UNIVERSITY OF CALIFORNIA, SAN DIEGO

Conflict and Third Party Mediation

A dissertation submitted in partial satisfaction of the
requirements for the degree
Doctor of Philosophy

in

Economics

by

Benjamin C. Horne

Committee in charge:

Professor Joel Watson, Chair
Professor Eli Berman
Professor Erik Gartzke
Professor David Lake
Professor David Miller

2013

The dissertation of Benjamin C. Horne is approved, and it is acceptable in quality and form for publication on microfilm and electronically:

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Chair

University of California, San Diego

2013

DEDICATION

Speaking as Ben's friends and advisors, we would like to dedicate this dissertation
to Ben's parents, Gary and Christine Horne.
We can't imagine Ben dedicating it to anyone else.

EPIGRAPH

Maintain the Light

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PREFACE

Benjamin C. Horne was a Ph.D. student in the Department of Economics, UC San Diego, and was also a presence in the Political Science Department. He entered the Ph.D. program in the Fall of 2007. In the summer of 2012, Mr. Horne and a mountain-climbing partner died tragically while on an expedition in Peru.

Before his trip to Peru, Mr. Horne was working to finish his doctoral dissertation. He was in the last stage of the Ph.D. program, having completed all of the requirements except the defense of his dissertation. Mr. Horne's dissertation consists of three parts, each which stands alone as a scholarly paper (a standard format for dissertations in economics). Horne completed all three of these papers before the end of the 2011-2012 academic year. At the time of his death, only minor work remained to be done. This included proofreading and correcting typographical errors, checking and revising the mathematical content, and formatting the dissertation for submission to the University.

The members of Horne's dissertation committee — Joel Watson (Economics, Committee Chair), David Lake (Political Science and Associate Dean, Social Science Division), David Miller (Economics), Eli Berman (Economics), and Erik Gartzke (Political Science) — closely examined the dissertation materials and have determined that they meet the requirements for a UCSD Ph.D. The dissertation makes a substantial and original contribution to economics and political science. The committee also confirms the academic integrity of the dissertation, which is the result of Horne's independent work and his collaboration with Benjamin Graham (a recent UCSD graduate, now at the University of Southern California) on the chapter coauthored with Graham.

The dissertation committee, with the help of Kristy Buzard (Syracuse University) and Benjamin Graham, has performed a light revision of the dissertation to correct typographical errors, check the mathematics, handle other minor issues, and format it properly for submission.

ACKNOWLEDGEMENTS

Benjamin Christopher Horne is our son. He passed away in July 2012 before completing this work, so the honor of acknowledging people in this section is ours.

Writing this acknowledgements section would have been a joy for Ben and we think he would have mentioned his family and close friends by name. We think he would have somehow conveyed the credos by which he lived and communicated his passion for living. He also loved and kept long lists of quotes, and we think he would have placed within this section some truly thought-provoking and appropriate ones. While we could make intelligent guesses, we simply don't know what these quotes would have been, so we will just share a quote that feels right to us: "We do not honor the dead by dying with them."

Details of Ben's passing and reflections on his life can be found at the website maintainthelight.org, but Ben's academic work, amazingly did not die with him. We are awed and humbled by the efforts after his death by many from UCSD. So, we are grateful for the chance to first offer thanks to those who worked so hard after Ben's passing to complete and file his dissertation. These included Eli Berman, Kristy Buzard, Dalia Ghanem, Dallas Dotter, Benjamin Graham, and Joel Watson.

In terms of Ben's intellectual journey here on earth, we would like to first thank the members of Ben's dissertation committee for their guidance: Joel Watson (chair), Eli Berman, David Miller, David Lake, and Erik Gartzke. Ben's development as a scholar owes its greatest debt to these individuals.

Erik Gartzke and David Lake are both political scientists, and they guided Ben as he worked to broaden the reach of his work and make contributions outside the field of economics. The committee's economists likewise showed extraordinary intellectual flexibility and generosity. David Miller's ever-present smile and ever-ready technical savvy were deeply appreciated and Ben benefitted tremendously from Eli Berman's expertise in the study of conflict.

While no dissertation can be completed without substantial cooperation from an advisor, this dissertation truly could not have been finished without the dedication and perseverance of Joel Watson. The role that Joel's guidance and encouragement played in this process cannot be overstated. It is exceptional for a theory advisor to continue to make such enormous investments in a student after his applications move him into a different discipline. Words are insufficient to describe the type of commitment it takes for an advisor to then complete that student's dissertation and disseminate his ideas in another field when the student is unable to do so himself.

Ben formed community wherever he went, and his Ph.D. program was no exception.

While Ben formed meaningful relationships with many of his fellow students, we want to mention a few in particular. In Ben's first year, he formed a study group with Dallas Dotter, Kirti Gupta, and Dalia Ghanem, and the members of that group remained close throughout their graduate careers. Kristy Buzard was practically Ben's Ph.D. twin, sharing his advisor, and working perhaps more closely with Ben than anyone else. Later in his graduate career, as Ben began to move toward political science, he began collaborating with Ben Graham, who co-authored one of Ben's dissertation chapters. Many others contributed to this intellectual community of which Ben was a part, and we are grateful to all of them.

Ben connected with people. Ben pursued peace. Ben sought the truth. And we want to conclude by saying that we are eternally grateful for the blessing of the 32 years we had with our son Ben here on this earth. But we also wanted Ben to get the last word (from his blog, June 2011): "Last year for my birthday, Grandmom sent me a card with a photo of Denali on the front. I climbed Denali for the first time 2 weeks after her death, still grieved. The emotion definitely spurred me to press on. A few years before she sent me a card of a lighthouse with the words 'Maintain the Light.' I do believe death is a part of life, and that her light can shine on through us."

Maintain the Light,
Gary and Christine Horne

Chapter 3, in full, has been submitted for publication of the material as it may appear in the British Journal of Political Science, 2013. Graham, Benjamin A.T.; Horne, Ben. The dissertation author was a principal author of this paper.

VITA

2002	Bachelor of Arts, Mathematical Economic Analysis *with Honors*, Rice University, Houston, TX
2002-2004	Volunteer, United States Peace Corps, Bishkek, Kyrgystan
2005-2006	Research Specialist and Programmer, Center for Naval Analysis, Alexandria, VA
2006-2007	Investment Climate Department Consultant, The World Bank, Doing Business Project, Washington, DC
2007	Master of Arts, Applied Economics, John Hopkins University, Washington, DC
2007-2012	Graduate Teaching Assistant, University of California, San Diego, San Diego, CA
2013	Doctor of Philosophy, Economics, University of California, San Diego, San Diego, CA

PUBLICATIONS

"Doing Business 2008," *The World Bank*, September 2007.

"Doing Business 2007: How to Reform," *The World Bank*, September 2007.

"Analysis of CIVMAR Attrition and the Role of Shore Leave." *CNA Research Memorandum*, May 2006 (with Michael J. Moskowitz).

"Providing Input to Improve the Readability of Marine Corps Manpower Website Section on Manpower Performance Indicators." *CNA Annotated Briefing*, January 2006 (with M. Kimble and Michael J. Moskowitz).

"Patterns of Reserve Officer Attrition Since September 11, 2001." *CNA Annotated Briefing*, October 2005 (with Michelle A. Dolfini-Reed and Ann D. Parcell).

"The Fifth Annual Navy Workforce Research and Analysis Conference: Building on the Pillars of the Navy's Human Capital Strategy." *CNA Research Memorandum*, August 2005 (with Anita U. Hattiangadi).

"Determining Patterns of Reserve Attrition Since September 11, 2001." *CNA Annotated Briefing*, June 2005 (with Michelle A. Dolfini-Reed, Ann D. Parcell and David Gregory).

ABSTRACT OF THE DISSERTATION

Conflict and Third Party Mediation

by

Benjamin C. Horne

Doctor of Philosophy in Economics

University of California, San Diego, 2013

Professor Joel Watson, Chair

This dissertation focuses on the effects of a third-party mediator in protracted conflict settings. I primarily use formal models based on game theory and mechanism design, employing case studies and empirical work to further my analysis. The question of mediation effectiveness in the literature is still an open one, addressed empirically but with little theoretical support. While some work has emphasized the important role of enforcement, there is no consensus as to whether, how and why these tactics work. I use formal modeling to examine the mediator's enforcement ability and show the ways in which manipulative mediation can in fact improve upon bilateral results.

The first chapter examines the use of different types of enforcement in conflict mediation. This paper compares potential outcomes of bilateral negotiations with the outcomes achievable with the help of a mediator capable of various levels of enforcement, seeking to gain

insight into how to end ongoing war using a signaling framework. I find that a mediator with sufficient enforcement capabilities can improve on the bilateral outcome, perhaps creating peace that would not have been possible bilaterally. However, while exhibiting enforcement capabilities can help a mediator to mandate peace in the short term, there can sometimes be a lower likelihood of lasting results, consistent with stylized facts about mediation.

The second chapter models conditions for efficiency gains from third-party conflict mediation when concessions are risky. Each party engaged in a conflict can indicate its interest in peace through costly signaling, or concessions. Through a formal model, I explore ways in which a mediator can act as a guarantor that promised concessions will be delivered, thereby reducing inefficiencies and increasing the potential for peace. In this process, I open up a rationale for mediation: to remove the inefficiencies of signaling in the pre-play round of negotiations.

The third chapter uses a game-theoretic framework to explain the persistence of de facto independent states that are not internationally recognized. This paper uses a four-player, game-theoretic framework to model the stalemates that often arise between the secessionist elite and home state central government and leverages this model to explore paths to settlement. We emphasize the pivotal role of an outside patron in sustaining unrecognized statehood as a stable equilibrium, but we also argue that the international community is capable of inducing peaceful settlement in these conflicts if it is sufficiently motivated to do so.

Chapter 1

Conflict, Costly Concessions and Manipulative Mediation

Abstract

Third party mediation is frequently employed in attempts to bring about peace in international conflict. Research suggests that this approach can work when the mediator has enforcement capabilities, but the mechanisms for the use of enforcement in mediation success remain poorly understood. Using a formal model, this paper compares potential outcomes of bilateral negotiations with the outcomes achievable with the help of a mediator capable of various levels of enforcement. Mediation is usually modeled with the same framework used in the war bargaining literature but has not been able to explain how enforcement can contribute to mediation success. This paper seeks to gain insight into how to end ongoing war by using a signaling framework, modeling mediator entrance into a conflict after it has already begun. We find that when the holdup to peace is trust, a mediator with sufficient enforcement capabilities can improve on the bilateral outcome, perhaps creating peace that would not have been possible bilaterally. However, while exhibiting enforcement capabilities can help a mediator to mandate peace in the short term, there can sometimes be a lower likelihood of lasting results; this is consistent with stylized facts about mediation.

1.1 Introduction

Mediation takes place often in the international system. Qualitative analysis shows us that mediation is effective and that enforcement power increases chances of mediation success (Bercovitch 1997, 2000). While regression analysis first failed to corroborate this conclusion, more recent studies that take into account selection effects also show the effectiveness of mediator enforcement (Beardsley 2008, Gartner and Haptonstahl 2011). In practice, mediators use a large array of tactics, including coercion and sanctions, as means of exerting enforcement power. Yet while qualitative and quantitative research show that mediation works, its mechanisms remain poorly understood.

Formal modeling has not gotten far in explaining how and why mediation is employed; in fact the formal literature shows that in delivering information and bargaining offers between parties, as in shuttle diplomacy, mediation is not effective (Fey and Ramsay 2010). For mediation to be useful in these models, a mediator with private information is required (Kydd 2003, Rauchhaus 2006 and Smith and Stam 2003) and enforcement power is not effective (Horner et al. 2010). These results are inconsistent with what the quantitative and qualitative literature; we attempt to resolve this disconnect between the empirical literature and the modeling literature by modeling mediation differently.

The extant formal literature in mediation has grown out of the war bargaining framework, which holds that uncertainty and informational asymmetries are important in understanding why states go to war (Fearon 1995), but does not explain failure to achieve eventual peace in some contexts where we observe prolonged conflict. In a protracted war, informational stories may be problematic as it is inevitable that the parties will develop an understanding of some aspects of each other (Powell 2006). Capabilities of the opponent are likely to be revealed in protracted war but there are other dimensions where information may still remain asymmetric.

Before World War II, wars generally either ended in conquest or with peace treaties but more recent wars have ended in long-lasting cease-fires, with few becoming resolved in peace deals in a timeframe less than a decade (Brown, 2012). While war bargaining is a very intuitive and cohesive framework for many conflicts, its assumptions and implications do not seem align well with these long-term conflicts. Conflicts with mediation are an especially potent class of cases where the war bargaining framework seems misaligned with observation. Since war bargaining predicts that information should be revealed over time even without a mediator, it is not intuitively clear what role a mediator can play in this framework. In long-standing conflicts

in particular, information should have been revealed so a bargain should be struck in conflicts with dividable spoils, with or without a mediator. The ineffectiveness of mediation that formal models suggest is puzzling given that mediation is often employed and is shown to be effective in other methods of analysis.

This paper extends the war bargaining argument to recognize that indeed some cases of bargaining may be stalled and end in a stalemate. In such cases, it is then appropriate to apply a different modeling framework to shed light on why states may be unable to make peace. This paper first models parties' relative strengths, and thus the concessions needed for peace that would be revealed in a long-running conflict under a bargaining framework. Putting this process in a reduced form, we can capture the necessary characteristics of mediation and focus on the key issue: parties have a lot to lose in moving to make peace, even if peace would be beneficial. In this paradigm, a mediator has an intuitive role: she can help to bridge the gap between reluctant but willing parties and allow them to achieve a cooperation that is otherwise impossible.

In a long war there may be pooling among types. A separating mechanism is needed through actions that reveal type. If mediation were modeled without thinking about it in a war bargaining context, a signaling model may be the most natural choice. We use a classic Spence (1973) signaling framework that is modified to allow both sides to signal and a mechanism design framework to model the mediator. Spence has an advantage over war bargaining in modeling mediation in that it presents an obvious role for a mediator: to increase trust. The Spence framework is not tailor-made for a mediation setting, meaning that it is not engineered to achieve particular results, but it intuitively fits the role a mediator might play.

In a Spence setup, we ask how mediators can affect the concessions needed to build trust between conflicting parties that have information asymmetry. Rather than outright war, this setup is more reflective of a protracted conflict that is not primarily about indivisible territory, but is nonetheless costly to both sides. The conflict in Korea, Russia-China, China-India relations and various Arab-Israeli conflicts are prominent examples of such conflicts. With uncertainty about the other player's willingness to cooperate, our model captures the reduced form payoffs as in Fey and Ramsay (2011), who examine similar informational uncertainties surrounding the costs of war and the opposing party's strength.

We find that when mediators of protracted conflicts have a critical level of enforcement power, mediation can indeed work. To be effective, mediation must be conducted by a strong third party willing to enforce agreements. The mediator capable of enforcement is able to alleviate the mistrust that would otherwise lead to inefficient actions. Depending on the exact

type of guarantees used by the mediator, parties will not experience as much loss as they might have without a mediator. Some types of enforcement are more effective than others, or work in different scenarios. We find that peacekeeping, for example, may work in the short term, but does not build the trust necessary for long-term peace. The results of this paper's formal model corroborate the most recent empirical results on mediation and thus offer a plausible explanation for the mechanisms through which mediation is effective.

1.2 Literature review and this model's contributions

Mediation is defined as "a reactive process of conflict management whereby parties seek the assistance of, or accept an offer of help from, an individual, group, or organization to change their behavior, settle their conflict, or resolve their problem without resorting to physical force or invoking the authority of the law" (Bercovitch and Houston 2006). Given this broad definition, it seems reasonable that mediation's effectiveness would depend on many factors, including the exact tactics used. In international negotiation, mediators may play a variety of roles, including arbiter, peacekeeper, translator, or mutual ally. Still, most formal models focus on information mediation, which emphasizes a mediator as a go-between who hears information from both sides and recommends actions. The literature is almost silent on the possibility that mediators may also have other capabilities. It has looked at mediation in terms of cheap-talk communication, whereas we look at mediation in the context of costly signals. More generally, we are looking at a different payoff and information structure, one with two-sided incomplete information, and a wider range of mediation technologies. Enforcement is one component of mediation, falling under what Bercovitch (1997) called "manipulative mediation" or more recently "directive mediation" (Bercovitch and Gartner 2009). A mediator can be identified as using manipulative mediation if she "offered to verify compliance with the agreement," "took responsibility for concessions" or "rewarded concessions made by the parties" (Wilkinson ICB data set).

This paper will focus specifically on the first two parts of the definition, verifying compliance and concession transfers. Because many conflicts occur in an international arena with no clear enforceable rule of law (Waltz 2002), much of the literature has focused on self-enforcing mechanisms. While this paper addresses this "bilateral" case, it focuses mostly on a mediator with some teeth, consistent with the reality that many international powers–both bodies and sovereign states–intervene substantively in conflicts. While perfect enforcement ability is sometimes unrealistic, it is seldom the case that a conflict exists where no international norms, penalty

or rule of law are applicable. Furthermore, since even imperfect enforcement can lead to results that differ from self-enforcing agreements, it is limiting to consider solely self-enforcing mechanisms in analysis of conflict resolution.

Most work exploring the effectiveness of mediation in different settings, including mediation enforcement, has been empirical. Walter (1997, 2002) finds empirically that enforcement is a critical element of successful mediation. In civil wars, "if a third party agreed to enforce the terms of a peace treaty, negotiations always succeeded regardless of the initial goals, ideology, or ethnicity of the participants. If a third party did not intervene, these talks usually failed" (1997). Sisk (2009) also finds that a mediator using sanctions and other strongarm tactics is more likely to be effective, though "progress or regression" is "explained principally by the willingness and ability of the protagonists themselves to escape a mutually hurting conflict trap."

It is an important quality of a mediator that she allow war to continue if parties are unwilling to make amends. And while it is important to note that Sisk's "peacemaking with power" can be most effective, only a credible and powerful third party is capable of using such methods. Good empirical results using classic techniques are difficult to achieve due to selection issues and small sample sizes, but alternative methods can be used to shed some light on this difficult question. Wilkenfeld et al. (2005) and Fortna (2008) also analyze conflicts, concluding that manipulative mediation internationally, and peacekeeping domestically, are indeed effective. Empirical results and theoretical models should work together to allow us the best overall understanding of mediation. This paper is able to construct theoretical underpinnings for the essential empirical results of these authors.

Mediation modeling is a subset of a broader literature that attempts to model war. Schelling's seminal 1966 *Arms and Influence* modeled war with a game theoretic framework, and Powell (1999) has comprehensively defended the use of modeling as an appropriate analytical tool for understanding war. Fearon (1995), Powell (1996a and 1996b, 2006) and others consider war to be a bargaining failure, caused by commitment problems and asymmetric information. Within this larger literature, some work has been done to model mediation specifically. All of this work considers mediation as a possible solution to the bargaining failure of war. Notable papers that have formally modeled mediation include Kydd (2003 and 2006), Smith and Stam (2003), Rauchhaus (2006), Beber 2008, Horner et. al. (2010), Ivanov (2010) and Fey and Ramsay (2008 and 2010).

Trust has been put forth as a critical component for dispute resolution (Hardin 2002, Gambetta 1988), and distrust can be modeled as asymmetric information with uncertainty about

the other party's type. Kriesberg (2001) and Kelman (2000) argue that mistrust had to be overcome in the Oslo Accords process in the Israeli-Palestinian conflict. Many formal models also find that inefficient war can rationally occur under uncertainty (Slantchev 2003, Powell 2004, Wagner 2000, Wittman 1979). Kydd (2006) formally models trust as the major provision of a mediator, showing that if parties trusted each other more, they could improve their outcome. Often, a mediator drawn from the international community has an interest in conflict resolution but no particular bias between the involved parties. Kydd concludes that the qualities of a mediator who can effectively build trust are: relative neutrality, a desire for parties not to be exploited, and a willingness to let conflict continue. These are the qualities that we will endow to our mediator in this model, and we will show precisely how these qualities can affect conflict outcomes in environments with various levels of mediator enforcement capability.

While modeling trust has been central to the formal mediation literature, approaches have varied in regards to blanket assessments. Morrow (1994) formally shows how a third party can use Bercovitch's facilitative mediation, modeled as cheap talk (Crawford and Sobel 1982) to make peace. However, this approach only works in a game like Battle of the Sexes where there are multiple equilibria and incentives are properly aligned. If parties' incentives are not aligned, as is the case in a Prisoner's Dilemma, this approach does not allow a mediator's cheap talk to yield results that are better than the bilateral face-to-face talks. This result is important, and explored further in first Fey and Ramsay (2010) and also this paper.

Rauchhaus (2006) likewise tries to give one overall assessment of mediation while Smith and Stam (2003) and Kydd (2006) model several different mediator options and try to differentiate between environments. Smith and Stam (2003) use a random walk model to argue that using side payments or threats to intervene directly does not help mediators to credibly convey trustworthiness. Leventoglu and Tarar (2008) focus on how a mediator can affect the signaling between parties in a crisis bargaining environment. Kydd (2003) studies how a mediator can credibly communicate information to the parties. Horner et al. (2010) rely on the mediator to "hoard" information in order to be able to improve on unmediated interaction. The mediator hears reports but does not relay them completely accurately in all cases. However each of these papers achieved its results with a very specific setup; the results are applicable to a certain mediator with certain capabilities within the realm of information mediation.

