estimation Results Bivariate Probit Model: War Termination

Variable	**1**	**2**	**3**
Leader Change	2.607***		2.552***
	(.556)		(.572)
ln(Population)	-0.0142	-.0170	-.0468
	(.036)	(.036)	(.037)
Capabilities	-0.6445	-.6319	.2218
	(.796)	(.808)	(.755)
Initiate War	0.1723	.2019**	.0593
	(.106)	(.098)	(.116)
W	-0.0126	-.1369	-.0243
	(.307)	(.323)	(.305)
Participants			-.0133***
			(.003)
Mean Deaths			.00007
			(.036)
(Mean Deaths)(W)			-.00007
			(.000)
ln(War Duration)	-0.2130***	-.2386***	-.1959***
	(.061)	(.061)	(.061)
ln(War Duration)(W)	-0.0146	.0163	-.0153
	(.095)	(.100)	(.097)
Intercept	-1.002***	-.8455**	-.5615
	(.396)	(.390)	(.420)
ρ	-.7722***	.2638***	-.7667***
	(.167)	(.081)	(.171)
N	3036	3036	3036
Log pseudolikelihood	-907.876	-912.434	-891.11905

*** Significant at the .01 level
** Significant at the .05 level
* Significant at the .10 level

Table 4: Estimation Results Bivariate Probit Model: Leader Change

Variable	**1**	**2**	**3**
ln(Energy Cons. pc)	0.0437	.0482**	.0405
	(.030)	(.024)	(.030)
Δln(Energy Cons. pc)	0.000	-.0000	-.00002
	(.000)	(.000)	(.000)
W	-0.6496	-.3903	-.4322
	(.400)	(.424)	(.396)
Mean Deaths			.0003**
			(.000)
(Mean Deaths)(W)			-.0026**
			(.001)
ln(Leader Duration)	-0.1981***	-.1675**	-.1631***
	(.061)	(.065)	(.059)
ln(Leader Duration)(W)	0.0303	-.0194	.0303
	(.121)	(.131)	(.116)
Intercept	-0.9337***	-1.076***	-1.138***
	(.201)	(.210)	(.215)
ρ	-.7722***	.2638***	-.7667***
	(.167)	(.081)	(.171)
N	3036	3036	3036
Log pseudolikelihood	-907.876	-912.434	-891.11905

*** Significant at the .01 level
** Significant at the .05 level
* Significant at the .10 level

Table 5: Estimation Results Bivariate Probit Model 4: War Termination

Variable	Coefficient	Variable	Coefficient
(Inherit)	1.893*	Participants	-0.019***
	(1.059)		(0.004)
Leader Change	2.572***	Mean Deaths	0.000
	(0.603)		(0.000)
(Inherit)(Leader Change)	-.0257	(Inherit)(Mean Deaths)	0.0005*
	(0.323)		(0.000)
ln(Population)	0.004	(Mean Deaths)(W)	-.000
	(0.053)		(0.000)
(Inherit)(ln(Population))	-0.188*	(Inherit)(Mean Deaths)(W)	-.002*
	(0.105)		(0.001)
Capabilities	-4.257	Win	0.301***
	(3.305)		(0.105)
(Inherit)(Capabilities)	6.077	ln(War Duration)	-0.231***
	(5.613)		(0.079)
(Inherit)(Capabilities)(W)	0.376	(Inherit)(ln(War Duration))	0.021
	(5.503)		(0.171)
(Capabilities)(W)	3.256	(ln(War Duration))(W)	0.005
	(3.669)		(0.134)
Initiate War	0.104	(Inherit)(ln(War Duration))(W)	0.156
	(0.134)		(0.312))
(Inherit)(Initiate War)	-0.341	Intercept	-1.029*
	(0.236)		(0.550)
W	-0.033		
	(0.325)		
(Inherit)(W)	-0.808		
	(1.057)		
ρ	-.7792***		
	(.154)		
N	3036		
Log pseudolikelihood	-873.92515		

*** Significant at the .01 level
** Significant at the .05 level
* Significant at the .10 level

Table 6: Estimation Results Bivariate Probit Model 4: Leader Change

Variable	Coefficient	Variable	Coefficient
(Inherit)	0.314	Win	0.035
	(0.381)		(0.109)
ln(Energy Cons. pc)	0.023	ln(Leader Duration)	-0.091
	(0.038)		(0.082)
(Inherit)(ln(Energy Cons. pc))	0.059	(Inherit)(ln(Leader Duration))	-0.015
	(0.060)		(0.146)
Δln(Energy Cons. pc)	0.000	(ln(Leader Duration))(W)	-0.034
	(0.000)		(0.161)
(Inherit)(Δln(Energy Cons. pc))	-0.001*	(Inherit)(ln(Leader Duration))(W)	-0.044
	(0.000)		(0.242)
W	-0.127	Intercept	-1.480***
	(0.632)		(0.377)
(Inherit)(W)	-0.144		
	(0.638)		
Mean Deaths	0.000**		
	(0.000)		
(Inherit)(Mean Deaths)	0.000		
	(0.000)		
(Mean Deaths)(W)	-0.002***		
	(0.001)		
(Inherit)(Mean Deaths)(W)	-0.003		
	(0.002)		
ρ	-.7792***		
	(.154)		
N	3036		
Log pseudolikelihood	-873.92515		