Using a standard bargaining framework, Fey and Ramsay (2010) show mediation utilizing cheap talk cannot improve upon results of parties' unmediated bilateral negotiation. If a mediator does not have outside information, they cannot affect the outcome; in other words

“shuttle diplomacy" cannot be effective. In their model, sufficient incentives for truth telling cannot be given because information critical to dispute resolution, “can only be learned by the mediator if [parties] are honestly willing to share this information....[but] the tension between the credibility of the mediator’s recommendation and the incentive for parties to misrepresent their private information acts to inhibit meaningful mediation."

Fey and Ramsay (2010) further claim that models achieving positive results for mediation such as Kydd (2003), Rauchhaus (2006) and Smith and Stam (2003) rely on mediator’s private information for the mediator to improve over bilateral negotiations. Therefore, absent this very special case, it can be concluded that mediators are ineffective. Nothing is said about mediators who have the option to employ more extensive mediation techniques; our paper expands upon Fey and Ramsay’s analysis, appealing not to a special case but to a general setup. Our contribution is that we also explore outcomes if mediators have enforcement capabilities.

All of the models cited above approach mediation as a response to the bargaining failure of war, essentially looking at how a mediator can change the game and possibly avert or forestall war. This way of modeling is due to the mediation literature growing out of the crisis bargaining, and hence the war literature. Pre-emptive mediation is unusual in practice in the international realm, and pre-emptive enforcement is even more unusual. As we look at actual mediation incidence, it generally happens once a conflict has started and often once hostilities have largely ended. Therefore while an opponent’s resolve may still be in question, uncertainty about the enemy’s capabilities is often not the issue at hand–it has already been revealed.

It is then useful to apply a different paradigm, as mediation is called in to address a different scenario than would be implied in war-bargaining models.. In this model, a lack of trust prohibits warring parties from selecting a riskier peaceful path, and costly concessions are necessary for one party to signal honest commitment to the other. A mediator can serve to enforce these promises.

Another advantage of this model is its usage of costly signaling, which allows it to draw on the rich signaling literature started by Spence (1973). While most models try to reflect uncertainty about the enemy’s capability, this model instead is about negotiation and stalemate in bargaining where parties are unsure of each other’s true motives in whether they are truly wanting to make peace. Costly signals convey information in some scenarios where cheap talk cannot, such as when parties are entrenched. This model portrays more accurately the questioning facing parties who are in a stalemate or even a ceasefire without a full peace.

This paper models a mediator’s ability to bolster trust so that promises are credible. We

examine different methods mediators can use to enforce agreements and compare their efficacy. In this paper, a mediator is a third party that lowers risk and costs of concessions. The mediator acts credibly on behalf of both parties. Without bias, the mediator's "preferences" are simply that neither side get exploited and that payoffs are maximized for those truly interested in peace. These are consistent with Kydd's (2003) findings but we are able to show a mediator's effectiveness without relying on the mediator's having private information, as in Kydd and others. These results are achieved through enforcement ability of the mediator. Our setup is not based on bargaining directly, but rather on reduced form payoffs. This format is used to be able to incorporate concessions used to end conflicts that do not necessarily hinge on a divisible piece of land–for example, peace negotiations between Israel and Egypt. Our model (stalemate in an ongoing war) is applicable in a different setting than Fey and Ramsay and others. Those results are most concerned with trying to avoid war; we are trying to end an ongoing war. Essentially we seek the existence of a cooperating equilibrium and try to find this equilibrium (peace) with the least cost possible. We do so using costly concessions, which are a ubiquitous part of making peace in many cases.

Our model is able to replicate the main result in Fey and Ramsay (2010): without enforcement ability a mediator cannot improve upon bilateral negotiation. We find this result using a setup that is not due to a mediator trying to forestall bargaining failure, but one who intervenes in an ongoing conflict. Remarkably different models on the surface, the agreement of the results is comforting because much of the literature uses the bargaining failure model which, while standard, does not represent an on the ground reality for many incidences of mediation. We are also able to show that a mediator can improve upon bilateral negotiation by enforcing parties' declarations. This improvement does not rely on a mediator's having private information, as Fey and Ramsay claim would be necessary. Declarations are obtained from parties who willingly reveal information. In our model, mediators do not have private information (unlike most of the mediation bargaining models cited) but the mediator is able to improve welfare in some settings. A mediator can help to resolve both of these issues when given sufficient enforcement capabilities. In some common and realistic scenarios, efficacy of the mediator can be due to as little as willingness to oversee and guarantee the delivery of concessions. A mediator is most effective when asymmetries between types' costs of concessions can be exploited. In other cases, a mediator will need to resort to strongarm tactics like sanctions or a peacekeeping force.

Our approach of applying mechanism design to mediation has been used, to date, only by Fey and Ramsay (2008, 2010 and 2011), Bester and Warneryd (2006) and Horner et. al.

(2010). These papers all use a bargaining setup similar to most of the formal mediation literature, although Horner et al. obtain results somewhat out of line with both the broader mechanism design and mediation literatures. On the topic of enforcement, the formal literature is also notably thin. Banks and Calvert (1992) consider a coordination game with incomplete information and contrast enforcement ability of a mediator with bilateral results. Bester and Warneryd (2006) and Horner et al. (2010) also address enforcement. Goltsman et al (2009) compare enforcement to arbitration and negotiation in a setting based on Crawford and Sobel (1982).

Using their setup, Horner et al. show first that a mediator using cheap talk can improve on bilateral negotiation and second that a trusted cheap talking mediator can achieve the same results as a more powerful mediator who has enforcement power (arbitration) if she uses a devious strategy of obfuscation. The first result is due to the mediator's ability to use an obsfuscation strategy that fully circumvents her lack of enforcement power. The second result is due to the authors' use of ex-post constraints, which is the key to their conclusions that enforcement ability has no effect. If players can always renege, the mathematical result supports an intuitive understanding that such lack of commitment will destroy any possible gains for having mediation. In contrast, Bester and Warneryd (2006) impose ex-interim incentive and rationality constraints, meaning the problem is more similar to our own. We expand their analysis in a model focused on the mediator supplying various types of enforcement guarantees and show that enforcement capabilities of the mediator indeed can improve on the bilateral outcome. We find that while strongarm enforcement does not need to be exercised in equilibrium, it is important that it can be resorted to if necessary; otherwise a mediator is reduced to delivering cheap talk messages.

The somewhat counterintuitive results of Horner et al. hinge on a few critical assumptions: First, the mediator is dedicated to achieving peace, which is a component of the setup in opposition to the conditions found by Kydd (2006) who states that to be credible a mediator should be willing to allow conflict to continue. Second, a mediator is required in this model to do actions that inherently characterize her as noncredible. This lack of mediator credibility is immediately exploited in Horner's analysis as the mediator is effective only by deceiving the parties in order to achieve peace. Their model therefore depends on the willingness for parties to enter into mediation knowing that there is a chance they will be deceived by the mediator. Furthermore, it is not obvious that devious/ double talking mediators are realistic real-world artifacts. As a result of this characteristic of the mediation, the division of the pie that Horner et al. propose is an ex-post unfair one; it randomizes and does not give equal shares to equal players.

In order for Horner et al.'s results to hold, the mediator must in some scenarios exploit

one of the parties, to the other's advantage. While in theory the exploited player is random, this could in practice lead to the mediator's favored side getting the better end of the bargain more than half of the time. Cries of corruption or unfairness would always arise even if a mediator did randomize, undermining the legitimacy of the mediator, and hence likely rendering the most effective mediation strategy only possible in theory. Such a mediator, while mathematically plausible, would have difficulty gaining clients in the real world. If the mediator's obfuscation ability–which is based on her hoarding of information–is at all weakened, or if the assumption is not valid, this central result of the mediator's ability to help falls apart. In this case the more classic mechanism design results hold, and enforcement power indeed could improve on results, as we show in our model.

Our more technical contribution is in demonstrating how different types of enforcement affect the payoffs and existence of various equilibria when mutual distrust is the primary impediment to peace. This paper also provides theoretical explanations for several results found in the empirical mediation literature. It provides one theoretical underpinning of the result that peace achieved through mediators is more fragile than bilateral peace (Beardsley 2008). We also demonstrate that the type of mediation affects the negotiation outcome (Bercovitch 2000; Beardsley et al. 2006). The results are also consistent that conflicts requiring concessions can make use of a mediator for resolution (Allee and Huth 2006, Beardsley 2010).

We also find that more mediator enforcement capability is generally better for welfare, consistent with Walter (1997, 2002). Walter further argues that parties in a civil war are more likely to be risk averse due to the outside option being worse. A combined military under peace effectively erases an outside option for one party and replaces it with annihilation if the other party cannot be trusted. Interstate conflict always has the relatively appealing outside option of continued war. Thus because consequences are so great, civil war combatants are less willing to take calculated risks for settlement even if the risk is small. While our model assumes risk neutrality and achieves its results under this assumption, relaxing this risk neutrality directly leads to further results which also include Walter's explanation. The model can then formally show the reluctance of parties to make concessions when facing dire consequences and how a mediator with enforcement capabilities can be effective in reassuring the parties. While diplomatic or financial constraints might sometimes make it difficult or even impossible to procure the most effective type of enforcement, this framework offers a critical guideline for how types of mediation compare in different situations.

1.3 Formal model description

We consider a setting in which two parties interact over time. Depending on the application, these parties could be countries, nation-states, or strategic non-state actors (such as in a civil war). We call the parties “players" or “countries." The primary assumption throughout the paper is that, at least initially, the parties do not trust each other fully; each uncertain if the other is a trustworthy (“high") type. This lack of trust means parties have trouble making peace; when they can make peace bilaterally, it is costly.

To model this type of conflict, we use a repeated Prisoner’s Dilemma with discrete periods of interaction, in which each party has private information about its discount factor.[1] In the stage game, “Fight" and “Trust" are the possible actions. The repeated game has one certain equilibrium: (Fight, Fight) played in every period regardless of the history. Call this the “War" equilibrium. Alternatively, in some conditions there may be a “Peace" equilibrium in which (Trust, Trust) is played in every period on the equilibrium path. The Peace equilibrium can only exist if both countries have sufficiently low discounting of future periods. Such a result is held in place by a threat of war in future periods if one of the countries deviates from peace.

We assume that each player’s discount factor is either “low" or “high." A low-type country’s discount factor makes defecting always preferred to cooperating for its decision makers. This may reflect, for example, the short-sightedness or selfishness of a country’s leaders. A “high type" country has a discount factor that is high enough to make the “Peace" equilibrium possible. One can think of this type of country as one in which decision makers take the future generations into account. Before the repeated Prisoner’s Dilemma is played, the countries engage in a round of negotiation in which they may communicate, send costly signals (make concessions), and possibly reveal information to each other. Mediators are modeled as mechanisms to which the parties report their intentions, and the analysis is carried out using a mechanism design framework. Mechanisms are given specific enforcement capabilities and implement these according to parties’ truthful reporting of their intentions.

We interpret the model as a situation in which two parties are in a protracted dispute. Instead of trying to avert war, they are enmeshed in conflict. Different mediators will be introduced, each with different enforcement capabilities. While enforcement during the negotiation process and enforcement during implementation are indeed different, the model condenses the timing to a single decision period; forward looking players make decisions that take into account

[1] This game form is not essential for the paper’s basic results to hold. The only necessary requirement is that the game form allows gains from risky cooperation, as in a stag hunt.

the credible threats a mediator can implement in the future.[2]

We next provide more details of the model. As is standard in game theory, a discount factor δ measures the ratio of the value of a gain in one period relative to the value of the same gain in the previous period. For example, a country would be indifferent between receiving a gain of δ units today and 1 unit in the next period. Typically $\delta \in (0,1)$ and this is what we assume. A high type player discounts future period payoffs according to discount factor δ_h, whereas a low type has discounts factor δ_l. The high type player is more patient (values the future more), so we assume that $\delta_h > \delta_l$ and both $\delta_h, \delta_l \in [0,1]$. Before the start of the game, nature independently determines the types of country 1 and country 2. The probability of nature selecting the high type for a given player is p, and $1-p$ is the probability of nature selecting the low type.[3] Countries are aware of their own type, but not the type of the other country.

Period 0 is the negotiation stage. In this period, countries 1 and 2 simultaneously give costly concessions g_1 and $g_2 \in \mathbb{R} \geq 0$. Concessions are given at cost $C(g)$ and benefit the recipient in the amount g. For simplicity, let us initially assume $C(g) = g$. We will relax this assumption later in this paper. We assume that there is no discounting between periods 0 and 1.

In each period, the countries engage in an infinitely repeated Prisoner's Dilemma with stage game payoffs represented below.[4] The choice of "Trust" or "Fight" will be referred to as the county's "stage game action."

Table 1.1: Stage Game Payoffs

	Trust	Fight
Trust	T, T	-D, T+W
Fight	T+W,-D	W-D, W-D

$T \geq 0$: Benefit from the other country playing Trust

$W \geq 0$: Additional benefit from playing Fight

$D \geq 0$: Damages due to the other country playing Fight

Assume $T > W - D$. Payoffs in the repeated game are the sum the stage-game payoffs, discounted appropriately. Parameters are common knowledge with the exception of the discount

[2]Different agents implement different types of enforcement—e.g. a peacekeeping force and a mediator at the bargaining table are not the same entity. Still, as long as all mediating entities share the essential basic preference, thinking of a single mediator that is able to apply different levels of enforcement does not distort the model's results.

[3]Note that parameters are symmetric across countries, as is consistent with the literature. Qualitative results do not depend on this being the case, and equilibria and equilibrium concessions can easily be calculated with asymmetric parameters between players

[4]This payoff matrix does not distinguish between civil and interstate conflict, though in practice the effects on the payoffs might indeed have a different structure in the different cases.

factors, which are privately known. The measure of social welfare, and thus the determinant of the optimal equilibrium, will be the sum of participating high types' expected utilities.

The assumption $T > W - D$ ensures that payoffs from Peace (Trust played by both parties) are higher than for "War," which is defined as the (Fight, Fight) outcome of the stage game.[5] If δ is high enough for both countries, then the cooperative outcome of Peace can be sustained with a grim-trigger punishment threat. For this "Peace equilibrium" to exist, δ must be high enough for each country so that sustaining Peace is more attractive than deviating. The threshold δ^* needed is

$$\delta^* = \frac{W}{T + D} \tag{1.1}$$

Assume $\delta_h > \delta^*$ and $\delta_l < \delta^*$.

The basic model just described (with no external involvement) will be called the case of "bilateral interaction." Depending on the discount factors, there may be a variety of equilibria in bilateral interaction.[6] Results for the bilateral case will be referred to as the benchmark results. Three potential equilibria exist. The most intuitive is the concessions separating equilibrium, where high-type players give the minimum sized concession that is sufficient to identify them as high types; low types do not give a concession. If both players give the concession, they learn that both are high types and will accordingly play the peace equilibrium in the repeated game and generally achieve the most profitable outcome. A low type has the incentive to not give a concession because its benefit of pretending to be a high type (which is derived from playing Fight in the Prisoner's Dilemma in the first period) does not exceed the cost of the required concession. There are also two no-concessions equilibria: pooling and separating. In the pooling equilibrium, all players play Fight and no concessions are given. In the no-concessions separating equilibrium, high types trust in the first round and only play Fight in subsequent rounds if the other country plays Fight.

This paper will focus on payoffs from the concessions separating equilibrium, which always exists as we show below. This is the most intuitive equilibrium, and it is the one which most closely resembles international conflict. By focusing on this equilibrium, we can compare how countries fare under various enforcement regimes.

Equilibrium payoffs beginning from round 1 are easily described in reference to the actions in this first round, because (a) if one or both players selects Fight in this round then both will Fight in all future rounds (the grim trigger) and (b) if both players select Trust in

[5] A country whose payoffs violate this assumption is of a special "very low" type that will be considered later in the analysis.

[6] See Horne (2011).

the first round then they will continue with Trust in all future periods in equilibrium.[7] Let X_{ij}^t represent the sum of discounted payoffs for a country of type $t \in \{l, h\}$ in the case in which this country chooses action i and the other country chooses action j in the first round of the Prisoner's Dilemma. If high-type countries both play Trust in round 1, then they each would get $X_{TT}^h = \frac{T}{1-\delta_h}$ from this period, because they will continue trusting in equilibrium. Likewise, a high-type country that selects Trust when the other country chooses Fight would get $X_{TF}^h = -D + \frac{\delta_h(W-D)}{1-\delta_h}$. The other key values to keep track of are $X_{FF}^t = \frac{W-D}{1-\delta^t}$ and $X_{FT}^t = T + W + \frac{\delta^t(W-D)}{1-\delta^t}$, where $t = l$ or $t = h$ depending on the type of the country. Note that because of the signaling value of the concessions given in period 0, countries play the same strategies as each other in a separating equilibrium. X_{FT}^t and X_{TF}^t are still necessary for calculating the equilibrium concession g_h.

Consider a concessions separating equilibrium in the bilateral model (the benchmark case), where the high-type players give concessions at level g_h and the low-type players give no concessions. Such an equilibrium exists if

$$-g_h + pg_h + pX_{TT}^h + (1-p)X_{FF}^h \geq pg_h + X_{FF}^h$$

and

$$-g_h + pg_h + pX_{FT}^l + (1-p)X_{FF}^l \leq pg_h + X_{FF}^l.$$

The first inequality is the condition that the high type prefers to make the concession, whereas the second inequality means that the low type prefers not to make the concession. These inequalities simplify to

$$p(X_{FT}^l - X_{FF}^l) \leq g_h \leq p(X_{TT}^h - X_{FF}^h). \tag{1.2}$$

There exists a concession g_h that satisfies these inequalities if and only if $\delta_h \geq \frac{W}{T+D}$, which we have already assumed. Equilibrium payoffs for the two types are then

$$U_h = pX_{TT}^h + (1-p)X_{FF}^h - g_h + pg_h$$

and

$$U_l = X_{FF}^l + pg_h.$$

Clearly, the high-type players prefer that they coordinate on a value of g_h that is as low as

[7] Part of the reasoning here is that the low type cannot rationally select Trust, so if (Trust, Trust) is played in the first round then the players know that they are both high types and will thus continue with the grim trigger strategy, which means trusting in the future.

possible. The lower bound on g_h needed for the two types to separate is given by inequality 1.2. Setting g_h equal to this lower bound yields the following expected payoffs for the high and low type players:

$$U_h = pX^h_{TT} + (1-p)X^h_{FF} - p(1-p)(X^l_{FT} - X^l_{FF}) \tag{1.3}$$

and

$$U_l = X^l_{FF} + p^2(X^l_{FT} - X^l_{FF}).$$

It is not difficult to extend this analysis to the setting of asymmetric type probabilities, where country 1 is the high type with probability p_1, and country 2 is the high type with probability p_2. Letting i denote one of the countries, and j the other country, we find that the lower bound on player i's concession size is $p_j(X^l_{FT} - X^l_{FF})$. The equilibrium expected payoffs of the two types of country i are

$$U_{ih} = p_j X^h_{TT} + (1-p_j)X^h_{FF} - p_j(1-p_i)(X^l_{FT} - X^l_{FF})$$

and

$$U_{il} = X^l_{FF} + p_i p_j(X^l_{FT} - X^l_{FF}). \tag{1.4}$$

We will need to keep track of payoffs for the asymmetric setting when constructing equilibria in the environment with mediation.

1.4 Mediation as a Mechanism

We will enhance the benchmark model to allow for external enforcement by a third party. As in the benchmark model, high type utility (equation 1.3) is the measure of social welfare. The underlying game is the same as the benchmark case, so the three types of potential equilibria are the same. However, the payoffs will differ in some cases. Cases differ with respect to the type of coercive power, or external enforcement technology, the mediator is able to wield.

The third party is modeled as a mechanism. Countries report their types to the mediator who requires certain actions based on the reports. We will examine five different mechanisms, varying in their enforcement power. These are, in increasing order of enforcement power, shuttle diplomacy, manipulative mediation, a mediator that can exact sanctions if violations occur, a guarantor of peace, and peacekeeping force. In reality, of course, there are a range of types of mediators and mediator capabilities. These five cases illustrate the differences between enforce-

ment abilities and show where the greatest gains from strict enforcement power occur.

A mechanism sees both countries' declared types and can mandate different concessions for different declarations, but here we restrict attention to mechanisms that behave symmetrically towards countries of the same type. When there are multiple equilibria, we have the mediator select the best equilibrium for welfare. The revelation principle is used to attain truthful self-identification (Myerson 1979).

While methods and strategies of mediation are more nuanced than can be modeled here, these broad capabilities of a mediator can be compared as benchmarks, and we can look at the factors that make mediation effective or not given specific abilities and amounts of enforcement power. The goal is to see a point at which a critical type or level of coercive ability held by the mediator can be effective.

Shuttle diplomacy, i.e. nonbinding mechanism

The first case we will examine falls under the category of information mediation: a mediator with no enforcement ability which we will call the nonbinding mechanism M^*. This mediator gathers information from the sides independently and reports to them the recommended actions. A prominent example is Kissinger's dealings in the Mideast during the Nixon administration.