*** Significant at the .01 level
** Significant at the .05 level
* Significant at the .10 level

The interpretation of the effect of leader change on war termination in model 1 is interestingly complex. On the one hand, the positive estimate of *Leader Change* in the war equation would suggest that a change in leader during war increases the probability of bringing the war to an end. On the other hand, the negative estimate of ρ would suggest that there is a negative relationship between leader change and war termination. This means that a change in leadership would reduce the probability of bringing the war to an end. However, model 2 presents a significant and positive estimate of ρ. This indicates that change in leadership is likely to bring a war to an end. What is then the effect of leader change on war termination? The following will show that these seemingly contradictory results are in fact equivalent.

Marginal effects in a bivariate model depend on the joint probability of failure (i.e. the probability of observing war termination and leader change), which can take on 4 different values: p[war termination (1) and leader change (1)], p[war termination (1) and leader continuation (0)], p[war continuation (0) and leader change (1)], and p[war continuation (0) and leader continuation (0)]. This paper is interested in estimating equation 1 conditional on the covariates. Nevertheless, the causal effect of leader change is given by the following first difference:

$$\begin{aligned} &p(\text{war termination}|\ \text{leader change}) - p(\text{war termination}|\ \text{leader continuation}) = \\ &\frac{p(\text{war termination, leader change})}{p(\text{leader change})} - \frac{p(\text{war termination, leader continuation})}{p(\text{leader continuation})}. \end{aligned} \tag{2}$$

To calculate this quantity, the paper requires estimates of joint and marginal probabilities. The calculation of marginal probabilities is straightforward. Joint probabilities are slightly more complex. Assume that $x = x_1 \cup x_2$, and that $x_1' = x'\gamma_1$, where γ_1 contains all the nonzero elements of β_1 after estimation and zeros in the positions of the variables in the second equation (Greene 2003). The same is true for γ_2. Therefore, the joint probability of failure is given by $p[y_1 = 1, y_2 = 1|x] = \Phi_2[x'\gamma_1, x'\gamma_2, \rho]$, where Φ_2 is the bivariate normal cumulative density function. The computation of $p[y_1 = 1, y_2 = 0|x]$ only requires of some sign changes. Evidently,

the marginal effects are a complex derivative of Φ_2 in respect to x. However, first differences in probabilities are easier to compute. These probabilities are calculated with a simple simulation of 10,000 draws from the coefficients estimated in models 1, 2, and 4, which are normally distributed. The values of all covariates are hold at their means. The conditional probability of war termination given leader continuation and change, as well as their difference, for models 1, 2, and 4 (SUR version) are given in table 7.

Table 7: Conditional Probabilities

Variable	**Mean**	**Std.Err.**	**C.I.**
Model 1: Recursive System			
p(war termination | leader continuation)	.0692	.0005	[.0683-.0702]
p(war termination | leader change)	.2631	.0023	[.2586-.2676]
Difference	.1938	.0021	[.1896-.1980]
Model 2: SUR			
p(war termination | leader continuation)	.0760	.0005	[.0750-.0771]
p(war termination | leader change)	.1843	.0009	[.1824-.1863]
Difference	.1083	.0004	[.1074-.1092]
Model 4: SUR			
p(war termination | leader continuation)	.0511	.0005	[.0499-.0523]
p(war termination | leader change)	.7229	.0024	[.7244-.7340]
Difference	.6780	.0025	[.6731-.6830]

Clearly, leader change increases the probability of war termination across the board. The first difference in probabilities is larger for model 1 than for model 2. Yet, the trend is essentially the same: when a leader is replaced during war, the latter is more likely to end. This suggests that models 1 and 2 are equivalent. In model 1 the effect of leader change on the war equation dominates the effect of a negative correlation among the failure processes. In model 2 the correlation absorbs the effect and hence the positive estimate of ρ. The same logic applies to models 3 and 4, which present a large positive coefficient for leader change that dominates the negative estimate for ρ. Altogether, all models all point at the positive effect of leader change on the probability of war termination.

What are the implications of these results? Most importantly, the fact that leader change increases the prospects of war termination improves our understanding of leader deposition and its

connection to accountability. In democratic countries, citizens can depose their leader in order to bring war to an end. It is therefore not a surprise that leaders in democratic countries choose very carefully whether to fight a war or not. In autocratic countries, this helps explain why leaders in these systems are often paranoid: small groups of organized people—often close to the leader—and regular citizens alike might plot to remove the leader in order to stop a bloody war. The several attempts made on Hitler's life—and organized by trusted army officials—during the Second World War, as well as Napoleon's final exile in St. Helena, are good examples of the importance of leader deposition on war termination.

There are additional results that further illustrate the significant, yet subtle effects of political change on war termination. Model 4 identifies leaders that took office after the war started. These leaders effectively inherited the war effort. Does inheriting a war affect the duration of it? Does change in leaders that inherited the war—as opposed to leaders that started the war—have an impact on war termination? The positive and significant coefficient for *Inherit* in model 4 clearly indicates that leaders that inherit the war greatly increase the probability of war termination. This means that any leader that takes over a country after the war has started is likely to end her country's participation in the conflict. However, it is important to stress that "inheriting office" should not be mistaken with leader change. Leaders that inherit office always increase the probability of war termination. The change in leaders *per se* only increases the probability of war termination if it is the first change in leaders during war time. The second, third, or fourth change in leaders during war time does not have an effect on the end of war. Indeed, the first change in leaders during war time increases the probability of war termination, as suggested by the positive and significant coefficient of *Leader Change*—when this variable is included in the war equation—or by the positive coefficient for ρ—when the variable *Leader Change* is not included in the war equation. Nevertheless, further leadership transitions do not increase the probability of war termination, as clearly indicated by the insignificant coefficient for the interaction between *Leader Change* and *Inherit* in model 4, which indicates the end of the tenure of a leader that took office after the war started. In

short, the end of the tenure of the leader that started the war increases the probability of war termination, but the end of the tenure of a leader that took over after the war started does not have an effect on war termination.[9] In an hypothetical illustration, these results suggest that the transition from the Presidency of George W. Bush to the Presidency of Barack Obama would increase the probability of the end of the American participation in Iraq. However, if American participation in the Iraq War continued and Barack Obama lost the Presidency in 2012, the political transition *per se* in January 2013 would not increase the probability of the end of the Iraq War.

Additionally, it is worth mentioning the consistent effects of the number of participants in a war, as well as the effect of the number of deaths on leader tenure. Intuition would suggest that wars that involve a large number of participants, such as the First and Second World Wars, are difficult to terminate. This paper presents evidence in support of this hypothesis, as indicated by the estimate for *Participants*, which indicates across the board that the larger the number of participants in a war, the more difficult it is to end it.[10] The result of the war also matters for war duration. Indeed, countries that win wars tend to end conflicts sooner rather than later. The positive and significant estimate for *Win* shows that winning a war increases the probability of war termination. This was confirmed by other models not reported in this paper, which also showed that although winning a war increases the probability of war termination, losing it does not have a significant effect on the probability of ending a conflict. Interestingly, although winning a war does not have an effect on leader tenure, battle deaths do present a consistent effect on the survival of leaders. Model 3 shows that an increase in the number of average battle deaths per month increases the probability of leader change in small coalition systems, which resemble non-democratic regimes. In large

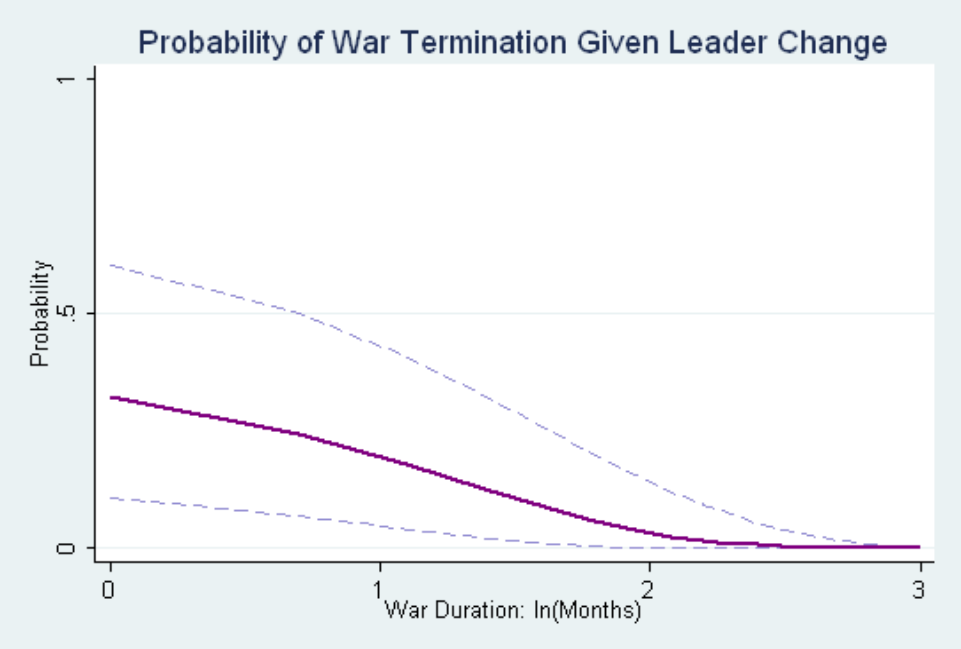
[9]The estimate for *Inherit* is only significant at the 90% level. Multiple leader change does not occur often during war time. However, it is important to mention that out of the wars that experience leader change, 43% of them experience multiple leader change. In light of this fact, this paper encourages more research on multiple leader change during war time.