In period 0, the nonbinding mechanism M^* asks each country i to privately report its type t_i. Given these reports, M^* makes a public nonbinding recommendation of the concessions countries should give (if any) and how they should play the repeated Prisoner's Dilemma based on high-type utility considerations. If separation is beneficial then when both parties report themselves to be high types, the mechanism will recommend that concessions be given. Otherwise, the mechanism will recommend that no party gives a concession.

Theorem 1: A nonbinding mechanism can support only the same outcomes achieved in the benchmark bilateral case.
Proof: See appendix.[8]

The results are exactly as in the benchmark case because reports are cheap talk due to the mechanism's recommendations being nonbinding. In practical application, there may be three caveats to this theorem's results. First, a mediator might have to expend time and

[8]This result, on the lack of value of shuttle diplomacy, is shown in a different setup in Fey and Ramsay 2010.

effort to achieve results so a mediated case could be seen as worse than the benchmark case because it achieves the same results for a higher cost. Secondly, this model assumes that all components of payoffs are common knowledge. With this knowledge, countries can calculate the equilibrium separating gift. In practice it may not be known. A mediator may then play a role to seek this information, to make this information common knowledge, and to convince the parties of the prospects of peace. While reports are still cheap talk, the mechanism may communicate parameter values, the knowledge of which is of substantive value. Results of this flavor have been discussed in the literature (see Kydd 2003 and others). Thirdly, facilitative mediation, which is a small step stronger than shuttle diplomacy, can be used effectively if the incentive structure is properly aligned. Such alignment would be found in a Stag Hunt, rendering facilitative mediation effective. This is not the case for our setup as it is based on a Prisoner's Dilemma.

Arm-twisting, i.e. manipulative mediation

A case that uses enforcement ability is arm-twisting, which falls under manipulative mediation (Bercovitch 1997), or, in a more recent classification of mediation styles, directive mediation. In the model, the enforcement technology arm-twisting (AT) urges and coaxes the countries in an effort to bring about peace. A mediator with this enforcement ability will be modeled as mechanism M. In this case a mediator solicits type reports and then enforces incentive compatible concessions.

As an example, in mediating the conflict between Eritrea and Ethiopia, former President Carter was able to use his clout to generate press releases on progress, forcing the issue. This public forum pressured sides to abide by their word- a softer version of AT.

As sitting president, Carter was able to use a strategy like this with even more weight in his dealings with Israel and Egypt, pressuring the sides and using the influence of the USA to make the parties stand by their word. Though this latter case is sometimes used as an example of shuttle diplomacy, this example is not an accurate characterization of information mediation. While the sides were indeed not in the same room, Carter and his team did more than deliver messages (pure information mediation); they indeed used significant diplomatic muscle. Carter's urgent strategy was to call bluffs and found it clear that indeed both sides wanted peace; Carter made sure gave both sides essentially no outlet given that they wanted peace. That the pressure was so strong and indeed that the only real option was peace makes this type of mediation more

in line with AT.[9]

M, the mechanism with enforcement technology AT, inputs the reports of types t_1 and t_1 and outputs the required concessions g_1 and g_2. Formally, $M : (t_1, t_2) \rightarrow (g_1(\cdot), g_2(\cdot))$. The countries are bound to send the mandated concessions. The benchmark case requires the countries to send the same concession to both types, since types are private information. M can differentiate based on recipient's type. Otherwise, the setup is identical to the benchmark case.

Welfare is again considered as the sum of the high type utilities. Qualitatively, similar results would hold if we also included low types in the analysis with weighting based on p. In the analysis, incentive compatibility and individual rationality constraints must be satisfied.

Theorem 2: If costs are the same for low types and high types, AT is not able to improve welfare compared to the benchmark bilateral case.
Proof: See appendix.

Mathematically, Theorem 2 is very powerful and seems to deal a blow to the arguments for a common type of mediation. But in practice we might think of some concessions as more costly for some types of leaders to give. As an example, stopping one's people from committing border raids might be very easy for a certain leader while prohibitively expensive for another. Releasing a political prisoner might be acceptable for a high type leader's constituency, but not politically feasible for a low type leader.

Allow $C(\cdot)$ to depend on type. The argument is still the concession g. For simple demonstration, allow cost to high type $C_h(\cdot) = 1(\cdot) = g$ and cost to low type $C_l(\cdot) = \gamma(\cdot) = \gamma g$ where $\gamma > 1$. The results are similar to Spence (1973) and are a two-sided version of this model in a mechanism design framework. In Spence's model, separation of types is possible due to difference in ability, which is manifested through lower effort costs of education for higher-ability applicants. In my model, separation is possible due to differential payoffs, manifested through different discount factors between types. Adding differential costs as a second difference between types is necessary for a mechanism to generate results that counties cannot achieve bilaterally. And when there are multiple concessions to choose from, a mediator can select the one with the greatest ability to separate between the types. Specifically she can choose a required concession with high costs for the low type and lower costs for the high type. Her choice of concession is not explicitly modeled, but is plausible. If such a concession is an option, the

[9] To be more thorough in classifying Camp David, the peace plan eventually struck included observers in the Sinai, making it a stronger type of enforcement than AT. Observers fall under a type of mediation addressed in a later case.

following analysis holds.

Theorem 3: If costs are higher for low types than high types, AT will improve welfare compared to the benchmark bilateral case.
Proof: See appendix.

Theorem 3 demonstrates the first scenario that we will examine where a mediator can make a difference when it enters into a conflict. If, per Bercovitch's (1997) definition, a mediator "offered to verify compliance with the agreement," her presence will deter those who are unwilling or unable to make peace from posturing as if they are doing so. By overseeing the peace process (the giving of concessions), the mediator essentially allows parties to communicate that their word is good. To illustrate intuitively why enforceability can make a difference, suppose that the mediator receives reports from the parties and then publicly declares who is supposed to make a concession and of what type, and then the parties are supposed to voluntarily follow through to make those concessions. The problem with this is that if country i is supposed to make a concession and country j is not, then i would not want to follow through. By keeping parties to their word, a mediator plays a substantive role. Note that there must be differential costs to prevent pooling of types. Differential costs drive down the high type's concession size, making peace a more appealing proposition for the high types decision-maker. Thus, enforcement of promised concessions always works weakly better, and usually strictly better than does non-binding mediation. We can see now that arm-twisting will be effective under certain conditions, whereas shuttle diplomacy would not be successful under any conditions.

Sanctions

Sanctioning a party if its actions do not comply with proscription is another type of enforcement. This enforcement technology, mediation sanctioning ability (MSA) is the mechanism's ability to state required concessions and stage game actions and to give sanctions if these actions are not followed. It differs from AT in that AT does not address the subsequent actions (playing peace).

Successful real life examples of MSA include the United Nations in Tajikistan's civil war. Sanctions under the United Nations Mission of Observers in Tajikistan kept the agreement and the actions and concessions as specified by the peace agreements in place with only a few violations.In Angola the threat of sanctions was used similarly after a deal was struck between UNITA and the government in 2002. Croatia and Haiti have similar UN involvement with heavy-

handed enforcement.

This mediator cannot force actions but can only wield punishments for noncompliance. While it cannot enforce required actions, the MSA technology allows it to levy a sanction cost Q to any noncompliant party. A mechanism soliciting type reports and having this enforcement capability will be known as mechanism M''.

Theorem 4: Under MSA, welfare is improved over AT and over the benchmark bilateral case.
Proof: See appendix.

The analysis of this setting in the appendix supposes that the mediator can impose a sanction of size Q to mandate stage-game actions for the first n periods of the repeated Prisoner's Dilemma. The larger is n, the less incentive there is for a low type to deviate now because peace is actually more profitable than war. Note that, as is intuitive, the size of the sanction matters. A larger Q will mean that M' can hold peace for more periods before deviation occurs, and thus create higher payoffs.

Pure peacekeeping

We last turn our attention another type of manipulative mediation, one that does not collect concessions: the peacekeeping force. This falls under the banner of mediation if parties indeed seek it out. In practice, peacekeepers are seldom sent without the will of both parties (Yuen 2011) so it is appropriate to consider peacekeeping in the mediation framework.

In the model, peacekeeping is represented as a mechanism that mandates peace for n periods then leaves. This type of peacekeeping force is an idealized one, where troops and police on every corner hold in place a peace, eliminating fighting as an option. In practice, there are indeed some forces that come close to this ideal; most peacekeeping forces simply make violence more difficult but are unequipped to completely prevent war if tensions and capabilities are high enough.

Rather than trying to bring the sides to terms, the peacekeeping force is interested in preventing immediate bloodshed. No consensus is reached, nor are parties consulted. This is much like the United Nations or African Union sending in troops in Sudan without first collecting promises or concessions from either side. Somalia, similarly, currently hosts African Union peacekeeping troops. See Fortna's (2008) work for more case studies and empirical support for peacekeeping.

In the model, playing Trust is required while the peacekeeping mechanism is around,

then Fight can be played after she leaves. The payoff to a high type is

$$\sum_{i=1}^{n} T\delta^{i-1} + \left(\sum_{i=n+1}^{\infty} \delta^{i-1} T \right),$$

which is higher than the pooling equilibrium and better than any case where concessions are given. Therefore war is postponed. If all parameters of the game remain unchanged, war will return when the peacekeeping force leaves if any of the countries is a low type. This indeed has occurred on numerous occasions, including Rwanda, Georgia-Abkhazia and Angola. Another very clear example is the small private peacekeeping force that held the peace in place in Sierra Leone. Almost immediately upon their leaving, and before the UN could effectively replace them, the war ignited again in force.

Peace is achieved nonetheless in the short run and if both types are high this heavy handed action will result in an equilibrium switch to a sustainable peace. It should be noted that while the results of a peacekeeping force are the strongest of any type of enforcement, again we do not consider the costs to the third party. Such costs are generally substantial for the provision of a peacekeeping force. If the externalities due to the conflict are large enough, such a force still may be desirable for a third party to provide.

1.5 Conclusion

We have applied the information mediation paradigm of shuttle diplomacy and extended the analysis to cases where the mediator has enforcement power. Where trust is the major obstacle, we find that increased enforcement power and manipulative mediation lead to better results in terms of cheaper costs and increased likelihood of peace. The findings align with well-documented stylized facts in the empirical literature on negotiation (Bercovich and Jackson 2001, Wall and Lynn, 1993, Bercovitch and Houston, 2000, and Bercovitch et al., 1991).

We have also formally shown how concessions can be used to eliminate mistrust between negotiating parties as well as the value that a third party can add given certain enforcement capabilities. The signaling modeling framework alone is useful in understanding the nature of mediating long-lasting disputes. The model suggests when it would be beneficial to impose certain types of enforcement.

A key finding of our model is that there are some cases in which a mediator can bring peace when bilateral interaction cannot. Our results differ significantly from the model of Horner et al. (2010), the only other paper to model mediator enforcement using mechanism design.

While that paper finds improvement from information mediation but no further improvements from enforcement power, we find the opposite in both cases, and our result in the first instance replicates Fey and Ramsay (2010) and corroborates empirical results that indicate mediation is indeed effective with certain enforcement techniques. Horner et al. cite a stylized fact that at first may seem to support their result but on closer inspection allows for the role of mediated enforcement: a mediated settlement that arises as a consequence of the use of leverage may not last very long because the agreement is based on compliance with the mediator and not on internalization of agreement-changed attitudes and perceptions (Kelman 1958).

We find that peace can be pursued and enforced even between parties that both have an inclination to fight. Such a peace is not long-lasting unless underlying parameters change, but it is indeed preferred in the short term by both parties. For peace to last, the underlying parameters governing patience must increase so that leaders value the future more highly. While not modeled, this possibility could justify the use of resources to secure peace for a short time in hopes that underlying parameters will shift and moving toward peace will be an equilibrium for the parties under new parameters. While there are number of other possible explanations, this could also be the logic behind mediated ceasefires. Specifically, if we allow some randomness to change players' payoffs or other underlying parameters, then enforced agreements can stay after enforcement leaves if underlying parameters change.

We have not considered the feasibility of implementing certain types of enforcement, but rather we present an idealized analysis of how a mediator might change negotiations. It is important to recognize that parties must usually choose, or at the very least approve of, their mediator. Backward induction makes clear that parties would not choose a mediator that would make them worse off. For example, a low type country would not choose a mediator that maximized payoffs to high types at low types' expense. The choosing of a mediator would then act as a screening of types, just as the reporting of types does in our model. This is an excellent example of why endogeneity continues to be an issue when quantitatively analyzing the effectiveness of mediation. This endogeneity does not undermine the model's conclusions, even if the parties have full knowledge of the mechanism, as is modeled here. To maintain equilibrium, the mechanism must still fulfill its required actions even if the screening is achieved by parties selection into mediation.

A mediator's incentives are also an important issue for future consideration (Kydd has formally modeled the mediator's utility). This analysis is relevant in considering the total costs of mediation, not just those borne by the parties in conflict. A complete analysis might also

include externalities. It might be reasonably assumed that war always has externalities, which explains why we see so many parties willing to intervene, even when intervention is costly. We also have not, more broadly, considered incentives to the third party. A fuller analysis would include both expected benefits of peace to the third party and costs of the different types of enforcement. Peacekeeping regimes, for example, are more expensive to the mediator than is guaranteeing initial concessions. This analysis could be included in future work.

This paper succeeds in showing the mechanics behind different mediator tactics, including shuttle diplomacy, manipulative mediation and peacekeeping. How a third party might be involved in renegotiation could also be an area of future investigation, in addition to addressing the costs and externalities of mediation. Because of the many humanitarian, security and diplomatic implications of this work, such analysis will be important.

1.6 Appendix

Proof of Theorem 1: The mediator makes a public announcement as a function of the players' private reports of type. For each announcement, the players have updated beliefs about each other in equilibrium. We assume that they play the best equilibrium from the high types' perspective from the concessions phase, which is that described at the end of Section 1.3. Note that, from equation 1.4, U_{il} is linear, and strictly increasing, in p_i. This means that the low-type player i has a strict incentive to send a report that would lead to the highest expected value of p_i given the mediator's rule. By Bayes' rule, in any equilibrium, the expected value of p_i must be greatest following player i report to be the high type. This means that there is no equilibrium with meaningful separation, where the two types send different reports and the mediator conditions on the reports. ■

Proof of Theorem 2: For any mechanism M, let g_{st} be the concession required for a country that reports its type to be s when the other country reports its type to be t. Because we assume that the mechanism is symmetric, it is completely characterized by the values g_{hh}, g_{ll}, g_{hl}, and g_{lh}. The truthful reporting incentive condition for the low type is:

$$p[g_{hh} - g_{hh} + X^l_{FT}] + (1-p)[g_{lh} - g_{hl} + X^l_{FF}] \leq p[g_{hl} - g_{lh}] + (1-p)[g_{ll} - g_{ll}] + X^l_{FF}.$$

The left side is the low type's expected payoff from reporting to be the high type. In this case, for instance, with probability p the other country will be the high type and the mediator will require

both countries to give concession g_{hh}, but then the low type will select Fight in the first round of the repeated Prisoner's Dilemma and thus get X^l_{FT}. Simplifying and rearranging this inequality yields:

$$p(X^l_{FT} - X^l_{FF}) \leq g_{hl} - g_{lh}.$$

The high types fare best by increasing g_{lh} and decreasing g_{hl}, so welfare is maximized by having this inequality hold as an equality. Writing the high type's expected payoff, and substituting $g_{hl} - g_{lh} = p(X^l_{FT} - X^l_{FF})$, leads to *exactly* the same expression as in the benchmark bilateral case (equation 1.3). Thus, there is no way to improve on the benchmark bilateral case. Intuitively, M's only way to increase high type expected utility is by decreasing costs in the event that the the high type faces the low type. But any reduction in benefits to the low type heightens the low type's incentive to pool with the high type. ■

Proof of Theorem 3: Suppose $C_l(\cdot) > C_h(\cdot)$ as per the assumption in the text. Consider the benchmark bilateral case. Here the low type incentive condition ($pg_h + X^l_{FF} \geq pX^l_{FT} + (1-p)X^l_{FF} - g_h + pg_h$) binds, so the equilibrium benchmark gift is $g^* = \frac{p(X^l_{FT} - X^l_{FF})}{\gamma}$ and high type utility is $U^*_h = pX_{TT} + (1-p)X_{FF} - (1-p)g^*$). Under M, the low type incentive condition can bind without having high types give a concession to low types. The equilibrium separating gift g^*M will be larger than g^* in this case, specifically

$$g^{*M} = \frac{p(X^l_{FT} - X^l_{FF})}{\gamma - p}.$$

High type utility under M is

$$U^M_h = pX_{TT} + (1-p)X_{FF}$$

because high types exchange concessions of the same value. We have $U^M_h > U^*_h$. Note that no additional wealth is created by M, but less is transferred to low types, and welfare is defined as high-type utility.[10] ■

Guarantor of Peace

In order to prove theorem 4, it is useful to first consider a stronger form of enforcement that is possibly not as realistic. Another type of mediator that may exist is one with an observational force at her disposal, but that must have the goodwill of countries to become involved.

[10] The low type's participation constraint still binds and $U_l = X_{FF}$

In other words, the mediator differs from a peacekeeping force in that this mediator does not impose her will without the consent of the parties.

One example is Mozambique's Rome General Peace Accords, which relied heavily on the contributions of mediators, and its signing was only possible with guarantees of the implementation of concessions. These guarantees were provided by a United Nations sponsored monitoring commission.

In this case she is invited, this mediator has the ability to force incentive compatible stage game actions based on type reports in addition to enforcing concessions. We will show that usually this incentive compatible action is Trust for both players, yielding Peace, so this enforcement technology will be known as a Guarantor of Peace (GP). Being a guarantor of peace is transitory due to its costs, so generally there will be a limitation to the number of periods a third party can exercise GP. A mechanism soliciting type reports and having this enforcement capability will be known as mechanism M'.

M' will act like M except in addition to requiring that concessions be given, M' also mandates the countries' stage game actions for a finite number of periods n based on the type reports. That is, it inputs the two reports of types then forces both period 0 concessions and actions in a number of following periods. After mandating concessions according to type reports, the mechanism binds the countries to play Trust for n periods if it is incentive compatible based on their reported types.

The countries are bound to send the mandated concessions and to take the required actions. As with the lesser enforcement capability before, players are bound by IR and IC constraints which, when satisfied, will lead to truthful reporting of their types.

Lemma 1: With GP, welfare increases as the number of enforceable periods increases.

Proof of Lemma 1: The mechanism will elicit type reports and mandate stage game actions for n periods as well as concessions that are given in period 0. $T > W - D$, so (Trust, Trust) is preferable to (Fight, Fight) in the stage game. M' will then prescribe that both countries select the incentive compatible action of Trust for n periods if t_i and t_j are not reported as "very low."[11] Since M' enforces actions in stages 1 to n, the countries are forced to play Trust, though low types would wish to deviate to Fight.[12] (Trust, Trust) yields a guaranteed payoff T and thus

[11] If $T(\cdot) < W(\cdot) - D(\cdot)$, the a country is a "very low" type, and it will not prefer (Trust, Trust) to (Fight, Fight).

[12] Because a mediator with this type of enforcement will be able to generate a short-term peace that will only sometimes later lead to a longer term peace, Beardsley's (2008) result that peace achieved through mediators is more fragile than bilateral peace can be understood.

is better than the expected 1-period payoff for high types $pT + (1-p)(W-D)$. Increasing n increases the number of periods where T is guaranteed, so welfare improves as n increases.[13] ■

Lemma 2: GP can make peace possible even with low types and improves welfare.

Proof of Lemma 2: Under M' there potentially exist the same three types of equilibria as in the benchmark case. Countries know that the Mechanism will pursue the best of these three equilibria, based on high-type welfare. Payoffs are:

$$U_h^{M'} = \sum_{i=1}^{n} \delta^{i-1} T + \sum_{i=n+1}^{\infty} \delta^{i-1}(W-D).$$

Under the no-concessions separating equilibrium, M' yields:

$$U_h^{M'} = \sum_{i=1}^{n} \delta^{i-1} T + p\left(\sum_{i=n+1}^{\infty} \delta^{i-1} T\right) + (1-p)\left(-D\delta^n + \sum_{i=n+2}^{\infty} \delta^{i-1}(W-D)\right).$$

In both cases, payoffs are higher than the benchmark case ($p(\frac{T}{1-\delta_h}) + (1-p)(-D + \frac{\delta_h(W-D)}{1-\delta_h}$) because under M a guaranteed peace is played for n periodsThese are also higher than payoffs under M' (which are identical to the benchmark for the no-concessions equilibria).

If types report truthfully and the high type is not given incentives to pool, separation can be achieved. Under the concessions separating equilibrium where $g^{M'*}$ is the minimum equilibrium separating concession,[14] M' yields:

$$U_h^{M'} = \sum_{i=1}^{n} \delta^{i-1} T + p\left(\sum_{i=n+1}^{\infty} \delta^{i-1} T\right) + (1-p)\left(\sum_{i=n+1}^{\infty} \delta^{i-1}(W-D)\right) + pg^{M'*} - g^{M'*}.$$

The equilibrium separating high type gift under M', denoted $g_h^{M'*}$ is not the same as g^* from the benchmark case, but is determined by the low-tye IC for. The binding low type IC will still determine the size of this gift, but because a chance for deviation only comes after n periods, this incentive to deviate will be discounted, therefore a concession that gives incentives for truth telling need not be as large if it is given in period 0. The binding low type IC will still determine the size of this gift, but because a chance for deviation only comes after n periods, this incentive to deviate will be discounted, therefore a concession that gives incentives for truth telling need

[13] As $n \to \infty$, concessions actually need no longer be given because countries are not allowed to deviate even if given incentives to deviate. So a strong enough M' means a pooling equilibrium of no concessions and peace.