[10]It is possible that the dynamics of two-party and multi-party wars are different. However, evidence not reported in this paper suggests that dyadic conflicts do not make a difference in the termination of wars. Yet, it is important to note that the interactions between countries and their leaders in a dyadic conflict require further analysis, as a change in leaders in a country can affect the propensity of the enemy to end the war. However, this creates further endogeneity problems whose solution is beyond the scope of this paper. I thank Sandy Gordon for highlighting this issue.

coalition systems, however, mean battle deaths in fact reduce the probability of leader deposition. This is also confirmed by the estimates in model 4. Although these results might seem odd, they in fact confirm the hypothesis that leaders from large coalition systems devote more resources in war than leaders from small coalition systems (Bueno de Mesquita et al. 2004). Indeed, in the case of war, leaders from large coalition systems fight harder and longer in order to win the war and stay in office. Thus, it is not surprising to observe that an increase in the number of average deaths in fact improves the survival prospects of leaders in large coalition systems.

Leader change could have been caused by war termination, and hence the bivariate model. Yet, it is worth investigating how the effect of leader change on war termination depends on the duration of the war itself. The estimate for the natural logarithm of war duration in all models indicates that war is less likely to end over time. In other words, the longer the war, the less likely it is to end. This is a new result that contradicts previous investigations that argued that war is not duration dependent (Bennett and Stam 1996; Goemans 2000). However, these investigations did not really analyzed the role of leadership on war duration and therefore they missed an important determinant of war termination. When leader tenure and leader change are added to the analysis, war duration presents negative duration dependence. Such dependence is illustrated in figure 1, which graphs a simulation of 10,000 observations of the likelihood of war termination conditional on leader change as a function of the magnitude of war duration for model 2. All variables are hold at their means.

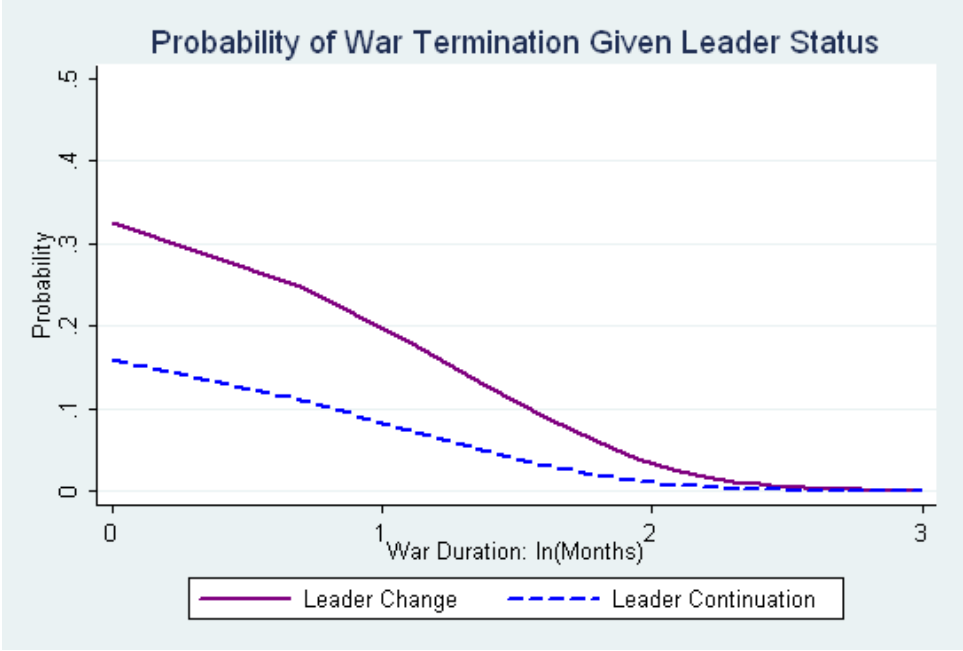
Figure 1: Probability of War Termination Given Leader Change: Model 2



Evidently, the longer the war, the less likely it is to end. This is a very important result not only because it contradicts previous studies of war duration, but also because general intuition would suggest that longer wars are easier to end than short wars: long wars may produce large number of casualties and loss of resources, thus weakening the participants and forcing them to concede and end the war. However, the evidence shows that long wars generate a powerful inertia that makes them resistant to time. Indeed, short wars are easy to end, while long ones are particularly difficult to stop. This result has important implications because early interventions to end the war are more likely to be successful than late ones. Consequently, the timing of war diplomacy is crucial.

In light of this result, it is important to investigate the effect of leader change on war termination *over time*. Indeed, the effect of a change in leadership immediately after the war has started is likely to be different than a change in leadership one year into the war. For instance, Guatemalan President Justo Rufino Barrios lost office on 6 April 1885, 9 days after the Second Central American War started. Guatemalan participation in the war ended 9 days after Barrios lost office. In a

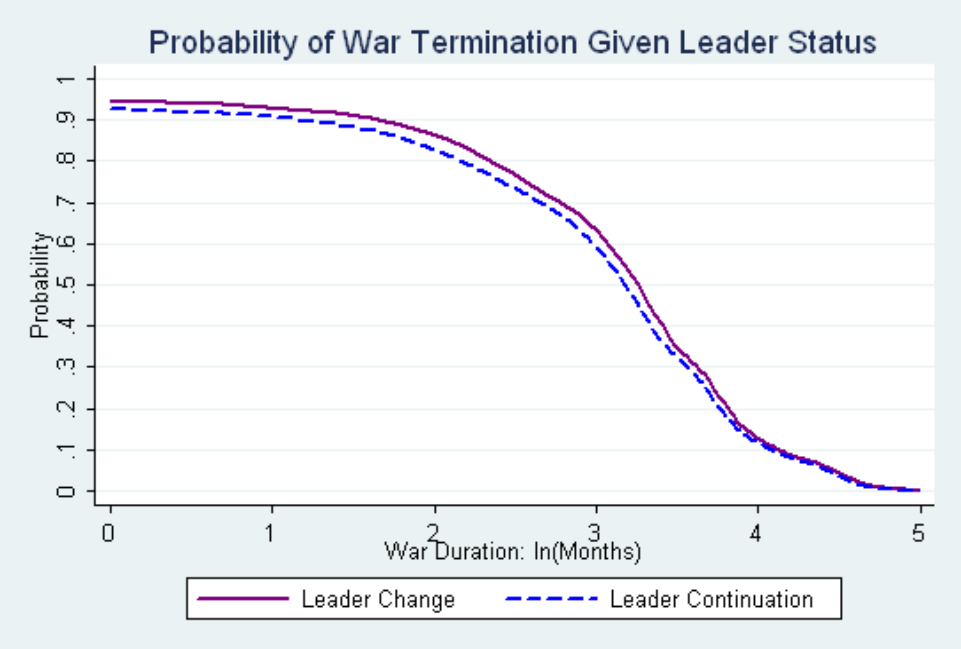
Figure 2: Probability of War Termination Given Leader Status: Model 2



completely different example, Greece extended its participation in the Korean War for 22 months after Nikolaos Plastiras took over as Greek Prime Minister in 1951, almost a year after Greece first started its participation in the war. Does this suggest that the effect of leader change might depend on the duration of the war? To illustrate the causal effect of leader change as war progresses, it is necessary to compare it to the probability of war termination given that a leader is still in office. It could well be the case that the difference in probabilities for these two cases shrinks or expands over time. Figures 2 and 3 present these conditional probabilities according to model 2 and the SUR version of model 4. The solid purple lines represent the probability of war termination conditional on a leader change as a function of war duration. The dashed blue lines represent the probability of war termination conditional on a leader still in office (i.e. lack of leader change) as a function of war duration. All other variables are hold at their means.

Figures 2 and 3 clearly show that the causal effect of leader change on war termination decreases over time. Recall that the difference between the probability of war termination given

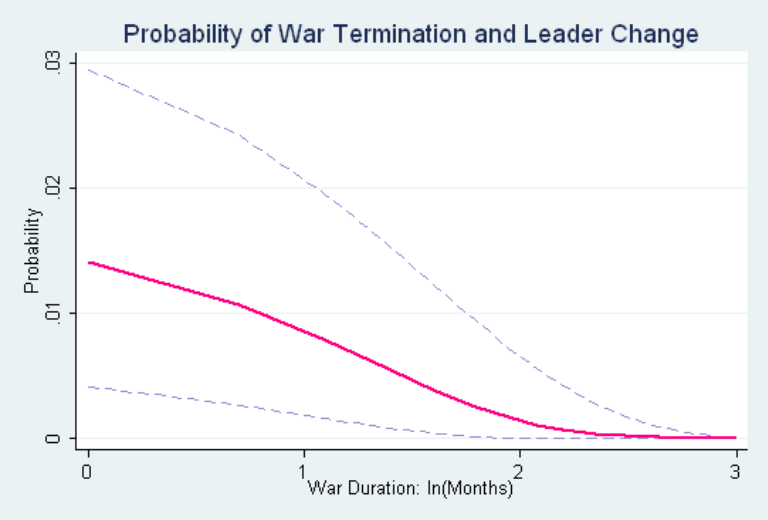
Figure 3: Probability of War Termination Given Leader Status: Model 4



leader change and the probability of war termination given leader continuation was positive and statistically significant. However, this first difference can change over time. This is shown by the shrinking distance over time between the conditional probabilities in the above figures. These figures demonstrate that a change in leadership early in the war has a very significant effect on war termination, but as the war progresses, leader change ceases to have an effect. This result has serious implications. For example, according to this result, the deposition of a leader by a foreign power early on the war can increase the prospects of peace, but not if the war has been fought for a significant amount of time. Since leader specific punishments do affect relations between states (McGillivray and Smith 2000 and 2008), the timing of depositions (a very specific punishment) is crucial.