[14] The giving of concession should always happen in period zero, due to differences in δ_h and δ_l. Because the non-bound periods are in the future, low types devalue them significantly more, therefore separation is cheaper if it can occur at an earlier stage.

not be as large if it is given in period 0. The low type IC for truth telling under M' is: [15]

$$\sum_{i=n+1}^{\infty}(W-D)\delta_l^{i-1} \geq p(W+T)\delta_l^n + p\sum_{i=n+2}^{\infty}(W-D)\delta_l^{i-1} + (1-p)\sum_{i=n+1}^{\infty}(W-D)\delta_l^{i-1} - g^{M'*}.$$

When binding, this simplifies to the minimum separating equilibrium high type gift

$$g^{M'*} = p(\delta_l^n)(T+D).$$

Full separation can be maintained as an equilibrium under M' if the high type's gain from separation is larger than the gift $g^{M'*}$: [16]

$$p\left(\sum_{i=n+1}^{\infty}\delta^{i-1}T\right) + (1-p)\left(\sum_{i=n+1}^{\infty}\delta^{i-1}(W-D)\right) - g^{M'*} \geq \sum_{i=n+1}^{\infty}\delta^{i-1}(W-D).$$

This simplifies to a separating equilibrium existing under M' if and only if

$$\sum_{i=n+1}^{\infty}\delta_h^{i-1}(T+D-W) - (\delta_l^n)(T+D) \geq 0.$$

Since M' guarantees the higher-payoff Peace equilibrium for n periods and mandates a smaller gift, it is welfare superior in its separating equilibrium (providing utility $\sum_{i=1}^{n}\delta^{i-1}T + \sum_{i=n+1}^{\infty}\delta^{i-1}(W-D)$) to the benchmark case ($\frac{T+D-W}{1-\delta_h} - (T+D)$) and to M (when not identical to the benchmark, $U_h^M = pX_{TT} + (1-p)X_{FF}$).[17] ■

The implication of this result is that parties that would never choose peace in the absence of a mediator now have the structure to safely and comfortably enter into a period of peace. As in the benchmark case, both the no-concessions separating equilibrium and the concessions separating equilibrium may exist. Comparing payoffs, the concessions separating equilibrium is preferred to the no-concessions separating equilibrium for high types if and only if [18]

$$(1-p)\delta_h^n W - p(\delta_l^n)(T+D) \geq 0.$$

Note that when $n = 0$, M' simplifies to the benchmark case.

[15] The terms $\sum_{i=1}^{n}T\delta^{i-1} + pg^{M'*}$ appear on both sides of this constraint but are excluded here for simplicity.

[16] The terms $\sum_{i=1}^{n}T\delta^{i-1} + pg^{M'*}$ appear on both sides of this constraint but are again excluded for simplicity.

[17] When costs are symmetric and gifts are allowed to be efficient, M and the benchmark case are identical.

[18] In cases when both exist and this condition is not met, a mediator would implement the no-concessions equilibrium. In this scenario the negotiation acts like an equilibrium selection device by coordinating the parties' switch over to peace.

Lemma 2 demonstrates how third party mediation makes more frequent, though more fragile, peace than unmediated negotiation, a stylized fact of the political science literature (Beardsley 2008, Gartner and Haptonstahl 2011). If the goal is peace at any cost (perhaps short term peace is the goal), the strongarm tactic of M' is effective. If the underlying δ is also changeable, it may make sense to have a short term peace in hopes that a new leadership will have a higher δ. If the goal is making a sustainable peace without the possibility of a changing δ, an expensive concession would also be required. In any case, peace is not possible in the long-term if one of the parties is a low-type unless parameters change.

Lemma 3: GP makes the concessions separating equilibrium better off relative to the pooling equilibrium.

Proof of Lemma 3: M' improves over the benchmark case in both the pooling and separating equilibrium by giving the sure peacetime payoff $\sum_{i=1}^{n} \delta^{i-1}T$ instead of an uncertain payoff. M' also reduces the separating equilibrium's required concession by a factor of (δ_l^n) (Theorem 5) so while it improves upon both equilibria, M' is even better for the separating equilibrium. ■
This result is subtle but very powerful. Under certain parameters, the pooling equilibrium might be preferred in the benchmark case while the separating equilibrium is superior under M'. This means that certain low- level conflicts are better to continue if parties face the bilateral case while a mediator can incentivize the peace–and end the conflict– just by entering. Welfare is increased and peace is made. [19]

Now that we have explored GP, we can very easily prove Theorem 4:

Proof of Theorem 4: The low type will want to deviate from the prescription by M' to play Trust when

$$T + W + \sum_{2}^{n}(W - D) - Q \geq \sum_{i=1}^{n} T.$$

If a low type is ever given incentive to deviate, he would not necessarily do so in the first period. As periods pass by, the relative size of the LHS grows and a low type country will be given

[19] Though we assume risk-neutrality of actors, the results of our model support indicate that risk aversion in the concessions stage could explain Walter's (1997) result. Risk aversion on the part of high types would make mediators with enforcement capabilities more appealing because they can eliminate risk of trusting while the other party fights. If this outcome-being fooled by trusting while the other does not- has a large negative payoff, the no-concessions separating equilibrium will not yield a high expected payoff. Parties then prefer an equilibrium where concessions are exchanged. In all cases, this result implies that the "natural" concessions equilibrium becomes even more salient (see also Filson and Werner 2007).

incentives by his short term gain and will eventually deviate if $W > Q$. Q will be incurred, and the equilibrium will shift into war in the next period. In any case, after n periods, a low type will always play F. With a high enough Q, M'' can sustain peace with a low type for a number of periods ≥ 1. Under bilateral interaction, a high type and a low type cannon sustain peace for any number of periods. As $T > W - D$, M'' yields a utility improvement over unmediated interaction. Since low types eventually deviate under M'' (as opposed to the impossibility of deviation under M'), utility is not as high as under M'. ■

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Chapter 2

Inefficient Concessions and Mediation

Abstract

Two parties are engaged in conflict, and each distrusts the other's willingness to pursue peace. Each can indicate its own interest in peace through costly signaling, or concessions. In certain environments, however, a lack of trust means that optimal concessions are not made, creating inefficiencies in the negotiation that can reduce the possibility of peace. Through a formal model, we explore ways in which a third party mediator can act as a guarantor that promised concessions will be delivered, thereby reducing inefficiencies and increasing the potential for peace. In this process, we open up a rationale for mediation: to remove the inefficiencies of signaling in a preliminary round of negotiations.

2.1 Introduction and motivation

In negotiations with its neighbors, Israel is hesitant to give certain concessions. The Golan Heights, captured from Syria during the 1967 War, is a particular point of contention in Israeli-Syrian relations. While the Golan Heights does not have the West Bank's historic or religious importance, Israel values it for its highly strategic location. The Golan Heights could be a useful concession, but Israel senses that were she to give over the land, Syria may ultimately use the concession against them. This same hesitancy exists with the West Bank settlements. Many are located on hilltops that could offer strategic military outposts for forces hostile to Israel. When it occasionally abandons settlements, Israel generally dismantles all infrastructure, including water and electricity, and bulldozes the buildings. Although inefficient, this reduces the possibility of those settlements being used against Israeli interests. Without trust, the most efficient concessions cannot be made.

This holds for concessions other than land. Russia is loathe to cede further autonomy to Chechnya, even though independence could hypothetically relieve tensions and reduce violence. If Chechen independence could in fact lead to lowered violence, it is possible that this move would be in Russia's best interest. But the Russians perceive, perhaps correctly, that any move towards autonomy might only give Chechens further leverage against the Kremlin. They also realize that were Chechnya to realize its hopes, other ethnic areas like Tatarstan might be emboldened to demand more. From the Russian perspective, granting the concession of increased autonomy would likely have future costs.

In these and many other situations, a lack of trust is an impediment to peace, preventing parties from making necessary concessions. Mediation has long been understood as a mechanism for reducing mistrust, but in most of the published literature on international conflict mediation lacks a rigorous theoretical framework.

This paper has three parts. First, it explores the role of costly concessions in a game theoretic framework, evoking a two-sided version of Spence signaling (1973). Second, after considering existing explanations for inefficient concessions, it proposes a new theoretical explanation for why inefficiency might occur in a conflict setting: inefficient concessions may be preferred if the most efficient concessions are seen as having additional, future costs.[1] The Golan Heights, for example, will not be conceded if Israel foresees future security risks that outweigh the immediate benefits of peace. Finally, this paper uses a mechanism design framework to

[1] The type of inefficient concessions addressed here are those whose value to the recipient are lower than the cost to the giver.

model a third party's role in bringing about more efficient concessions. Many scholars contend that mediators with enforcement capabilities can help to resolve conflict; this formal analysis provides an explanation for why enforcement is effective.

2.2 Literature review and model introduction

While an integral part of conflict literature, concessions have not been adequately addressed by theoretical research. The broader literature that attempts to model war has included concessions as part of bargaining, but has not explicitly considered the role of concessions in achieving peace. Schelling's *Arms and Influence* (1966) modeled war with a game theoretic framework, and Powell (1999) has also defended the use of modeling in understanding war. Fearon (1995), Powell (1996a and 1996b, 2006) and others consider war to be a bargaining failure, caused by commitment problems and asymmetric information. In these models war can be averted by splitting the pie (i.e. the disputed territory) in a way acceptable to both parties. Concessions are modeled as offering part of the pie to the other party.

The literature often views conflicts as bargaining over assets that confer future power. In these cases, a lack of credible commitment can create a holdup problem. A lack of trust prevents the high level of interaction that would otherwise be optimal.

We will approach the commitment problem through this same general understanding, but modeling a party's willingness to cooperate as private information. A high type is willing to cooperate; a low type has incentives to not cooperate. These types map onto the commitment problem, with a high type one who is able to commit in certain scenarios. A low type, though perhaps willing, is unable to do so. A low type may posture like the high type, but lacks the political muscle or will to make the necessary concessions for peace. Democratic leaders may more often be high types because they are less likely to face coups or other hostilities in reaction to short term decisions. This is not always the case, however. Mahmous Abbas may be a low type, not because he does not want to make peace, but because he cannot credibly act on behalf of the entire Palestinian population.

Third party involvement is ubiquitious in conflict and mediation has been extensively studied in the literature, but still the question of third party effectiveness is intensely debated. Some authors have concluded that mediation has little impact, (Bercovitch 1996; Bercovitch and Langley 1993; Fortna 2003) while others insist that a correct analysis finds mediation playing a positive role in resolving conflict (Dixon 1996; Beardsley et al. 2006). But the term mediation

encompasses a broad range of actions and interactions, making any one-size-fits-all conclusion on the efficacy of mediation suspect. The type of mediation affects the negotiation outcome (Bercovitch 2000; Beardsley et al. 2006) and timing is important (Greig 2005a). It is essential to focus more precisely on the specific actions and environments that make use of a certain type of mediation, which is how we approach the question. This paper models an environment where the primary issue is trust, not uncertainty about an opponent's capabilities, and where a mediator is employed who has certain manipulative abilities—as defined below.

Mediation rarely occurs in the absence of violent conflict (Bercovitch 1996; Beardsley 2006). In this paper, parties are in conflict and can benefit from seeking mediation in order to overcome mistrust. Parties are more likely to seek mediation when they are entrenched in costly conflict (Bercovitch and Jackson 2001; Greig 2005b; Greig and Diehl 2006; Terris and Maoz 2005; Svensson 2008). Alternatively, parties may seek a mediator to justify difficult concessions and avoid angering domestic constituencies (Allee and Huth 2006, Beardsley 2010). These empirical results, while interesting, have generally lacked strong theoretical foundations. Mediation is used, but why actors use it is not well understood. This paper helps to fill this gap by explaining at least one of meditation's roles.

Concessions form the centerpiece of the GRIT (graduated and reciprocated initiatives in tension reduction) theory in the psychological literature (Osgood 1962) and have shown ample success in lab settings. Komorita (1973) conducts lab experiments using a repeated Prisoner's Dilemma similar to the setup in our paper and finds costly conciliatory acts (concessions) to be useful in promoting cooperation. De Dreu (1995) likewise uses a lab setting to experiment with concessions and conflict. In addition to concessions, De Dreu also reports laboratory results on mediation; he concludes that a weaker mediator should work with promises while a more powerful one can be effective with threats. Larson (1988) and others have applied this framework to political science questions. On the theoretical side, Filson and Werner (2007) use a bargaining setup to explore the sensitivities of costs compared to the sensitivity of giving concessions.

This paper will explore the role of concessions as signals, and not only as ends in themselves. Concessions may play either role – or both – in conflict resolution. If concessions are used solely for signaling, this can be considered inefficient as value can be lost. We will examine cases where concessions have material value, signaling value, and both.

In analyzing both the signaling and material value of concessions, an extensive literature on gift giving is particularly helpful. Like concessions, costly gifts have been shown to have a valuable role in relationship building. And the gift giving literature, more so than the concessions

literature, focuses specifically on the issue of efficiency. Inefficiency is defined for the purposes of this paper as some sort of money burning: giving a gift or concession that is more costly to the giver than it is valuable to the recipient, that is, using a concession as a signal and not taking advantage of its full inherent value. It is not problematic for giving to also have a signaling component, but it is ideal if the full value of the gift can be transferred.

Gift giving as a whole is inefficient (Waldfogel 2009); it has been estimated that Christmas gift-giving is only 75 percent efficient, meaning that the average gift is valued at 75 cents of the dollar that is spent on it (Waldfogel 1993). But merely looking at aggregate numbers blurs together many possible reasons for gift giving. It has even been theorized that buying something that the receiver would not buy himself is an inherent component of gift giving (Thaler 1985). Often, inefficient gifts occur in the formative stages of relationships or in immature relationships (Camerer 1988). Gifts given in established relationships, such as wedding presents or spousal gifts, are more likely to be cash gifts or efficient gifts that are specifically requested or selected from a registry. Since inefficient gift giving is more likely involved in nascent relationships and partnerships, it is natural to suppose that inefficient gifts play a signaling role in addition to the material value of transferring the gift's inherent worth.

In efforts to explain the existence of gift giving, Camerer (1988) and Van de Ven (2000) give several anthropological explanations for inefficiency. Amongst these explanations are altruism, social mores, and egoism. But the most relevant explanation for the field of international relations is that gift giving is strategic. Camerer also creates a theoretical model using mechanism design that models gifts as costly signals; inefficiency is useful in pre-play communication in order to form relationships between like types. This strategic giving of gifts in societies looks very much like the strategic giving of concessions to remedy conflict situations. When modeled game theoretically, these different environments look even more similar.

Camerer's model includes players that have one period to signal before they decide whether to partner. There are two types, high types and low types, and a separating equilibrium is characterized by a threshold gift that is necessary for high types to reveal themselves while low types do not send a gift (or send a gift of zero cost). Two high types who have just received each other's gifts will then choose to create a partnership with a positive payoff; other combinations will not find it economical to form a partnership.

Camerer shows that in this general formulation, a costly signaling model will always yield efficient gifts. In order to explain inefficiency, Camerer adds in an additional pre-play period where players must pay a cost in order to enter the game and send and receive gifts. If

types separate in the pre-play period with low types not being willing to pay, high types are saved the cost of sending a signal to low types in the main game. High types would, in some parameterizations, be given incentives to give inefficient equilibrium gifts in the main game in order to lower the low types' expected payoff of playing to below the pay-to-play fee. Such an action can keep out the low types and this can raise the expected payoff for a high type by saving on the gifts given.

Several other papers essentially use Camerer's theoretical explanation for inefficient gifts. Iannaccone (1992), Rabin (1993), Kranton (1996) and Carmichael and MacLeod (1997) all use a similar explanation with various modifications to the model. Carmichael and MacLeod (1997) extend the argument to long time frames, arguing that inefficient gifts might arise evolutionarily by keeping "parasite" numbers low. In an environment with repeated opportunities for concessions Watson (1996, 1999) is able to show that a strong relationship can be reached by starting with small gifts and increasing their size as the relationship becomes more committed. Kranton (1996) applies a similar concept to a model resembling Camerer (1988). See Van de Ven (2000) for an analysis of how these papers relate to each other.

The second major way to explain inefficient gifts is expressed in Prendergast and Stole (2001). The authors have a result that explains inefficient gift giving by modeling utility of matching–if players are of a like mindset they get an extra benefit; they are willing to take the risk of giving the wrong gift. This explanation has less applications to questions of conflict.

While these several explanations for inefficiency are interesting, we propose another theoretical contribution to explain this real-life phenomenon that is more rooted in a realistic international relations puzzle. The basic formulation of our model is most similar to Camerer (1988) who also uses mechanism design; our model is an expansion of Camerer's analysis. The model can achieve the Camerer result and another similar to that of Prendergast and Stole (2001) but adds a very different explanation for inefficiency. This paper expands upon the existing literature by generalizing the analysis using mechanism design theory more extensively than has been done thus far. The basic model is a costly signaling model, at its root similar to ideas in Spence (1973) and subsequent papers. See Connelly et al. (2011) for a review of the costly signaling literature. In essence, the model shows that if concessions can be later used against the party that gives, then giving inefficient concessions can be in their best interest. While our model is tailored to an international relations setting, the mathematical explanation for inefficient giving of concessions may be more broadly applicable.

2.3 Formal model description

Countries[2] are of two possible types, high and low. A high type discounts future period payoffs at rate δ_h and a low type discounts at δ_l. $\delta_h > \delta_l$ and both $\delta_h, \delta_l \in [0, 1]$. Before the start of the game, nature independently determines the types of country 1 and country 2. The type distinction, as explained later in the model, is relevant in that it encompasses the country's willingness to cooperate in solving the conflict with the other specific country. It should not be thought of as an inherent quality of a country, but rather an interactive parameter. Thus it is not necessary to think of a type as fixed; it can change as regimes and relations between countries change.[3]

The probability of nature selecting high type for a given player is p. The probability of nature selecting low type is $1 - p$.[4] Countries are aware of their own type, but not the type of the other country. Similar scenarios have been modeled as credible commitment problems in the bargaining literature. Our model can be thought of as a reduced form bargaining model, but it can also be considered somewhat differently – when trust is the issue to be solved, there are several solutions to conflict. Concessions are one way in which countries can signal their commitment. By modeling the conflict in such a way we can also gain insight from how a third party can affect trust issues inherent to the conflict.

In period 0, countries 1 and 2 simultaneously give costly concessions g_1 and $g_2 \in \mathbb{R} \geq 0$. Concessions are given at cost $C(g_i)$ and benefit the recipient g_i, where $i \in \{l, h\}$. For simplicity, let us initially assume $C(g_i) = g_i$. We will relax this assumption later.

Beginning in period 1, countries engage in an infinitely repeated Prisoner's Dilemma once per period with stage game payoffs represented below. While not a good representation of all-out war, the Prisoner's Dilemma is appropriate to represent a limited, continued conflict, not a zero-sum short term war. In cases appropriately modeled by a Prisoner's Dilemma, it would be better for both parties to exit the protracted conflict, but no party has the unilateral incentive to do so. The critical results of this paper do not depend on a prisoner's dilemma structure; they require only that a better result can be achieved through trust or credible commitment. Thus, a stag hunt or other game structures are also possible. The Prisoner's Dilemma is used because of

[2] Players will be referred to as countries, though it could also be appropriate to think of players as intra-state actors, as in a civil war.

[3] We can enrich the model to assign a probability (and even different probabilities) of a country's type shifting from high to low or low to high in a given period.

[4] Note that parameters are symmetric across countries, as is consistent with the literature. Qualititative results do not depend on this being the case, and equilibria and equilibrium concessions can easily be calculated with asymmetric parameters between players.

its wide exposure in the literature.[5]

The choice of "Trust" or "Fight" will be referred to as the county's stage game action.

Table 2.1: Stage Game Payoffs

	Trust	Fight
Trust	T, T	-D, T+W
Fight	T+W,-D	W-D, W-D

$T \geq 0$: Benefit from the other country playing Trust

$W \geq 0$: Additional benefit from playing Fight

$D \geq 0$: Damages due to the other country playing Fight

Assume $T > W - D$. Payoffs for a country are the sum the stage game payoffs, discounted by δ. For example, if both parties play "Trust" in every period, the payoff for a player i is $\sum_{t=1}^{\infty} \delta_i^{t-1} T = \frac{T}{1-\delta_i}$. Parameters are common knowledge with the exception of δ_i, which is country i's private information. The measure of social welfare, and thus the determinant of the optimal equilibrium, will be the sum of participating high types' expected utilities.

If δ is high enough for both countries, the cooperative outcome of "Peace" (Trust, Trust) can be sustained with a grim trigger punishment threat. The assumption $T > W - D$ ensures that payoffs from Peace (even if it cannot be held as an equilibrium) are higher than for "War" (Fight, Fight).[6] For a Peace equilibrium to exist, δ must be high enough for each country so that sustaining Peace is more attractive than deviating. The threshold δ^* needed is

$$\delta^* = \frac{W}{T + D} \tag{2.1}$$

Assume $\delta_h > \delta^*$ and $\delta_l < \delta^*$.

2.4 Analysis of benchmark cases

When countries are faced with doubts about each other's motives, they have several options of how to proceed. There are three basic types of equilibria that this analysis will examine.[7]

[5] This payoff matrix does not distinguish between civil and interstate conflict, though in practice the effects on the payoffs might indeed have a different structure in the different cases.

[6] A country whose payoffs violate this assumption is of a special "very low" type that will be considered later in the analysis.

[7] If the discount factor for the high type (δ_h) exceeds the cutoff found in expression (1), there are many types of equilibria; consider for instance oscillating every other period between Peace and War with a grim trigger War threat. In this paper, we are not interested in these equilibria because they are not as realistic for applications to conflict scenarios. These are also always payoff dominated by at least one of the other equilibria discussed, so are not attractive.

A thorough analysis of the different types of equilibria, as well as all proofs for this section, can be found in the appendix.

Pooling equilibrium

In the *pooling equilibrium*, both countries do not give concessions in period 0, then always play Fight in every period beginning with period 1. Countries continue to doubt, doing nothing to bridge the credibility gap, and thus not cooperating. This is a *pooling equilibrium*, and is likely to happen when countries are in long-set patterns of distrust. Active fighting is not necessary; remaining outside of a state of peace is all that is required. See Lemma 1 and Lemma 2 in the appendix for a formal characterization of this type of equilibrium.

Cyprus' civil war is a good example of the pooling equilibrium where neither side is taking actions to move things forward. While both sides posture that they want peace, and while there has been some lessening of tensions, very few concrete actions have been taken that move the sides toward settlement. This conflict is a stalemate.

Sri Lanka is another example. While the government has finally won the war of secession, it still refuses to address grievances of the minorities and leaves the conflict still unresolved. Other prominent examples of this pooling equilibrium include Israel and its neighbors, North and South Korea, Greece and Turkey, and a multitude of other long-lasting conflicts. The mistrust of the other party is perhaps justified- indeed if one party did take the first step and give a concession first, they may indeed be taken advantage of.

In any case, these long lasting stalemates are the types of conflict which are most appropriate for mediator involvement. Without a third party, there is little hope of overcoming mistrust. In some sense then, these are the cases that are most interesting because the international community might play a positive role. A mediator will be added to the model later to illustrate exactly how this role can be played.

Separating without concessions

The other two equilibria are separating equilibria in which low types and high types have different strategies. In a *no-concessions separating equilibrium*, no concessions are given by either type in period 0. In period 1, high types play Trust while low types play Fight. So long as there are two high types, as revealed by their period 1 play, both countries continue to play Trust in all following periods. Otherwise, both countries play Fight in all following periods.

Theorem 1: The strategy of not giving concessions in period 0, then playing Trust unless the other country defects to Fight is an equilibrium strategy for high types if $\delta_h \geq \frac{W}{(1-p)W+p(T+D)}$.
Proof: See appendix.

In this equilibrium two mutually distrustful countries go ahead and behave as if they trust anyway, taking a risk. This generally will happen when the result of trusting and then being betrayed is not catastrophic, or the odds of such a scenario are small. This is representative of a case where countries have suspicions about each other, but proceed anyway.

Examples of a *no-concessions separating equilibrium* are most likely to be those where countries have traditionally had good relations but something has recently come in the way. Certain relationships between the USA and countries that its wikileaks alienated- such as Italy- would be an example. Italy essentially laughed off the criticisms and reassured the USA of its commitment to their relationship. Warsaw pact countries generally allowed the USSR similar leeway; it was better to have occasionally imperfect cooperation than conflict. Certain things can disrupt trust without completely derailing actions.

Of course, it is possible that in a *no-concessions separating equilibrium* one country can take advantage of the other. It can be argued that indeed that did happen in the Warsaw pact cases; the Eastern Bloc countries were first exploited before the fall of the iron curtain; eventually this led to a steely relationship between many of those countries and Russia that exists to this day in Poland, Lithuania and other countries.

Though it will not be modeled here, a stochastic component – when countries occasionally unilaterally defect – can explain why powerful countries like the USSR more often "get away" with cheating: the payoffs to the relationship are not symmetric. Losing the USA or USSR as an ally is much more devastating for a satellite country than vise versa, therefore big countries can have their alliances and take advantage of them too.

Separating through concessions

The third option is for distrustful countries to use concessions as a way of building trust. In the model this is the *concessions separating equilibrium*. This equilibrium is costly, but can be worth the investment if the other country also cooperates. It is also not as risky as cooperating without concessions, as in the previous equilibrium. The concessions are given before more substantive actions, thus concessions are a costly signal that the other country is serious about cooperating. Most agreements come with concessions, and in many cases, though not all, they

are used as signals. The goal is to use this option to avoid continual distrust; a mediator is one way of enabling this solution.

In the *concessions separating equilibrium*, low types do not give concessions while high types give a concession of a certain size in period 0. If both countries receive concessions, they know the other is a high type and both play Trust in subsequent periods. Otherwise, if both players do not receive concessions, there is at least one low type so both countries play Fight in subsequent periods.

The analysis is conducted with standard Incentive Compatibility and Individual Rationality constraints. Consider the commonly held grim trigger punishment path of the "Fight, Fight" equilibrium being played forever played forever if Fight is played by any party in any round. This paper will focus on separating equilibria in which high types make use of concessions to identify themselves in hopes of establishing Peace. Because we look at grim trigger punishments, there are essentially only 4 equilibrium combinations of strategies after concessions are given: 1) Both countries play Trust always, 2) Both play Fight always, 3) Country 1 plays Fight in round 1 while country 2 plays Trust, which is followed by both countries playing Fight from round 2 onwards and 4) Country 2 plays Fight in round 1 while country 1 plays Trust, which is followed by both countries playing Fight from round 2 onwards.

Equilibrium payoffs beginning from round 1 are now easily described by noting only the collective first round behavior. Let X_{ij} represent the sum of discounted payoffs for country i where subscripts represent first round strategies of that country. If both countries play T in round 1, the corresponding payoff to country i is represented as $X_{TT} = \frac{T}{1-\delta_i}$. Likewise $X_{TF} = \left(-D + \frac{\delta_i(W-D)}{1-\delta_i}\right)$, $X_{FF} = \frac{W-D}{1-\delta_i}$, and $X_{FT} = T + W + \frac{\delta_i(W-D)}{1-\delta_i}$. Note that because types have different discount rates, these quantities are different by type, and when ambiguous will be superscripted to indicate the type (e.g. X^h_{FT} represents the high type). Note that because of the signaling value of the concessions given in period 0, starting from period 1 in the Trust/Fight game, both countries play the same strategy in a separating equilibrium (both play Trust if there were two high signals; otherwise both play Fight). X_{FT} and X_{TF} are still necessary for calculating the equilibrium concession g_h.

Lemma 3: In a separating equilibrium, low types do not give a concession. Cheap talk does not allow for a concessions separating equilibrium.

Proof: See appendix.

Theorem 2: In the best concessions separating equilibrium, high types give the smallest concession necessary to separate. Equilibria with higher concessions yield strictly lower payoffs.
Proof: See appendix.

This smallest concession is denoted g_h^* and is calculated in equation (11) in the appendix to be $p(T + D)$.

In general, a high probability of a high type will make this no-concessions separating equilibrium very attractive. Under low p, high types are better off choosing the pooling equilibrium.

Concessions separating equilibria are a way for countries to solve their disputes. By giving costly concessions, they signal their intentions in a way that a partner unwilling to make peace would not be willing to signal. A mediator can sometimes make this a possibility, as will be shown in section 7, but this equilibrium is also achievable bilaterally in some cases.

One example of such an equilibrium includes Israel and Egypt at the Camp David Accords. Both parties gave concessions (Israel a material land concession and Egypt diplomatic recognition of Israel) that signaled their willingness to end the stalemate that had characterized the previous five years. Of course this result depended on Carter's use of mediation techniques, including use of manipulative mediation – a concept we will explore in section 7 below.

2.5 Inefficiency and concessions

We now relax the assumption about the benefit of a concession being equal to its cost and instead allow countries to "burn" a portion of the concession they give. For example, an expensive display of pageantry to a dignitary might benefit the receiving country very little, if at all, but it still signals good intentions on behalf of the giving country. The option to give efficient concessions is still available along with new options to give a variety of less efficient concessions.

In the model, countries choose a scalar e to multiply by their given concession g. $0 \leq e \leq 1$. As before, $C(g) = g$ but while the receiving country observes the full concession g, its benefit is now only eg.[8] From here on in the analysis, we use $g_l = 0$ and $g_h = g_h^*$ to denote the equilibrium concenssions as presented in the previous section and calculated in the appendix.

[8] In a more general model not relevant to results presented here, we could also think of e as a function $E(\cdot)$. The argument is still g, but instead of a scalar, $E(\cdot)$ can transform g into any concession, not only a numerical value. These gifts will be converted into utilities by cost and benefit functions, which then allow the possibility of a gift having efficiency greater than 1. The transformation function $E(\cdot)$ can be thought of as the type of gift, and has a cost to the sender and a direct benefit to the receiver in addition to its signaling value.

Theorem 3: It is optimal to give efficient gifts (where $e = 1$) in a separating equilibrium.

Proof: The benefit of a gift appears on both sides of the IC for both types and thus cancels out in the low type IC $(pg_h + X^l_{FF} \geq pX^l_{FT} + (1-p)X^l_{FF} - g_h + pg_h)$ and in the high type IC: $(pX^h_{TT} + (1-p)X^h_{FF} - g_h + pg_h \geq X^h_{FF} + pg_h)$.[9] Therefore, receiving a gift where $e < 1$ does not affect incentives to truth tell about the countries' types. However, the expected separation utilities under this game are now

$$U_h = pX_{TT} + (1-p)X_{FF} - g_h + peg_h \tag{2.2}$$

and

$$U_l = X_{FF} + peg_h \tag{2.3}$$

$\frac{dU}{de} > 0$ for both countries so it is never optimal have $e < 1$.[10]■

We now model concessions to potentially have real material help or harm to the giver. The interpretation is that the country which receives the concessions can use them to build up their military or to build up their civil society. The former hurts the giver of the concessions in war; the latter helps the giver in peace. The Golan heights is such an example: if Syria is an ally of Israel, the Golan Heights is a reasonable concession to make, but if Syria later turns out to betray a trust, surrender of the strategic land would be disastrous for Israel.

Allow T, W and D to be functions $T(\cdot), W(\cdot)$ and $D(\cdot)$. Payoffs depend on arguments s_i, the size of country i's civil society and m_i, the size of country i's military. s_i and m_i are exogenous.

In period 0, after receiving his concession, a country makes the decision to allocate it between military and civil society. α_i is the portion of his received concession that country i chooses to dedicate to civil society; $(1-\alpha_i)$ is the portion country i dedicates to military buildup. This decision is a simple optimization problem for each country. Parameters are common knowledge so the result of this decision is well known should the country's type be known. Concessions are immediately converted into civil society or military gifts and incorporated into payoff functions. $C_h(\cdot) = C_l(\cdot) = 1$ as earlier in the model description. Periods 1 to ∞ are as before but with the following stage game payoffs:

[9] Elaboration and explanation of the IC constraints is in the proof of Theorem 2.

[10] This result does not depend on the benefit so it holds for any monotonic benefit function. It also holds for any monotone cost function.

Table 2.2: Modified Stage Game Payoffs

	Trust	Fight
Trust	$T(s_2+\alpha_2 g_1)$, $T(s_1+\alpha_1 g_2)$	$-D(m_2+(1-\alpha_2)g_1)$, $T(s_1+\alpha_1 g_2)+W(m_2+(1-\alpha_2)g_1)$
Fight	$T(s_2+\alpha_2 g_1)+W(m_1+(1-\alpha_1)g_2)$, $-D(m_1+(1-\alpha_1)g_2)$	$W(m_1+(1-\alpha_1)g_2)-D(m_2+(1-\alpha_2)g_1)$, $W(m_2+(1-\alpha_2)g_1)-D(m_1+(1-\alpha_1)g_2)$

Theorem 4: Under some parameters, the optimal equilibrium uses inefficient concessions.

Proof: Because it is relatively complicated to calculate equilibrium concessions in the general case, a slight simplification of the general model will be made for proof of inefficient concessions. Restrict functional forms of $T(\cdot), W(\cdot)$ and $D(\cdot)$ so that each is a scalar multiplied by its arguments. Also assume that $s_1 = s_2 = m_1 = m_2 = 1$. Because of linearity, equilibrium optimization has high types choosing $\alpha = 1$ (because a concession would only come from another high type in equilibrium) and low types choosing $\alpha = 0$. Note that none of these simplifications is essential for the results to hold but we make them for ease of calculation and demonstration of the results. The low type's IC constraint binds so with $e = 1$, g^* can be calculated to be $g^* = \frac{p(T+D)}{1-pT}$. Under an equilibrium with purely inefficient concessions $(e = 0)$, the minimum separating concession would be $g' = p(T + D)$.

Assuming gifts must be non-negative, g^* will always be greater than g'. This is not enough to show that inefficient concessions are sometimes optimal. To show this, consider high type equilibrium utility and assume that the high types are perfectly patient (that is, $\delta_h = 1$):

$$U_h = pT(1+eg) + peg + (1-p)(W - D(1+eg))^{11} \tag{2.4}$$

Whether it is beneficial for high types to settle on the efficient concession or the inefficient concession needs to be determined by comparing the utility under each. For low p, the term $(1-p)(W - D(1+eg))$ dominates, showing that clearly, as low an e as possible is best, so $e = 0$, that is, complete inefficiency is the best possible equilibrium efficiency level. It is thus rational under such parameters for inefficient gifts to be given as concessions. ■

This finding of inefficiency is for profoundly different reasons than the literature related to Camerer (1988) or Prendergast and Stole (2001).[12] Instead of being in reaction to a behavioral regret for mismatching or serving as a ay to discourage low types for entering the game

[11] Note the gift payment does not enter here: the current period is weighted $1 - \delta$, which is 0, while the future is weighted $\delta = 1$.

[12] Since our initial setup is essentially identical to Camerer's, the desired inefficiency of pre-play communication

altogether, here making concessions inefficient is a device to prevent low types from using those concessions against oneself in the future.

2.6 Mediation

All results in this paper thus far have relied on bilateral engagement. We will now consider the involvement of a mediator which will be modeled as a mechanism. Mediation has been studied to some degree in the formal literature and has most recently been modeled using mechanism design. Applying mechanism design to mediation has been used, to date, by Fey and Ramsay (2008, 2010 and 2011), Bester and Warneryd (2006) and Horner et. al. (2010).

Because many conflicts occur in an international arena with no clear enforceable rule of law (Waltz, 2002), much of the literature has focused on self-enforcing mechanisms. If however a credible third party does exist, then results beyond self enforcing agreements can be relevant. A mediator with such enforcement ability is said to use manipulative mediation, specifically if she "offered to verify compliance with the agreement" or "took responsibility for concessions" (Bercovitch 1997). We will now introduce a mediator who does both.

The model setup is as before, but instead of parties being free to give whatever concession they want, the mediator solicits type reports and then enforces incentive compatible concessions. This mediator wil be modeled as a mechanism M.

M inputs the reports of types t_1 and t_2 and outputs the required concessions g_1 and g_2. Formally, $M : (t_1, t_2) \rightarrow (g_1(\cdot), g_2(\cdot))$. The countries are bound to send the mandated concessions. The benchmark case requires the countries to send the same concession to both types, since types are private information. M can differentiate based on recipient's type. Otherwise, the setup is identical to the benchmark case.

Welfare is again considered as the sum of the high type utilities. Qualitatively, similar results would hold if we also included low types in the analysis with weighting based on p. In the analysis, incentive compatibility and individual rationality constraints must be satisfied. The revelation principle is used to attain truthful self-identification (Myerson 1979). For mediation to be useful, $C_l(\cdot)$ needs to be pointwise greater than $C_h(\cdot)$, and we will assume this. This means

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can also be found in our model. With a slight behavioral modification, the reasoning of Prendergast and Stole (2001) can also be had: if a country suffers regret after efficiently giving to a type different than their own, there is a premium for guessing correctly. In Prendergast and Stole the two types are equal except in labeling; in our model, high types and low types are used so there is an incentive for low types to try to pose as high types. Aside from this difference, essentially the same result is found: if countries suffer a "mismatching" cost due to giving to the wrong type, they will be hesitant to do so and may offer inefficient concessions.

that a low type is not identical to a high type, and indeed bears greater costs for peaceful actions. This can be thought of as a leader who must explain peace to his people. If the people want to make peace with the rival, posturing for peace is not costly for the leader. But if the people do not want to make peace with the rival, the leader loses credibility by outwardly touting peace. Therefore taking a peaceful action is more costly, and perhaps even impossible. This low type leader can bluff in the bilateral setting but not, as we will see, when a mediator is present.

Theorem 5: A mediator can be used to eliminate inefficient concessions.

Proof: $C_l(\cdot) > C_h(\cdot)$ as per the assumption above. The low type IC ($pg_h + X^l_{FF} \geq pX^l_{FT} + (1-p)X^l_{FF} - g_h + pg_h$) binds, so the equilibrium benchmark gift is $g^* = p(X^l_{FT} - X^l_{FF})$ and high type utility is $U^*_h = pX_{TT} + (1-p)X_{FF} - (1-p)g^*$). Under M, the low type IC can bind without having high types give a concession to low types. The equilibrium separating gift g^{*M} will be larger than g^* in this case, specifically

$$g^{*M} = \frac{p(X^l_{FT} - X^l_{FF})}{1-p} \tag{2.5}$$

High type utility under M is

$$U^M_h = pX_{TT} + (1-p)X_{FF} \tag{2.6}$$

because high types exchange concessions of the same value. $U^M_h > U^*_h$. Note that no additional wealth is created by M, but less is transferred to low types, and welfare is defined as high-type utility.[13] ■

Since the low type IC constraint binds, the only way which a mechanism can improve upon the benchmark case is by having asymmetric costs of giving for the types. As per Theorem 4, inefficiency is due to the high types giving an inefficient gift in order to separate while still being able to prevent low types from using concessions against the high types. If costs are disparate, under certain parameters the mediator can mandate concessions only between declared high types. This means there is no longer a need for inefficient concessions since concessions will never be used against the giver. Thus, a mediator is able to remove inefficiency in concession giving and bring willing parties to the table to give the gifts necessary to achieve peace.

The improvements by the mediator here do not rely on the mediator's private information as in the models of Kydd (2003), Rauchhaus (2006) and Smith and Stam (2003). Therefore the mediator's preferences need not be a huge factor in her participation. So long as the costs are

[13] Low types IR constraint still binds and $U_l = X_{FF}$

small enough to be worth her participation the mediator can effectively enter and assist in solving the conflict.

The value of truth telling by the mediator has been brought up in the literature. Kydd (2003) studies bias in mediation and how a mediator can credibly communicate information to the parties. Conversely Horner et al. (2010) rely on the mediator to "hoard" information in order to be able to improve on unmediated interaction. In our model, a successful mediator relies on the parties trusting her. However, here the mediator had no incentive to lie: lying can only potentially hurt the high types, the only type who the mediatorcan possibly help.

2.7 Conclusion

In states of perpetual conflict, concessions have been shown in the literature to ease distrust. Our paper shows a mechanism by which this might work. In our model's setup, there are three potential types of equilibria: first, if prior trust is low a no-concessions pooling equilibrium exists, which is essentially a state of war for all types. Second, if prior trust is sufficiently high, a no-concessions pooling equilibrium exists where high types trust in the first period and can maintain that trust if both are high types. Third, the most intuitive or realistic type of equilibrium, a concessions giving separating equilibrium exists where high types offer concessions to eliminate the distrust.

While parties generally are better off when concessions are efficient, we have shown that inefficiency may be useful. In particular, if concessions may be used for further material harm against the giver, it may be better to give inefficient concessions. This explanation captures the hesitancy of nations to fully engage in moving forward with a peace process when there is mutual distrust.

However, there must be a caveat about modeling concessions. The initial thought would be that it is somewhat abstract to model a concession as a number. However it is not necessarily insufficient as often times concessions really do come in sizes, for example the number of prisoners released, an amount of land ceded, or an amount of time given to carry out actions. So the magnitude of concessions can indeed vary. But while magnitudes vary, the real caveat is that the nature of the concessions is sometimes non-negotiable. For instance if one country demands release of hostages, it is not possible-or at least not realistic- for the other country to give the equivalent value in land, cash or weapons.

In practice, in "sons of the soil" conflicts, concessions are indivisible (Walter 2002),

therefore if inefficient concessions need to be given, no concessions will be in fact given as an inefficient concession is an impossibility. The full value is the only concession worth making because it is the only one that will be accepted. Inefficient concessions can have the same signaling value, but unless signaling is the only facet of a concession that is valued, this is not enough. Therefore when we think about concessions, we should think about their nature as being fixed. With this in mind, we can then accurately consider whether concessions are of sufficient size. These observations do not undermine the model. Countries may prefer to give inefficient concessions; they do not necessarily prefer to receive them.