Finally, how often do war termination and leader change coincide? Of 214 wars, 17 of them ended in the same month the leader was deposed. This seems like a unique event. However, from the perspective of the wars that experienced leader change, there is a large proportion of wars

Figure 4: Probability of War Termination and Leader Change



whose end coincides with leader deposition: 25% of all war terminations coincide with a change in leader. Figure 4 presents the probability of jointly observing war termination and leader change according to model 2.

Altogether, the probability of the joint occurrence of these events is small. This probability is even smaller over time. Indeed, leader deposition and war termination are events that are seldom observed. Illustrative examples of these cases are Haile Selassie, Emperor of Ethiopia, deposed at the end of the Italo-Ethiopian War of 1935-1936; Pakistan's Prime Minister Yahya Khan, deposed after the campaign in Bangladesh in 1971; or Pol Pot, deposed after the Vietnamese-Cambodian War of 1975-1979. In light of these examples, it is not a surprise to observe such a small number of cases: both Haile Selassie and Pol Pot were deposed by another state at the end of the war. In fact, 70% of all leaders deposed at the time the war ended were removed by the winning country. 3 of these leaders were deposed by irregular means. Goemans (2008) has already begun to analyze the post-conflict fate of leaders and has argued that "international conflict barely affects the hazard of a regular removal from office but significantly affects the hazard of an irregular removal from office."

In sum, if leaders are instrumental for the initiation of war, this paper demonstrates that they are equally important in the termination of it. The estimation results in this paper clearly indicate that a change in leadership—and particularly the first change in leadership—is likely to end a country's participation in interstate war. Often, leader change occurs during the duration of the conflict. When this event is observed early in the war, the latter is more likely to end. Nevertheless, once war has progressed and is more firmly established, leader change is less likely to end it.

4 Conclusion

The word "causal" has been seldom used throughout this paper. For the purposes of investigating the effect of leader change on war termination, an analysis of the first differences between conditional probabilities—while also conditioning on covariates—solidly demonstrates that a change in leadership is likely to end a country's participation in interstate war. Moreover, when there is multiple leader change during war, only the first change in leaders—that is, the end of the administration that started the war—increases the probability of war termination. Further leadership changes do not have a significant effect on the duration of war. These results are based on a crucial characteristic of the relationship between war and leader tenure: interdependence. This feature cannot be neglected. Yet, numerous studies of war duration have failed to address this issue. In this sense, this paper has filled this gap in the literature by estimating the partial effect of leader change on war termination in this framework of simultaneity.

Nevertheless, there might be other methods that could prove useful in the analysis of war termination and leader change. If leader change is interpreted as a "treatment" that is not assigned but observed, matching techniques could be used to produce better and more objective causal effects and inferences about counterfactuals (Zekhon 2004; King and Zeng 2006; Gelman and Hill 2007; Ho et al. 2007a). Matching can also reduce the ubiquitous need to rely on parametric

models to estimate causal effects (King and Zeng 2005; Ho et al. 2007). For instance, Bennett and Stam (1996) and Goemans (2000) have found completely different results on the impact of particular covariates on war duration. This suggests that their results might be model dependent, which casts doubts on the significance of their causal estimates. Preprocessing data by matching might significantly reduce model dependence.

This paper has omitted results derived from a semi-parametric analysis of war duration based on a preprocessed data set obtained with matching. The results were omitted due to the small number of cases produced after matching. The procedure is particularly complex because the treatment (i.e. leader change) partly depends on the outcome variable, that is, war duration. Complexity is increased by the use of snapshots in the matching procedure.[11] Yet, the analysis produced estimates that coincide with the results presented in this paper (i.e. leader change increases the hazard rate of war duration) but the small number of observations make them statistically insignificant.

This paper was motivated by recent expectations about the war in Iraq and Afghanistan produced during the presidential election in the United States in 2008. Although candidates explicitly addressed this issue, citizens around the world kept wondering whether a new American President was really likely to bring the war to an end, particularly in the Iraqi theater. This was a question often asked in Great Britain, as Prime Minister Tony Blair passed on the leadership of the Labor Party to Gordon Brown. In the last few months, the leaders of both nations have set a deadline for the final withdrawal of troops in Iraq. As suggested by this paper, leader change is likely to bring war to an end. However, the war in Iraq has been dragging on for more than 5 years. The results presented in this paper also suggest that, although that the Iraq War is more likely to end now than at any other time, bringing American and British participation to an end will not be easy or fast paced.