The effectiveness of mediation is debated in the literature; this paper shows that a third party mediator can remedy this inefficiency if she is trusted. One result of this formal exposition is to show the mechanisms through which a mediator can help. Since the mediator eliminates inefficient concessions, the observation that inefficient concession may not do the trick only further indicates the value of a mediator even more.

While this model uses manipulative mediation, which is indeed used in resolving conflicts, the usefulness of mediation relies on perfect trust of the mediator. Such an all-powerful mediator is a strong assumption, and while useful as a benchmark, it is unlikely to exist in most scenarios. It would be useful as a further exercise to examine the effectiveness of mediators with different strengths of enforcement capabilities.

While it is an important theoretical result to show how a mediator can help conflict situations, it should also be noted that mediation is not free, at least to the providing (third) party. Therefore, the inefficiencies borne by the inefficient concessions and/ or by the ongoing conflict must not be outweighed by the cost of providing the mediation. If the model accurately captures the costs, the expected savings of mediation can be calculated and therefore the usefulness of mediation in a specific scenario can be determined. This will allow the mediator to analyze whether her involvement is worthwhile.

This paper succeeds in showing a role for inefficient concessions, and shows how a mediator can remedy this situation. Opportunities for further research clearly include looking at the roles of different types of mediation. Because of the many humanitarian, security and diplomatic implications of this work, both deeper and broader analysis is required.

2.8 Appendix

Pooling equilibrium

Lemma 1: From period 1 on, playing fight in all periods regardless of beliefs constitutes an equilibrium strategy of the continuation game for both types.

Proof: As $D \geq 0$ and $W \geq 0$ the dominant stage game action for all types is to play Fight. Thus the stage game equilibrium is (Fight, Fight) and in any repeated game, playing the stage game equilibrium in each period is an equilibrium of the entire game. ■

Lemma 2: From period 1 on, playing fight in all periods is the only sequentially rational strategy for low types regardless of their beliefs of the other country's type and strategy.

Proof: As $D \geq 0$ and $W \geq 0$ the dominant stage game action for all types is to play Fight. Playing Trust is only possible in equilibrium where there is punishment for playing Fight. The minimax payoff is $W - D$, and punishing a country by playing it every period is the worst possible punishment, hence it gives the greatest potential for a country to be given incentives to play Trust. Low types, with $\delta_l < \delta^*$ achieve a higher payoff deviation from being punished than they do from cooperation, so they cannot be given incentives to play anything except Fight. ■

One high type equilibrium strategy is to pool with the low types and always play Fight. If both the low and high type of player j choose the strategy that gives no concessions and always plays fight, Lemma 2 shows that the low-type of player i best responds by always playing Fight. The high-type of player i is made strictly better off by playing Fight in each period given player j's behavior by Lemma 1. Given that the stage-game equilibrium will be (Fight,Fight), there is no incentive to give a concession in period 0 because concessions are costly and signaling one's type can give no benefit in this equilibrium. Types pool by never giving concessions and always playing Fight.

Separating without concessions

Let us examine the conditions for a separating equilibrium held in place by a grim trigger.

Theorem 1: The strategy of not giving concessions in period 0, then playing Trust unless the other country defects to Fight is an equilibrium strategy for high types if $\delta_h \geq \frac{W}{(1-p)W+p(T+D)}$.

Proof: Countries with the equilibrium strategy to play Trust in the first round reveal themselves as a high type as per Lemma 2. This will be incentive compatible for high types if the expected payoffs from this strategy are greater than the payoffs from deviating against someone playing the pooling (always Fight) strategy. If both countries play Trust in a period, a Peace equilibrium takes place and both countries continue to play peace in every period with the grim trigger threat of the War equilibrium. Low types play Fight in the first period, so a high type that observed Fight being played would respond by playing Fight in period 2 and in all future periods. If the potential advantages of Peace are large enough to outweigh the risks of encountering a low type in expected utility terms, a high type will be given incentives to play Trust in the first round rather than Fight. Formally, to play Trust, the following must be satisfied:

$$p(\frac{T}{1-\delta_h}) + (1-p)(-D + \frac{\delta_h(W-D)}{1-\delta_h}) \geq p(T + W + \frac{\delta_h}{1-\delta_h}(W-D)) + (1-p)\frac{W-D}{1-\delta_h} \quad (2.7)$$

This simplifies to the condition of high types choosing Trust in period 1 if and only if:

$$\delta_h \geq \frac{W}{(1-p)W + p(T+D)} \quad (2.8)$$

Since under some parameter sets this condition will hold, this type of separating equilibrium can exist. Let us refer to such an equilibrium as a *no-concessions separating equilibrium*, since the high types have sufficient incentive to separate under appropriate parameter values even without concessions being given in period 0. ■

Separating through concessions

If the condition in equation (8) is not met, in the absence of period 0 concessions[14] two high types would play Fight in every period because both would not have the incentive to play Trust. If instead high types are provided sufficient incentive to give a concession that reveals their type in period 0, the high types could safely play Trust in period 1. Two high types would avoid the trap of War that would occur under pooling.

This type of equilibrium will be called a *concessions separating equilibrium*. We refer to the optimal equilibrium separating gifts as g_h from the high type and g_l from the low type. These equilibrium gifts will mean that when period 1 is reached, countries know which type the other country is and choose to play accordingly. The concessions phase acts as a coordination

[14]Countries need to deliver concessions in period 0, not just promise them. A concession that is promised but not delivered will count as cheap talk.

device to match countries' actions. To play different actions from each other is an off equilibrium contingency. These off equilibrium payoffs are nonetheless necessary for calculating the minimum separating concession.

Lemma 3: In a separating equilibrium, low types do not give a concession. Cheap talk does not allow for a concessions separating equilibrium.
Proof: According to the revelation principle, we can assume that in a concessions separating equilibrium countries reveal their types truthfully, allowing period 1 actions where High types only play Trust with other high types, and play Fight with low types. Low types play Fight (Lemma 2) and their payoff is $U_l = X_{FF} + pg_h - g_l$. Though low types might be willing to give a non-zero gift in a separating equilibrium, it must distinguish them from the high types. Thus it cannot help them to achieve a higher payoff, and because their concession g_l enters negatively in the payoff function, low types' optimal concession is 0. High types have the incentive to play Trust only in the Peace equilibrium, which can only be sustained by a pair of high types. Both types benefit from the other country playing Trust because of the payoff structure so all countries have incentive to signal that they are high types if concessions are costless (cheap talk). Thus costless announcements cannot lead to truthful revelation. If concessions lead to a separating equilibrium, they must be costly. ■

Theorem 2: In the best concessions separating equilibrium, high types give the smallest concession necessary to separate. Equilibria with higher concessions yield strictly lower payoffs.
Proof: Under certain conditions, the high types will be given incentives to send costly concessions in order to reveal their type and separate (Lemma 3). In a separating equilibrium constructed here, any-off equilibrium behavior (a concession not equal to the equilibrium concession) will be considered low type gifts. In this case, the binding incentive compatibility constraint is the low type IC constraint, which when simplified to allow $g_l = 0$ is:

$$pg_h + X^l_{FF} \geq pX^l_{FT} + (1-p)X^l_{FF} - g_h + pg_h \tag{2.9}$$

This equation represents the low types' incentives by truth telling as opposed to posing as a high type and giving the corresponding equilibrium gift. Rearranging and simplifying this inequality, in order to separate the high types need give a gift

$$g_h \geq p(X^l_{FT} - X^l_{FF}). \tag{2.10}$$

High type separating equilibrium utility is $U_h = pX_{TT} + (1-p)X_{FF} - g_h + pg_h$. Since utility is decreasing in g_h, it is optimal for high types to make g_h as small as possible and still have separation, which is when equation (10) holds with equality. Substituting in the definitions of the X variables yields the minimum separating gift to be:[15]

$$g_h^* = p(T + D) \tag{2.11}$$

In order to incentivize high types to send nonzero concessions, the high type IC must not be violated. The payoff from separating must be higher than the payoff from pooling with the low types.

$$pX_{TT}^h + (1-p)X_{FF}^h - g_h + pg_h \geq X_{FF}^h + pg_h \tag{2.12}$$

Combining equations (11) and (12), we have the condition for a concessions separating equilibrium to exist:

$$pX_{TT}^h - pX_{FF}^h - p(X_{FT}^l - X_{FF}^l) \geq 0 \tag{2.13}$$

In terms of original variables, the condition for a concessions separating equilibrium to exist is:

$$\frac{T + D - W}{1 - \delta_h} - (T + D) \geq 0 \tag{2.14}$$

■

The no-concessions separating equilibrium also will exist if equation (8) holds. In the case that both exist, the preferable equilibrium will be the one with a higher payoff. The high types will prefer the concessions separating equilibrium if and only if

$$pX_{TT}^h + (1-p)X_{FF}^h - g_h \geq p(\frac{T}{1-\delta_h}) + (1-p)(-D + \frac{\delta_h(W-D)}{1-\delta_h}) \tag{2.15}$$

This is simplified to preferring the concessions separating equilibrium if and only if

$$(1-p)W - p(T + D) \geq 0. \tag{2.16}$$

[15] While not formally addressed in this paper, inference about sizes of concessions when parties are of unequal force can be made. Note that the constraints determining the requisite size of the separating gift depend on the low types' ability to gather war spoils. Thus, a more powerful country would be more able to plunder, and hence has to make a greater concession to convincingly convey its type as being high.

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Chapter 3

Unrecognized States: A Theory of Self-Determination and Foreign Influence

Abstract

The persistence of unrecognized states as territorial units is both intellectually puzzling and normatively problematic. Unrecognized states have demonstrated the capacity to survive for decades in spite of the high costs of their exclusion from the international system. They are characterized by stagnant or crumbling economies and instability on their borders, often serve as havens for illicit trade, and challenge the territorial sovereignty of recognized states. This paper uses a four player, game theoretic framework to model the stalemates that often arise between the secessionist elite and home state central government and leverages this model to explore paths to settlement. We explain the persistence of unrecognized statehood by modeling how the support of an unrecognized state by a patron can both prevent military reconquest by the home state and cause the secessionist elite to persistently prefer continued stalemate over rejoining the home state through negotiated settlement. We emphasize the pivotal role of the patron in sustaining unrecognized statehood as a stable equilibrium, but we also argue that the international community is capable of inducing peaceful settlement in these conflicts if it is sufficiently motivated to do so. The formal approach in this paper serves both to identify common mechanisms in operation across a diverse set of cases and to provide a coherently structured environment for the analysis of individual cases.

3.1 Introduction

South Ossetia is an archetypical unrecognized state – characteristic of those regions of the world in which non-state actors control territory and govern populations. From 1990 to 1992, Ossetian rebels fought a successful secessionist civil war against the Georgian government that ended with a ceasefire and left the rebels in *de facto* control of much of the region of South Ossetia, which sits along Georgia's northern border with Russia. In the 18 years since the ceasefire was signed, South Ossetia has functioned as an unrecognized state, governing its own affairs but unrecognized by foreign nations.[1] The Georgian government maintains its claim to the territory of South Ossetia, while the South Ossetians continue to seek international recognition of their independence. In 2004, the Georgian government began intermittent efforts to close trade with the separatist region, and in 2008, following escalating provocations from the Ossetian side, Georgia attempted to reclaim the territory by military force. Russian troops acting in support of the Ossetians quickly crushed the would-be reconquest, and the status quo was restored.[2]

Persistent unrecognized statehood is both intellectually puzzling and normatively problematic. Lack of international recognition is a nearly sufficient predictor of state death,[3] and much of the literature on unrecognized states emphasizes expectations of quick demise. Spears (2004) refers to unrecognized states as "fleeting or temporary phenomena"; Kolstø(2006) both acknowledges their "impressive longevity" and notes that they are still "regarded as essentially transient phenomena," and according to Caspersen (2012:), unrecognized states "perceive themselves as temporary phenomena."

That some unrecognized states, particularly small ones, persist for decades requires explaining. But there is also a normative motivation for this project. Unrecognized statehood is a thorn in the side of the state system. Many unrecognized states are havens for smuggling and trafficking illicit goods, they are prone to violent conflict, and their very existence challenges the norm of territorial sovereignty.[4] Like most unrecognized states, South Ossetia pays high costs for non-recognition. Its political survival is tenuous, its licit economy is in shambles after years of isolation and instability, and yet, if the history of similar entities are any guide, its chances of eventual recognition are slim. Stalemate imposes similar, though less severe, costs on home

[1] South Ossetia, along with Abkhazia, was recognized by Russia and Nicaragua in 2008, Venezuela and Nauru in 2009, and Tuvalu in 2011.

[2] Good sources on the history of the conflict include Lynch 2004, Asmus 2010, and a series of reports by the International Crisis Group.

[3] Fazal 2007

[4] e.g., King 2001, Stanislawski 2008

states (e.g. Georgia) as well.

The purpose of this paper is to identify the mechanisms that sustain unrecognized statehood as a stable equilibrium and to evaluate potential paths to settlement. We present a formal model that allows us both to identify these mechanisms and to analyze comparative statics and assess the conditions under which various outcomes – stalemate, war, peaceful settlement – emerge. A strength of our model is that it identifies common mechanisms across a very diverse set of cases.

We model the actions of the home state and the secessionist elite, as well as the patron and the international community. Our analysis suggests both that the role the patron is pivotal in preserving unrecognized statehood and preventing settlement, but also that the international community is capable of intervening to induce settlement when it is sufficiently motivated to do so. We evaluate several different strategies through which the international community can choose to pursue its preferred outcome, and suggest that the enforcement of bargains and the granting of positive inducements for settlement, rather than direct pressure on the unrecognized state via sanctions, represents the most constructive means by which the international community can induce settlement.

We begin the paper by briefly discussing the current literature on unrecognized states, and characterizing unrecognized statehood as a subset of attempted secessions. We then present a formal model of the strategic situation that emerges when secessionists gain territorial control but cannot overthrow the central government militarily. Next, we analyze the conditions under which different outcomes, including unrecognized statehood, emerge as equilibria, and finally, we leverage the model to assess various strategies available to the international community as means to induce peaceful settlements.

3.2 Unrecognized States in the Literature

The political science literature on civil war is focused primarily on war onset,[5] war intensity and duration,[6] and the durability of post-conflict peace.[7] Unrecognized statehood does not fit neatly into these areas of study because, while unrecognized states begin, and often end, through violent conflict, periods of unrecognized statehood generally contain little, if any, fighting. Unrecognized statehood often represents a relatively stable end to civil war, but the cessation

[5] e.g. Fearon and Laitin 2003, Hegre and Sambanis 2006

[6] e.g. Collier and Hoeffler 2004; Cunningham 2006

[7] e.g. Hartzell, Hoddie and Rothchild 2001

of fighting is not coterminous with resolution of the conflict in any meaningful way. We argue that persistent unrecognized statehood is not a successful resolution to secessionist civil war, it is a costly and normatively bad outcome in its own right, and it needs to be analyzed as such.

This argument is also relevant in the literature on state creation. For example, Philip Roeder undertakes a detailed analysis of the path to recognized statehood, but in his analysis unrecognized states represent failures to gain recognized statehood, not outcomes to be analyzed in their own right.[8] The first literature to address unrecognized states directly was grounded in comparative politics, and a robust area-studies literature exists around each of the current cases of unrecognized statehood.[9] More recent literature has addressed wider ranges of cases and made important conceptual progress identifying patterns and commonalities across cases (e.g. Pegg 1998; Kolstø2006; GeldenHuys 2009; Caspersen and Stansfield 2011; Caspersen 2012). However, the literature continues to lack a clear general theory specifying the conditions under which this outcome emerges and persists. One of the major contributions of this article is to provide a unified analytic framework for understanding the mechanisms sustaining unrecognized statehood as a stable equilibrium. By modeling unrecognized statehood formally, we move away from a case-by-case treatment toward development of a rigorous general theory. Analysis of comparative statics within the model also allows us to assess the conditions under which unrecognized statehood persists, and those under which war and negotiated settlement occur. It also allows us to evaluate various strategies available to actors, particularly the international community, who want to achieve a particular resolution.

3.3 Characterizing Unrecognized States

Since WWII, the path to recognized statehood has been narrow, and securing territorial control is not sufficient to gain recognition. The international community has been exceedingly clear that a national right of self-determination applies only to cases of decolonization: it does not extend to cases of secession. In 1970, UN secretary general U Thant said, “The United Nations has never accepted and does not accept and I do not believe will ever accept the principle of secession of a part of its member states."[10] In cases where the home state’s sovereignty is disputed or where the home state government commits mass atrocity crimes, some states may

[8] Roeder 2007

[9] Dov Lynch (2004) and Charles King (2001) provide notable treatments of the Former Soviet cases, and a pair of edited volumes by Bahcheli, Bartmann, and Srebrnik (2004) and Kingston and Spears (2004) each compile broader sets of case studies.

[10] Pegg 1998: 8

choose to grant recognition, but there remains a strong norm of home-state veto.[11] That is, secessionist entities are rarely recognized by foreign states unless they are first recognized by the home state from which they are attempting to secede. This has lead to the existence of an odd group of state-like entities that control territory and govern population but are not recognized as states and cannot participate in the international system. We refer to these entities as unrecognized states, though, variously specified, they are also referred to states-within-states[12] *de facto* states,[13] or almost-states.[14]

We define unrecognized states as a subset of attempted secessions. Within cases of attempted secession, those secessionist movements too weak to secure territorial control never enter the universe of cases in this study. Those strong enough to force recognition militarily (Eritrea, South Sudan)[15], or to capture huge numbers of prisoners of war (Bangladesh)[16] may be able to bargain with the central government for recognition and achieve recognized statehood. Those that are strong enough to secure territorial control, but not strong enough to overthrow the central government, become unrecognized states.[17].

Entities meeting all the conditions of militarily successful secession (secession, recognition sought, and two years of territorial control) are listed in the following table.[18] The list excludes: entities where autonomy, but not internationally recognized statehood, is sought; conflicts where armed groups, such as FARC in Colombia, seek territorial control as a means to profit but do not seek their own state; and rebel movements who seek to replace the central government rather than secede from it.[19]

The contributions of this paper are primarily theoretical, not empirical, but it is useful to introduce the empirical landscape that informs our model. We reference individual cases throughout the paper to illustrate our theory and to justify its assumptions.

The cases listed here represent the most successful secessionist movements since WWII,

[11] We discuss this norm in greater detail in the section on the costs of unrecognized statehood.

[12] Kingston and Spears 2004

[13] Pegg 1998, Lynch 2004

[14] Stanislawski 2008

[15] A referendum on independence was granted to South Sudan as part of an agreement to end the war of secession.

[16] Bangladesh's war of independence was a three-party conflict that included India as well as the home state of Pakistan. The Simla agreement, signed by India and Pakistan in 1972, granted independence to Bangladesh and lead to the release of over 90,000 Pakistani POWs captured during the conflict.

[17] We also omit cases in which the home state granted recognition without dispute, such as the Velvet Divorce in Czechoslovakia

[18] The two-year restriction is consistent with definitions given by Pegg (1998), Kolstø(2006), and Caspersen and Stansfield (2011).

[19] We also exclude cases of decolonization, which we consider a separate phenomenon from secession.

Table 3.1: Current Status of Militarily Successful Secessions

Unrecognized States (Recognized by fewer than 10 UN members)	Partially recognized states (Recognized by more than 10 members, but not the home state)	Rejoined home state following military defeat of secessionists	Rejoined home state in negotiated settlement	Recognized by the home state
• Abkhazia • Nagorno-Karabakh • Somaliland • South Ossetia • Transnistria • Turkish Republic of Northern Cyprus	• Kosovo • Taiwan[3] • Palestine[4] • Southern Sudan[5]	• Biafra • Chechnya • Croatian Republic of Herzeg-Bosnia • East Turkestan Republic • Hyderabad • Katanga • Repbulic of Mahabad • Tamil Eelam • Republika Srpska • Republika Srpska-Krajina • Western Bosnia • Western Sahara[2]	• Anjouan[1] • Bouganville • Gagauzia • Moheli	• Bangladesh • Eritrea

1 Anjouan separated from the Comoros on two occasions: first in 1997 and again in 2007. The first separation ended in negotiated settlement. The latter separation lasted less than a year and ended in military defeat by the secessionists.
2 All but a tiny portion of the territory claimed by the Polisario Front is back under the control of Morocco: nonetheless, the some states still recognize the territory's independence.
3 Taiwan does not officially seek independence and those states that recognized Taiwan recognize it as sovereign over all of China.
4 Palestine is recognized by about 100 states, but has only permanent observer status at the UN, the same status accorded the Vatican.
5 Southern Sudan continues to evolve during the writing of this paper, but full international recognition appears likely in the near future.

yet eventual military defeat by the home state is still the modal form of resolution. Recognition by the home state is similarly rare, occurring in only three cases and never except as a direct result of concessions won on the battlefield. In cases where recognition by the home state is not secured as part of the initial peace agreement, it has not historically been forthcoming. Nonetheless, only four cases of negotiated reunification are observed: secessionists who are strong enough to secure territorial control and maintain it for two years are rarely willing to surrender their independence at the bargaining table, even though the chances of eventual recognition are vanishingly slim. The number of long-running, costly stalemates has been substantial, most of them eventually ending in military reconquest by the home state.