The fact that individual leaders and their tenure in office are crucial in explaining the end

[11] Snapshots of the information at different points in time have been used to match observations organized in multiple records (Gilligan and Sergenti 2007).

of interstate war has immense implications for our understanding of domestic accountability and relationships among nations. Citizens seldom have control over tools of dispute resolution: negotiations and diplomacy are carried out by government officials and not by voters. Yet, this paper shows that voters can bring war to an end by deposing their leaders. Furthermore, since leader deposition is not restricted to voters in democratic systems, coalitions—or organized groups of individuals—in autocratic countries can also attempt to depose a leader in order to stop an armed conflict. In addition, countries and international organizations might find that leader deposition is an effective strategy to control international conflict. It follows that if citizens, foreign countries, and international organizations combine their efforts to make leaders more accountable, this will increase the prospects for peace. Yet, these efforts need to take place as soon as the war starts. Otherwise, the prospects for peace will be smaller as the war progresses.

References

[1] Beck, Nathaniel, Jonathan N. Katz, and Richard Tucker. 1998. Taking Time Seriously: Time-Series Cross-Section Analysis with a Binary Dependent Variable. *American Journal of Political Science* 42 (4): 1260-1288.

[2] Bennett, Scott D., and Allan C. Stam. 1996. The Duration of Interstate Wars, 1816-1985. *American Political Science Review* 90 (2): 239-257.

[3] Bennett, Scott D., and Allan C. Stam. 1998. The Declining Advantages of Democracy: A Combined Model of War Outcomes and Duration. *Journal of Conflict Resolution* 42 (3): 344-366.

[4] Boehmke, Frederick J., Daniel S. Morey, and Megan Shannon. 2006. Selection Bias and Continuous-Time Duration Models: Consequences and a Proposed Solution. *American Journal of Political Science* 50 (1): 192-207.

[5] Bueno de Mesquita, Bruce. 1978. Systemic Polarization and the Occurrence and Duration of War. *Journal of Conflict Resolution* 22 (2): 241-267.

[6] Bueno de Mesquita, Bruce, Randolph M. Siverson, and Gary Woller. 1992. War and the Fate of Regimes: A Comparative Analysis. *American Political Science Review* 86 (3): 638-646.

[7] Bueno de Mesquita, Bruce, and Randolph M. Siverson. 1995. War and the Survival of Political Leaders: A Comparative Study of Regime Types and Political Accountability. *American Political Science Review* 89 (4): 841-855.

[8] Bueno de Mesquita, Bruce, Alastair Smith, Randolph M. Siverson, and James D. Morrow. 2003. *The Logic of Political Survival*. Cambridge, MA: MIT Press.

[9] Bueno de Mesquita, Bruce, Alastair Smith, Randolph M. Siverson, and James D. Morrow. 2004. Testing Novel Implications from the Selectorate Theory of War. *World Politics* 56 (3): 363-88.

[10] Carter, David, and Curtis Signorino. 2009. *Back to the Future: Modeling Time Dependence in Binary Data*. Working Paper. Department of Political Science, University of Rochester.

[11] Chan, Steve. 2003. Explaining War Duration. A Boolean Analysis of Causes. *Journal of Peace Research* 40 (1): 4966.

[12] Chiozza, Giacomo, and H. E. Goemans. 2003. Peace Through Insecurity: Tenure and International Conflict. *Journal of Conflict Resolution* 47 (4): 443-467.

[13] Chiozza, Giacomo, and H. E. Goemans. 2004. International Conflict and the Tenure of Leaders: Is War Still Ex Post Inefficient? *American Journal of Political Science* 48 (3): 604-619.

[14] Edwards, Peter. 1997. *A Nation at War: Australian Politics, Society and Diplomacy During the Vietnam War 1965-1975*. Sydney: Allen & Unwin.

[15] Fearon, James D. 1994. Domestic Political Audiences and the Escalation of International Disputes. *American Political Science Review* 88 (3): 577-92.

[16] Filson, Darren, and Suzanne Werner. 2002. A Bargaining Model of War and Peace: Anticipating the Onset, Duration, and Outcome of War. *American Journal of Political Science* 46 (4): 819- 838.

[17] Filson, Darren, and Suzanne Werner. 2004. Bargaining and Fighting: The Impact of Regime Type on War Onset, Duration, and Outcomes. *American Journal of Political Science* 48 (2): 296-313.

[18] Gelman, Andrew, and Jennifer Hill. 2007. *Data Analysis Using Regression and Miltilevel/Hierarchical Models*. New York: Cambridge University Press.