3.4 The Costs of Unrecognized Statehood

Unrecognized statehood is a particularly compelling outcome from attempted secession in part because it is such a bad outcome for the secessionists. Much of the high cost of non-recognition is generated by an international system extremely hostile to non-state territorial units. The modern state system is based on institutions designed to facilitate peaceful and eco-

nomically beneficial relations between like actors, and on the empowerment and legitimation of states through mutual recognition.[20] The norm challenged most directly by unrecognized states is that which, in the post-WWII era, has become most fundamental to it – the norm of territorial sovereignty. Almost all states have reason to fear the emergence of secessionist movements within their own borders, and a state system that places seceding entities at an extreme disadvantage lowers the benefits of secession, and thereby makes secession less likely.[21] The higher the costs of secession, the greater the security of existing states.

The most direct manifestation of this systemic hostility to secession is the norm of states refusing to recognize a seceding entity unless the home state recognizes it first.[22] This norm is not absolute: in some cases, like the People's Republic of China, the sovereignty of the home state government (over Taiwan) has never been recognized by parts of the international community. In other cases, like Kosovo, the commission of mass atrocities by the home state government may supersede its sovereignty. However, the norm is strong and gives recognition by the home state its significance: without recognition by the home state, the post-WWII norm is for other states is to withhold recognition as well.[23] Abkhazia, Ngorno-Karabakh, Tamil Eelam, Transnistria, Somaliland, South Ossetia, and the Turkish Republic of Northern Cyprus have all controlled territory for over a decade without gaining recognition by more than four other states.

This norm of home-state veto locks unrecognized states out of a states-only club whose members enjoy benefits in terms of both security and economic integration. For recognized states, the norm of territorial integrity lowers the cost of territorial defense by increasing the chance that foreign powers will intervene against, or at least sanction, an invader.[24] Recognition also allows entry into multilateral and bilateral trade agreements, dramatically bolsters access to foreign aid, and incorporates territory into international legal frameworks that make it easier to secure foreign investment.[25][26] In their most direct form – loans and foreign aid – these benefits are referred to as "rents to sovereignty."[27]

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[20] Spruyt 1996

[21] Coggins (2011: p. 451) notes that, "The more acute the domestic threat, the more the reticence to recognize."

[22] For a thorough international legal discussion of the issue, see Crawford 2006.

[23] Caspersen (2012) traces the history of collective non-recognition, which begins after WWI and solidifies after WWII. In terms of the model presented below, the payoff from territorial control before WWI was equivalent to the payoff from recognized statehood. Players did not need to participate in the game described in the model. We limit our discussion to the post-WWII era, when the norm of home state veto is fully developed.

[24] See Zacher (2001) on the norm of territorial integrity.

[25] See, for example, Milhalkanian (2004) and Caspersen (2012: pp. 40-45)

[26] Transnistria represents a case where the gains from smuggling, particularly for the elite, may have outweighed these other economic costs in the 1990s (King 2001). However, as Moldova deepens ties with the EU, Transinistria's lack of access to EU markets and EU aid becomes a much larger relative cost to bear (Tudoroiu 2011).

[27] Collier and Hoeffler 2005

Most unrecognized states are low income countries, and the costs of non-recognition grow over time as their economies further decay. Because the resources of unrecognized state governments are primarily focused on security, unrecognized states are generally characterized by a lack of public investment in infrastructure and education. They also face severe brain drain, and a lack of private investment caused by the absence of security and restrictions on trade.

Non-settlement has costs for the home state as well, but they are simply not as high as those facing the unrecognized state. Instability in the border region and the diversion of military resources to monitor the *de facto* border are costly, as is maintenance of economic sanctions against the unrecognized state. In Azerbaijan, where an oil boom sent GDP soaring in the mid-2000s, the unresolved secessionist conflict in Nagorno-Karabakh lead a massive military buildup to take precedence over other government spending.[28] Foreign investors may be more wary of investing in states that do not effectively control their own territory, and there are diplomatic costs as well. For Georgia, failure to resolve its outstanding secessionist conflicts has hindered progress toward NATO accession.

3.5 Characterizing the Patron

Support by a foreign patron is, in almost all cases, necessary for the persistence of unrecognized statehood (Kolstø2006; Caspersen 2012). The only exceptions to this rule have been Somaliland, where the home state is a failed state incapable of attempting reconquest, and Tamil Eelam. In Tamil Eelam, India served as a patron in early stages of the rebellion, but eventually withdrew their support.[29] The Tamil diaspora funded the secessionist military until 2009, when this support proved insufficient and the territory was reconquered by the Sri Lankan government.[30]

The model we present includes a patron who, in equilibrium, contributes economic and/or military resources to the unrecognized state. Patrons choose to contribute resources to secessionists for one or more of several reasons: 1) As an efficient mechanism for imposing costs on the home state (Salehyan, Gleditsch and Cunningham 2012), e.g. as Russia does to Georgia via South Ossetia and Abkhazia; 2) ethnic solidarity with the secessionists (e.g. Turkey's support of the Turkish Republic of Northern Cyprus); 3) hope of eventual annexation of the dis-

[28] Military spending increased 51% in 2004-2005, and went up another 82% in 2006 (International Crisis Group 2007)

[29] Singer 1992

[30] On a smaller scale, the Isaaq diaspora has also fulfilled some of the roles of the patron in Somaliland (Galipo 2011).

puted territory (e.g. Armenia's support of Nagorno-Karabakh). While annexation is appealing to many patrons (and some unrecognized states), annexation is not an outcome we observe in any historical cases post-WWII, and not an outcome we model.[31]

Perpetuation of the status quo (unrecognized statehood) is generally the preferred outcome for patrons focused on imposing costs on the home state. To stylize the relationship: the secessionist group provides (some) legitimacy, the foreign patron provides military and economic capacity. Secessionist groups can claim some level of international legitimacy by asserting a right of self-determination and/or persecution by the home state. By funneling resources to a secessionist group, the foreign patron can impose costs on the home state while gaining the ability to hide or plausibly deny some actions and to claim humanitarian motives for others. For example, Russia has never admitted the full scope of its military involvement in wars of secession in Abkhazia and South Ossetia in the early 1990s, and claims that its 2008 invasion of Georgia was necessary to prevent a Georgian acts of "genocide" against the South Ossetian population.

As long as unrecognized statehood persists, the patron also enjoys a great deal of influence across policy areas in the unrecognized state. In many cases, it is only the military support of the patron that prevents immediate reconquest by the home state, and only economic support from the patron that prevents economic collapse. This total dependence is relieved by resolution in either direction: the patron's influence is maximized when non-recognition persists.

3.6 A Model of Unrecognized Statehood

Our formal theoretical approach places us in a literature that began with Schelling's *Arms and Influence*.[32] Powell has comprehensively defended the use of modeling as an appropriate analytical tool for understanding war,[33] and we draw directly on this conflict modeling literature, particularly in our decision to treat war as a costly lottery.[34] This literature generally treats war as a bargaining failure, caused by commitment problems and asymmetric information, and secession is sometimes also modeled this way.[35]

We argue that unrecognized states are cases of stalemated bargaining in which there are standing offers, but no new ones. The central issue of contention, independence vs. reunifica-

[31] International norms against irredentism are very strong, and the costs of annexing an unrecognized state appear to be very large (e.g. Zacher 2001).

[32] Schelling 1966

[33] Powell 1999

[34] Fearon 1995; Powell 1996a and 1996b, 2006

[35] Fearon 2004

tion, is both difficult to divide and highly valued. Typically, the unrecognized state demands independence; the home state demands unity, and these demands do not vary over time. The side payments offered in exchange for the opponents' surrender of the independence/reunification issue are limited not by the offerer's willingness to pay, but rather by the absence of sufficiently large concessions that can credibly be made.[36]

One of the major innovations of our model is the introduction of international actors in a four-player format. While the role of outside actors in determining the duration and outcome of civil conflicts is well documented,[37] the role of these actors has not been prominent in the formal literature.[38] This is true even of work that addresses the role of outside actors as potential third-party enforcers.[39]

The formal model presented here serves a heuristic purpose in articulating the mechanisms that create these persistent stalemates, but it also allows us to examine some comparative statics and thereby assess the consequences, intended and otherwise, of different players' attempts to foster their desired outcome.[40]

Two players, a home state central government (g) and a secessionist elite (s), both seek control of a disputed territory. Two other players, the patron (p) and the broader international community (c) also have preferences over the outcome. The game consists of a repeated sequence of options that players face under potentially changing payoffs; the focus of each round is the interaction between g and s. We also incorporate actions by the a patron country, p, and the international community, c. We do not model the behavior of the home-state public or the secessionist public, choosing instead to incorporate their preferences into the payoffs of their respective leaders.

While in most cases the institutions in question, both in the central government and the de facto government of the unrecognized states, are relatively autocratic, leaders still rely on some level of public support to remain in power. If the leaders' actions deviate too far from the public's preferred course, they may be removed from office or forced to bear the costs of additional repression of regime opponents. Therefore, both the central government and the secessionist elite have incentives to take the public's opinions into account, and the preferences of the public are thus internalized in the payoffs expressed in the model.

[36] Walter 1997, 2002; Schultz 2010.

[37] e.g., Elbadawi and Sambanis 2000; Regan 2002; Balch-Lindsay, Enterline, and Joyce 2008

[38] One exception is van Houten (1998), who models the patron state ("reference state") as a player in ethnic conflicts but otherwise takes an approach quite different from ours.

[39] Walter 1997, 2002.

[40] For another example of the strategic manipulation of decision-makers into (and out of) conflict see Sjostrom and Baliga (2010).

Table 3.2: Normal Form

$g \downarrow, s \rightarrow$	Fight	Status Quo	Cede
Cede	L_g, W_s	L_g, W_s	Q_g, Q_s
Status Quo	Ω	Q_g, Q_s	W_g, L_s
Fight	Ω	Ω	W_g, L_s

The game begins at the status quo, which is defined as the outcome after the civil war ends; the secessionist elite controls at least some of the disputed territory, but cannot gain international recognition unless the central government cedes its claim to the territory. In each round the secessionist elite and central government may choose to fight, to cede, or to allow the status quo to persist. Every period, players face the normal form game below. Payoffs may change and thus the game is dynamic. The game is played infinitely unless one of the players cedes while the other does not, or outright military victory is achieved through war. Outright military victory is defined as a battlefield outcome enabling the victor to dictate the terms of settlement to the other party without negotiation. In practice, outright military victory by the secessionists would rarely be achieved without capturing the capital city of the home state. If one player cedes, the game enters an absorbing state (i.e. the game ends), with payoffs in every subsequent period given by the corresponding entry in the matrix below. We interpret one player ceding as that player ceding the issue of status (independence vs. reunification) in exchange for some set of (relatively small) payments from the opposing player. For example, if the secessionists cede, the secessionist region is reunified with the home state, and the payoffs of are L_s for the secessionists losing and W_g for the home state winning. Therefore, if one player agrees to cede while the other player chooses status quo or fight, the result is a negotiated settlement benefitting the player who did not cede.

A more formal exposition of the model can be found in the appendix. In particular, we discuss later how payoffs might vary by period; in such case payoffs can be written more formally by indexing them by periods as in Table 3.2.[41]

If, for some reason, both states simultaneously play cede, we assume that they renege immediately and that the status quo is preserved for that round. In this case neither player has demonstrated a willingness to give up more than the other. Therefore, payoffs for both players ceding simultaneously are identical to the status quo payoffs.[42]

[41] For example period n payoffs of both players playing status quo would be denoted Q_{gn}, Q_{sn}.

[42] This assumption is appropriate as precise simultaneity is an artifact of discrete time modeling: it is not a phenomenon we observe in the real world.

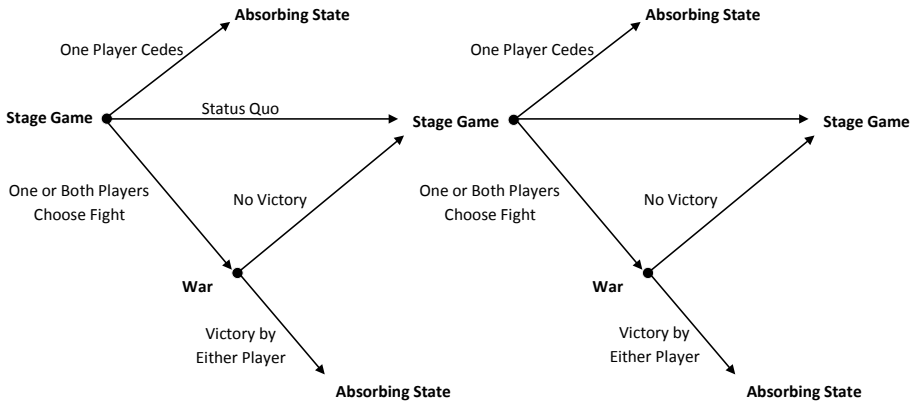

Figure 3.1: Extensive Form Representation

Our model is general enough to incorporate a range of preferences and capabilities for the players, but most cases of persistent unrecognized statehood are characterized by a weak secessionist elite and a relatively stronger central government. Payoffs from the status quo are relatively better for the central government meaning that the secessionists' payoffs for ceding and for war are closer to the status quo payoffs.

An extensive form representation of the game is given in Figure 3.1.

There are three possible ways to end up in war: that either of the parties attacks first, or that both attack simultaneously. Because the unrecognized state already controls territory and the de facto borders are armed, there is likely only a small advantage to be gained by attacking first for either side. Therefore, we argue it is not essential to differentiate between these war scenarios analytically, and we instead denote the payoffs of war, no matter who it is initiated by, as a lottery Ω which reveals the state of the world. This lottery determines one of three potential outcomes: outright victory by either of the players, which are both absorbing states, and an indecisive war where costs of war are borne but then the game returns to the status quo. Payoffs for all outcomes and the probabilities of the lottery are common knowledge. In almost all cases, the military balance of power is stacked against outright victory by the unrecognized state.[43] The lottery and its parameterization are described in the appendix.

[43]Decisive victory would, among other things, allow an unrecognized state to force recognition by the home state government.

3.7 The Patron and the International Community

At the start of each round, the patron, p, and the international community, c, are given the option to take actions affecting the payoffs, namely to invest resources. It is possible for both c and p to alter payoffs for the status quo, ceding, and war. Resources are able to change the payoffs of the home state central government, g, and the secessionist elite, s, in the normal form game at a rate γ. For example, if p wants to make the status quo better for s, p can invest x in economic aid, causing the payoff to s for the status quo to rise to $Q_s + \gamma x$. Alternatively, p might contribute x in military aid to s, increasing s's payoffs from war by γx.

The patron has the opportunity to give resources first, and the international community gives second.[44] Actions at all points in the game are observed by all players and, therefore, are common knowledge. R_{in} represents resources expended by player i in round n. Both c and p are subject to budget constraints B_{in} that require $R_{in} \leq B_{in}$.The patron and the international community have payoff functions reflecting their preferences for reunification or independence, with payoffs from the status quo normalized to 0.[45]

In practice, we also observe that the international community generally has a preference for peace over war. For simplicity, we limit our modeling of this preference to the assumption that the international community will not choose to fund a military buildup that it expects will induce war. This assumption is not necessary for the basic results to hold. However, this justifies our decision later in the paper not to address military support of armed reconquest by the home state as a deliberate strategy by the international community to achieve reunification. The payoffs functions and all parameters are common knowledge.[46]

We acknowledge that treating the international community as a unitary actor is a significant simplification. The unifying preference across members of the international community that justifies this simplification is the preference against the creation of new states via secession. This is the preference that motivates the involvement of the international community in unrecognized states, and that places it in opposition to the patron.

The preference against the creation of new states via secession depends, to substantial degree, on the identity of the home state in question. While the international community strongly opposes secession from states that are, in a general sense, members in good standing of the

[44] Results do not hinge on this assumption and analysis is very similar if the order is reversed.

[45] Precise payoffs U_i are described in the appendix.

[46] The assumption of common knowledge enables precise results from the model. A relaxation of this assumption is addressed formally in a later section.

international community, it is much less protective of the territorial integrity of pariah states, such as those guilty of mass atrocity crimes. When the home state is guilty of mass atrocity crimes, the preferred outcome of the international community may by two states, aligning the interests of the international community and patron.

The game has three outcomes that we will consider, each of which can be characterized by a class of equilibria. The outcome of greatest interest is both players choosing the status quo in perpetuity; we will also examine the two absorbing states, reunification and recognized statehood.[47] Future payoffs are discounted with parameter δ_i. In the baseline formulation of the model, players approach war lotteries as expected values (i.e. they are risk neutral).

Unrecognized statehood is economically and politically isolating. Without compensation from an outside source, the economy of the unrecognized state steadily declines, and the populace grows weary of the tough conditions associated with being unrecognized. To capture this reality, we model the status quo payoffs to the secessionist elite as decaying over time. At the beginning of every round, the status quo payoffs for the secessionist elite decrease by quantity $\mu/2$.

Likewise, the unrecognized state's military also gets weaker with time. This can be modeled by a decrease $\mu/2$ in the expected payoffs from war. In the absence of patron support and funding, the unrecognized state will therefore become very weak militarily and the quality of life for is citizens will decrease. A total flow income of μ in each period is therefore necessary to keep the secessionists' status quo and war payoffs the same in each subsequent period.[48]

Figure 3.2 recaps the timing of each period: first the war and status quo payoffs for s drop if the status quo was maintained in the previous period. Next p then c are given the opportunity in turn to give resources that affect the payoffs of the stage game. Finally, g and s play the stage game and all parties receive payoffs for that round.

3.8 Analysis of the Status Quo Outcome

There is only one decision by each player in each period. For the international community and the patron, this decision is how much to invest. There are two considerations for

[47] Other classes of equilibria are possible, for example it is theoretically possible for the players to agree to a lottery between the absorbing states which would yield a higher expected payoff than the status quo. However, in practice there is a credibility issue: the losing party does not have an incentive to cede if they lose the lottery. Such strategies are, in any case, not analyzed here.

[48] Essential results do not depend on these periodic payoff decreases of military and status quo being equal to each other; they are equal here only for simplicity of presentation.

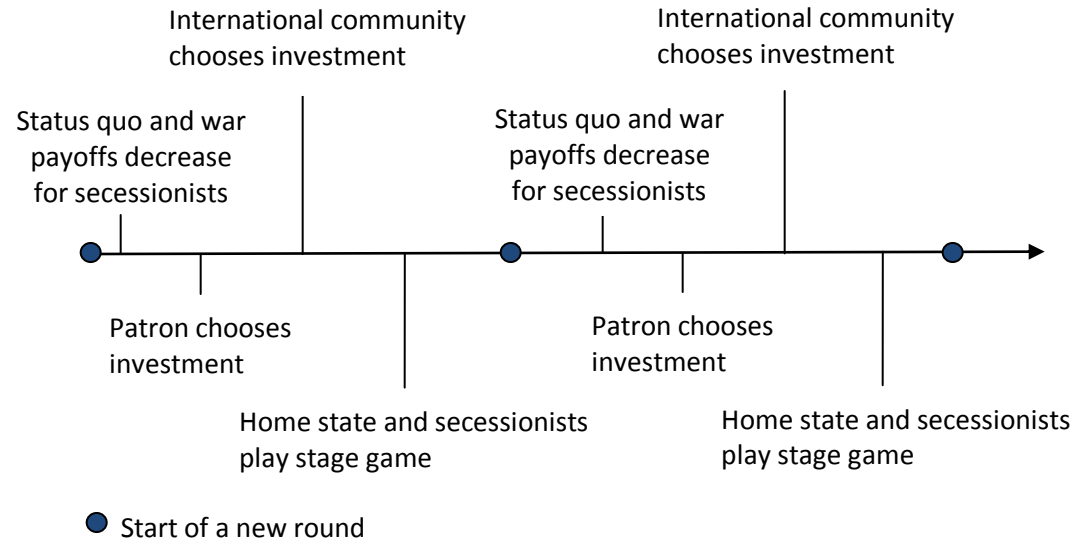

Figure 3.2: Timeline

players in this decision: first, how much does it cost to maintain the status quo and second, how much would it cost to resolve the conflict in the player's preferred way for all time? The players use rational expectations to look forward and determine which available action yields the highest payoff. Persistent unrecognized statehood emerges when both the home state and the secessionists prefer the status quo to going to war or ceding the issue of status.

The relative strengths the patron's and the international community's preferences over the outcome determine their willingness to spend resources. In a typical case of persistent unrecognized statehood, the patron may prefer two independent states to the status quo, but the international community has a strong aversion to creating more states. Likewise the international community may prefer resolution by reunification, but this is a bad outcome for the patron.

In cases of persistent unrecognized statehood, the status quo can serve as a happy medium for all parties and this outcome can be maintained in equilibrium under certain conditions. Sufficient conditions for persistent nonrecognition to be on an equilibrium path are stated here and shown formally in the appendix. [49]

[49]These conditions for the status quo are sufficient but not necessary. For example, if the status quo has a much higher long term payoff than the next best alternative for the secessionists, condition (5) need not be met to maintain the status quo in the short run; it conditions will be necessary in the long run because the secessionist payoffs from the status quo decrease over time. In cases where condition (5) is not met, we can have unrecognized statehood for some time, but it is not an equilibrium outcome.

(1) For both the home state central government and the secessionist elite, remaining in the status quo forever is better than ceding.