[19] Gilligan, Michael J., and Ernest J. Sergenti. 2008. Do UN Interventions Cause Peace? Using Matching to Improve Causal Inference. *Quarterly Journal of Political Science* 3(2): 89-122

[20] Goemans, H.E. 2000. Fighting for Survival: The Fate of Leaders and the Duration of War. *Journal of Conflict Resolution* 44 (5): 555-579.

[21] Goemans, H.E. 2008. Which Way Out? The Manner and Consequences of Losing Office. *Journal of Conflict Resolution* 53 (6):771-794.

[22] Greene, William. 2003. *Econometric Analysis*. New Jersey: Prentice Hall.

[23] Hays, Jude C., and Aya Kachi. 2009. *Interdependent Duration Models in Political Science*. APSA 2009 Toronto Meeting Paper.

[24] Ho, Daniel E., Kosuke Imai, Gary King, and Elizabeth Stuart. 2007a. Matching as Nonparametric Preprocessing for Reducing Model Dependence in Parametric Causal Inference. *Political Analysis* 15 (3): 199-236.

[25] King, Gary, and Langche Zeng. 2006. The Dangers of Extreme Counterfactuals. *Political Analysis* 14 (2): 131159.

[26] Logevall, Fredrik. 2004. Lyndon Johnson and Vietnam. *Presidential Studies Quarterly* 34 (1): 100-112.

[27] Maddala, G.S. 1983. *Limited Dependent Variables and Qualitative Variables in Econometrics.* New York, NY: Cambridge University Press.

[28] Mattes , Michaela, and T. Clifton Morgan. 2004. When Do They Stop? Modeling the Termination of War. *Conflict Management and Peace Science* 21 (3): 179193.

[29] McGillivray, Fiona, and Alastair Smith. Trust and Cooperation Through Agent-specific Punishments. *International Organization* 54 (4): 809824.

[30] McGillivray, Fiona, and Alastair Smith. 2008. *Punishing the Prince*. Princeton NJ: Princeton University Press.

[31] Moss, Walter G. 2002. *Russia in the Age of Alexander II, Tolstoy and Dostoyevsky*. London: Anthem Press.

[32] Petersen, Trond. 1995. Models for Interdependent Event History Data: Specification and Estimation. *Sociological Methodology* 25: 317375.

[33] Quiroz Flores, Alejandro. 2008. *Copula Functions and Bivariate Distributions for Survival Analysis: An Application to Government Survival*. Working Paper. Department of Politics, New York University.

[34] Quiroz Flores, Alejandro. 2009. *Testing Copula Functions as a Method to Derive Bivariate Weibull Distributions.* APSA 2009 Toronto Meeting Paper.

[35] Sarkees, Meredith Reid. 2000. The Correlates of War Data on War: An Update to 1997. *Conflict Management and Peace Science* 18 (1): 123-144.

[36] Schultz, Kenneth. 1999. Do Democratic Institutions Constrain or Inform? Contrasting Two Institutional Perspectives on Peace and War. *International Organization* 53 (2): 233-266.

[37] Schultz, Kenneth. 2001. Looking for Audience Costs. *Journal of Conflict Resolution* 45 (1): 32-60.

[38] Sekhon, Jasjeet S. 2004. Quality Meets Quantity: Case Studies, Conditional Probability, and Counterfactuals. *Perspectives on Politics* 2 (2): 281-293.

[39] Slantchev, Branislav L. 2003. The Principle of Convergence in Wartime Negotiations. *American Political Science Review* 47 (4): 621-632.

[40] Smith, Alastair. 1998a. International Crises and Domestic Politics. *American Political Science Review* 92 (3): 623-638.

[41] Smith, Alastair. 1998b. Fighting Battles, Winning Wars. *Journal of Conflict Resolution* 42 (3): 301320.

[42] Werner, Suzanne. 1998. Negotiating the Terms of Settlement: War Aims and Bargaining Leverage. *Journal of Conflict Resolution* 42(3): 321343.

[43] Wagner, R. Harrison. 2000. Bargaining and War. *American Journal of Political Science* 44 (3): 469-484.

[44] Van de Ven, W.P.M. and B.M.S. Van Pragg. 1981. The Demand for Deductibles in Private Health Insurance: A Probit Model with Sample Selection. *Journal of Econometrics* 17 (2): 229-252.

[45] Vuchinich, Samuel, and Jay Teachman. a993. Influences on the Duration of Wars, Strikes, Riots, and Family Arguments. *Journal of Conflict Resolution* 37 (3): 544-568.

[46] Waltz, Kenneth. 2001. *Man, the State, and War. A Theoretical Analysis*. New York: Columbia University Press. Revised Edition.

[47] Wittman, Donald. 1979. How a War Ends: A Rational Model. *Journal of Conflict Resolution* 23 (4): 743-763.

[48] Wortman, Richard. 2000. *Scenarios of Power. Myth and Ceremony in Russian Monarchy*. Princeton NJ: Princeton University Press. Vol. 2.