(2) For both the home state central government and the secessionist elite, the expected outcome under war is worse than the status quo.

(3) A two-state outcome is more important for the international community to avoid than for the patron to achieve.

(4) A single-state outcome is more important for the patron to avoid than for the international community to achieve.

(5) The patron can afford to pay to maintain the status quo.

(6) The patron can afford to deter the international community from inducing reunification.

If these conditions exist, perpetual status quo is an equilibrium outcome. Ceding generates a lower payoff than the status quo. Fighting for final resolution by way of war gives a potential windfall if victorious, but the war's outcome is uncertain and its expected utility is lower than the status quo. Apart from loss of support from the patron (not a possibility in the model presented here) or changes in parameters, there will not be a change in the status quo.

Both ceding and outright military victory/defeat yield absorbing states, so the players are forward-looking and use rational expectations to determine their best strategies, calculating the discounted value of each strategy over time.[50] Using rational expectations, the discounted stream of payoffs for s when ceding is $\frac{L_s}{(1-\delta_s)}$. The discounted stream of payoffs for s when always playing the status quo is $\frac{Q_s}{(1-\delta_s)}$. [51]

By contributing μ (at the cost of $\gamma\mu$) in each round, the patron supplies sufficient resources to the unrecognized state to ensure two things: first, that that the secessionist elite prefers the status quo to surrendering independence and that they will continue to prefer this even if the international community were to offer significant payments for a concession. Second, that the unrecognized state is sufficiently militarily imposing to deter potential attack from the home state.

The actions in the status quo equilibrium as outlined above are for p to maintain the status quo by paying $\gamma\mu$ each period; for c to pay nothing and for both g and s to play $Status\ Quo$ each period. This equilibrium is explained in greater technical detail in the appendix.

Because the international community and the patron can adjust contributions to reflect

[50] Whether c or p invests first, similar results hold.

[51] These discounted payoff streams are calculated based on the belief that the patron will continue funding s while the international community does nothing, and on the secessionist elite's belief that the home state will not cede.

changing conditions on the ground, exogenous shocks that might otherwise have the potential to alter the equilibrium have their strategic impact nullified. For example, while a drought in the unrecognized state might decrease the secessionist elite's payoffs from the status quo and increasing their need for international trade and assistance, additional humanitarian and economic assistance from the patron offsets the effects of the shock and preserves the status quo. Likewise, if the home state gains military strength, altering the probabilities in the war lottery, the patron can offset these changes by providing arms or otherwise investing in the defenses of the unrecognized state.

If the patron is unwilling (due to preferences) or unable (due to a budget constraint) to pay the equilibrium upkeep to maintain the status quo, the status quo and war payoffs for the secessionists drop each round. At some point, either due to perturbations in payoffs due to the international community investing, or eventually due simply to the decay of the payoffs over time, the status quo no longer becomes the most appealing option for one of the players. At this point, ceding or fighting becomes a more appealing option. It is rare in real life to observe a case where the secessionists have a military advantage, so in most situations, loss of patron support will mean negotiated reunification or military defeat for the secessionists.

Some unrecognized states (only Somaliland among those still in existence today) lack a patron. In these cases, the model still applies, but there is no actor supplementing the secessionist elite's payoffs from stalemate, or limiting the central government's ability to reclaim the territory militarily. These stalemates are less stable, and resolution through war and negotiated reunification are both more likely.

Spending By The Patron and the International Community

It is useful to look more specifically at how the patron and the international community can alter the game's payoffs, and potentially its outcomes. By analyzing comparative statics in the normal form game, we can evaluate the different actions through which these players pursue their desired outcomes and the conditions under which they might be successful.

Let us first consider when the patron supplies the unrecognized state with weapons or other military support, changing the payoffs from war and making outright victory by the secessionists more likely. This would make war more appealing to the secessionist elite and less appealing to the central government, deterring attempts at reconquest. At a certain point, if the central government (and the international community) do not invest in the home state military to counteract this support, due either to their preferences or budget constraint, the expected pay-

off of war for the secessionists can surpass the status quo payoff, and the secessionists would have the incentives to fight (arrows indicate the direction of change in payoffs due to the outside action. A blank cell or "-" indicates no change):

Table 3.3: The Effects of Additional Military Support to the Secessionists

$g\downarrow, s\rightarrow$	Fight	Status Quo	Cede
Cede			
Status Quo	$(\downarrow), (\uparrow)$		
Fight	$(\downarrow), (\uparrow)$	$(\downarrow), (\uparrow)$	

Alternatively, the patron state may supply humanitarian support (such as providing passports to citizens of the unrecognized state or funding schools), making the status quo more appealing and stable:

Table 3.4: The Effects of Humanitarian Assistance to the Secessionists

$g\downarrow, s\rightarrow$	Fight	Status Quo	Cede
Cede			$(-), (\uparrow)$
Status Quo		$(-), (\uparrow)$	
Fight			

Similarly, the international community can contribute resources to make ceding more likely by either party. However, because the international community generally prefers reunification to independence, these resources are most likely to be committed to encouraging ceding by the secessionist elite (reunification), instead of ceding by the home state (recognition).

Changes in payoffs can be made either by carrots or by sticks. In one option the international community provides the secessionist elite with positive inducements, like aid, in exchange for rejoining the home state. The international community may also expend resources to make payments by the home state, such as various autonomy rights, more credible. The effect is the same: for a price, the international community can increase the secessionists' payoffs from ceding.

Table 3.5: Positive Inducements From the International Community

$g\downarrow, s\rightarrow$	Fight	Status Quo	Cede
Cede			
Status Quo			$(-), (\uparrow)$
Fight			$(-), (\uparrow)$

In the other option, the international community joins the home state in enforcing economic sanctions against the unrecognized state, lowering the secessionists' payoffs from the

status quo, and altering the probabilities in the war lottery in favor of the home state. Unfortunately, while the intended effect of sanctions is to reduce the unrecognized state's expected payoffs from the status quo, sanctions also raise the central government's payoffs from war and reduce the secessionists' payoffs from ceding. When the home state collaborates with the international community to enforce sanctions and impose economic suffering on the residents of the secessionist region, this has the unintended consequence of increasing the hostility of the secessionists toward reunification: people rarely wish to be governed by a regime that has demonstrated a willingness to use tools of coercion against them. The stronger the secessionists' preference against reunification, the lower the payoffs from ceding. Therefore, the effect of sanctions on the unrecognized state's strategy is ambiguous. The effect of sanctions on the home state's strategic considerations is clear cut. By weakening the unrecognized state militarily, sanctions increase the home state's expected payoffs from war, making a war initiated by the home state more likely.

Table 3.6: Economic Sanctions by the Home State and the International Community

$g \downarrow, s \rightarrow$	Fight	Status Quo	Cede
Cede			$(-), (\downarrow)$[52]
Status Quo	$(\uparrow), (\downarrow)$	$(-), (\downarrow)$	$(-), (\downarrow)$
Fight	$(\uparrow), (\downarrow)$	$(\uparrow), (\downarrow)$	$(-), (\downarrow)$

Despite this potential for perverse effects, sanctions are a common tool of the international community, more common than aid and other positive inducements. A flow payment of carrots, even backed by the promises of the international community, may not be credible in the eyes of the secessionists, which could explain the frequent resort to sticks.

It is important to note that not every force exerted on the situation will lead to a change in strategy. Only if a knife-edge condition exists or if a large enough investments is made to overcome a buffer will the perturbations of payoffs lead to a change in the actions of the decision makers. Some situations very much favor the status quo because of relatively high status quo payoffs compared to the alternatives. These situations are hard to perturb even if significant pressures are exerted from the outside players. The stability of the game can be amplified by strong preferences of both p and c which lead them to contribute rather than surrender the status quo.

3.9 Outside Interactions Between the Patron and the International Community

The game that we model, with the control of the unrecognized state at stake, is only one of several strategic games in which the patron and the international community may be interacting at any given time, and linkages between games are possible. We do not model any direct exchange of resources or imposition of harm between the international community and the patron, but we take the implications of these possible outside interactions seriously. The willingness and ability of either party to contribute resources within the game we model may be affected by their interaction with one another in other contexts. As we will discuss in greater detail below, in a number of cases a patron has withdrawn support for an unrecognized state in response to pressure exerted by the international community in other venues.

3.10 The Payoffs from Ceding

The payoffs for the party that cedes the issue of status (independence vs. reunification) are low. This reflects a combination of two factors. First, the issue of status is indivisible and highly valued by each side, making its surrender undesirable. Various forms of ethno-nationalism often motivate secession, and the values attached to independence by secessionists (or to reunification by citizens of the home state) are generally large relative to the values placed on economic prosperity and other goals. Second, many of the payments that could be offered are not credible (e.g. Schultz 2010). We consider status indivisible because either the unrecognized state has sovereignty over its territory and is co-equal with the home state, or the secessionist region (and its government) are subordinate to the central government.

The difficulty of making credible payments in exchange for status is one clearly demonstrated in the civil war literature.[53] Unrecognized states generally constitute “sons of the soil" conflicts in which the central government cannot credibly commit to preserving the local demographic and political dominance of the secessionist elite once the disputed territory reverts to central government control.[54] While the central government might initially grant the secessionist elite a high level of autonomy in exchange for agreeing to reunification, the level of autonomy is likely to decrease over time, perhaps quite quickly. Reference to the cases of Abkhazia and Gagauzia are informative here.

[53] e.g. Licklider 1995; Walter 1997, 2002; Fearon and Laitin 2007; Doyle and Sambanis 2006

[54] Weimer 1978; Fearon 2004

At the time of secession, ethnic Akbhaz made up a minority of the population of Abkhazia,[55] but they now control almost all political posts in the *de facto* government of the region. In 2004, the basket of payments offered by the Georgians in exchange for reunification included a provision guaranteeing that ethnic Abkhaz would retain a majority in the regional parliament, even if the return of internally displaced persons (IDPs) once again placed ethnic Abkhaz in a minority demographic position in the region. The promise, however, was not very meaningful. First, even if the promise were upheld, it would still mean a step back from the total dominance the ethnic Abkhaz currently enjoy in the region. Second, if Georgian IDPs returned, they may demand and receive a more equitable system of representation. These concerns are not abstract; this type of reneging has already occurred in cases that did reach settlement.

Gagauzia achieved de facto independence at the time of the Soviet Union's collapse, but agreed to rejoin Moldova in 1994 as an autonomous region. While Gagauzia was granted substantial autonomy under the Moldovan Law on the Special Legal Status of Gagauzia, when the governor of Gagauzia, Dmitrii Croiter, moved to assert these powers in 1999, the Moldovan government balked. By 2002, Croiter was forced to resign, effectively deposed by the Moldovan government. The Moldovan government jailed a number of other Gagauz politicians, and while Gagauz autonomy was enshrined in the Moldovan constitution in 2003, the de facto level of autonomy has been limited by continued by central government meddling in less-than-free regional elections.[56] The payoffs to Gagauzia for ceding have turned out to be quite low, and a similar fate can rationally be expected by other unrecognized states who choose to cede.

The payments that can be offered by the unrecognized state to the central government are similarly small or unenforceable. To return to the Abkhaz example: Under a scenario in which Georgia recognizes Abkhazia as an independent state, the ethnically Georgian region of Gali, currently under Abkhaz control, would likely rejoin Georgia, Russian troops would be (at least temporarily) expelled, and compensation might be paid to displaced Georgians, but other side payments are difficult to picture. Abkhazia might promise Georgia privileged access to Abkhaz ports, or promise to keep Russian troops out of its territory permanently, but once recognition is granted, any such promises could easily be reneged upon.

Furthermore, while relinquishing territorial claims relieves the home state of a persistent source of instability, conceivably supplementing g's payoffs from ceding, it also would increase

[55] Cornell 2001; Wooleh 2006

[56] Roper (2002) argues that secessionists in Transnistria are wary of negotiated reunification precisely because of the creeping re-centralization they have observed in Gagauzia. Protsyk (2010) provides an updated account of the "salami tactics" by which Moldovan authorities have gradually reclaimed powers originally granted to the regional government.

the probability of future attempts at secession by other regions.[57] The lack of enforceable side payments and the ambiguous impact on stability make ceding the issue of status a low-payoff option for g, just as it is for s.

Among the means through which the international community or the patron can spend resources to alter the payoffs to g and s is to enforce bargains and guarantee future concessions by either party, raising the payoffs from ceding. For example, if both the home state and the secessionists prefer reunification with autonomy rights to both war and continued stalemate, the international community can spend resources to enforce an agreement in which the secessionists are promised specific autonomy rights and the international community agrees to ensure that these rights are later retained. Should the home state later attempt to revoke the promised autonomy, the international community can levee sanctions or employ other coercive measures to deter this action. The promises and pitfalls of this approach are discussed in the section on policy implications of the model.

3.11 Introducing Uncertainty

The assumption of perfect information may be somewhat unrealistic, and here we explore adjusting the model to accommodate some uncertainty on the part of the international community and the patron. Payoffs as described in the stage game are those perceived by g and s. If these payoff values are not precisely known by c and p, enough uncertainty may be present in order for both those players to contribute resources in equilibrium.

Mathematically, c and p observe a random draw of the stage game payoffs, with each payoff drawn independently with a mean matching the original stage game payoffs. After viewing these (uncertain) payoffs, c and p each invest some level of resources, altering the payoff structure before it is observed (accurately) by s and g. Based on this altered payoff structure, c and g choose their strategies. Uncertainty can lead to outcomes where either c or p invests too much, wastes resources, or makes a more severe misstep, such as p investing too little and allowing settlement to occur.

We argue that uncertainty is lower for the patron than for the international community because the patron is closer to and more intimately involved in the conflict and therefore has a better grasp of the two players' payoffs. This makes over-contribution by the international community more likely than under-contribution by the patron.

[57] Walter 2006

Full information on all sides implies that one of the parties would, in equilibrium, not give any resources. By adding some uncertainty about payoffs, we can account for the observed fact that the international community sometimes expends resources unsuccessfully. This type of spending can also be explained as non-strategic spending – i.e. spending aimed at goals other than promoting settlement, like pure humanitarianism.

3.12 Partial Recognition

The norm of home state veto gives recognition by the home state its significance: recognition by the home state is the core demand of the secessionists in our model. In cases where the secessionists can gain recognition from large parts of the international community without first gaining recognition by the home state, the status quo is a less costly outcome for the secessionists. This increases the patience of the secessionists. In the model, if the payoffs to the secessionist leaders for the status quo rise, the equilibrium decision by the secessionist elite to play "status quo" becomes more stable. Less support from a patron is needed and deterioration of conditions for the unrecognized state does not immediately disrupt the status quo equilibrium. Because the home state is aware of this payoff change, it may realize that holding out is less likely to be fruitful – reabsorption of the secessionists by the home state is less likely to occur through the secessionists ceding. Additionally, if the international community's preferences shift toward protection of the secessionists following mass atrocity crimes, expected payoffs from a military conflict would decrease for the home state. It is possible that the status quo payoffs are lowered for the home state as well, due to lack of support for its cause in the international community. If these dynamics lead to a sufficiently low home state payoff for both status quo and war, the the home state will cede.

With the official adoption of the Responsibility to Protect doctrine by the United Nations and the precedent of Kosovo, home states are put on notice that the commission of mass atrocity crimes against the residents of seceding entities may lead to recognition of that entity by other countries.[58] However, the norm of home state veto remains strong, and so long as further atrocities are not committed, the Responsibility to Protect doctrine is unlikely to affect recognition of the unrecognized states already in existence.

[58] For a discussion of the sanction theory of recognition, see Berlin (2009).

3.13 How Resolutions Occur: Military Reconquest

Patron support is very nearly a necessary condition for the persistence of unrecognized statehood. When there is no patron, or when the patron withdraws its support, military reconquest by the home state is likely. As illustrated in Table 1, military reconquest is the modal form of resolution for unrecognized states.

In the model, g or s has an incentive to fight rather than stay in the status quo if the expected discounted stream of payoffs is greater by fighting. Specifically, if condition (2) for the status quo equilibrium is not met, then one player will prefer war to both ceding and the status quo. In the case of most prolonged stalemates, strategic spending by the patron averts these outcomes. The patron provides military assistance to the secessionists at such a level that g does not prefer to initiate conflict, and provides sufficient economic and humanitarian assistance to prevent s from preferring war to a continuation of the status quo. However, if there is no patron or if the patron is not sufficiently interested, war may become a more attractive outcome than the status quo for at least one of the parties.

Consistent with the model, the 11 cases of military reconquest in Table 1 occur in cases with no patron or cases in which the patron withdraws or reduces its support. The cases where there is no patron, such as in Chechnya, this is relatively easy to explain. As the home state (Russia) strengthened, there was no patron support to offset the relative decline in the Chechens' military capabilities. Over time the war lottery became progressively more skewed in favor of Russian victory, the payoffs to ceding for the unrecognized state remained extremely low, and the Russian government invaded and reconquered Chechnya.

It is worth exploring, however, the reasons why a patron might support a secessionist group during its initial rebelion and then withdraw support at a later date. Patrons' strategic interests in the unrecognized state vary from patron to patron, and both budget constraints and salience of interest vary over time. For example, domestic political concerns (primarily ethnic solidarity with the secessionists) induced a modest level of Indian support for the Tamil Tigers in Sri Lanka 1983-1987. These domestic political concerns were eventually outweighed by broader strategic security concerns and a desire for regional stability. In 1987 the Indian government signed a peace accord with Sri Lanka (the home state) and largely withdrew their support from the Tamil secessionists, even sending in peacekeepers that later clashed with the secessionists militarily.[59]

[59] Singer 1992

As noted in the section on outside interactions between the patron and international community, the patron's decision to withdraw support for the secessionists is sometimes motivated by interactions between the patron and the international community that we do not model directly. Empirically, we observe a number of cases in which the international community applies pressure directly to encourage the patron to withdraw support from the unrecognized state. In an extreme example involving both sanctions and direct military confrontation, NATO coerced Serbia into, among other things, withdrawing its support from Republika Srpska and Republika Srpska Krajina.[60] In the final section of the paper, we consider direct coercion of the patron among the strategies available to the international community.

3.14 How Resolutions Occur: Negotiated Agreements

In equilibrium, the patron manipulates the payoffs to ensure that neither player prefers ceding to continuation of the status quo. Negotiated agreements are struck when the patron does not contribute sufficiently to prevent the secessionists from preferring ceding to the status quo, and when a deal is available that both sides prefer to war. Since WWII, four peacefully negotiated reunifications have occurred, while in no cases have negotiated agreements been reached in which the central government grants recognition to the unrecognized state.[61]

Secessionists in Ajara, Bouganville, and Gagauzia have opted to rejoin the home state. In all four of the cases of negotiated settlement, the observed outcomes seem to match the model well: the payoffs to the secessionist elite from ceding have been low, and the payoffs to the central government high.

In Ajara, where the level of patron (Russian) support was quite low, the choice facing the secessionist elite was between ceding or facing military defeat. In Bouganville, secessionists lacked not only a patron, but also a clear preference for secession – demands for secession had emerged only late in a struggle that began as an effort to stop a mining operation.[62] Here the value of status to the secessionists was actually quite low, and they were willing to surrender it in exchange for relatively small side payments.

Gagauzia was discussed in some detail earlier. The secessionist elite appeared to expect that the large side payments promised by the home state would be delivered. They were not. This seems to reflect a fundamental misunderstanding of the strategic environment, rather than

[60] For an excellent discussion of the case of Republika Srpska, see Zahar 2004.

[61] We limit our discussion here to entities that had existed in a period of stalemate prior to reaching a settlement – i.e. those that had maintained territorial control for at least two years.

[62] Ghai and Regan 2006

the uncertainty regarding another player's payoffs that we discuss above, but the actual (small) side payments received by the Gagauz elite are consistent with the payoffs we depict.

While the low number of observed cases of negotiated reunification is consistent with our model, the model suggests that a sufficiently motivated patron can induce negotiated settlement if it so chooses. The means through which the international community might induce negotiated settlement are discussed in detail in the section on policy implications. It is notable, however, that we do not expect any future cases of peacefully negotiated independence. While negotiated reunification is the preferred outcome of the international community, and they may be willing spend to achieve it, recognized statehood is generally not the preferred outcome of the patron or the international community. Our analysis suggests that the most likely path to recognized statehood is, and will remain, military defeat of the home state.

3.15 How Resolutions Occur: Recognition via Outright Military Victory

While the path to independent statehood via secession is an extremely narrow one, recognition does sometimes occur. It has occurred primarily in cases where the secessionists (often supported by a patron) are so strong militarily that they not only achieve territorial control in the initial conflict, but also threaten the home state government outside the unrecognized state. Bangladesh, Eritrea, and Southern Sudan all secured recognition or the right to referendum in the initial ceasefire or peace agreement ending the war of secession. Once unrecognized statehood has emerged as an equilibrium, however, the path to recognition is narrower still.

No unrecognized state has yet managed to gain recognition from the home state when recognition or a referendum was not agreed to as a condition of ending the initial war of secession. Wars that have reignited after a period of unrecognized statehood have always either resulted in reunification or left the status quo intact. However, if an unrecognized state were to gain an outright military victory over the home state at any time, this does represent a plausible path to recognition.

3.16 Policy Implications: Options for The International Community

We assume in the model, and believe in practice, that the international community has preferences for reunification over independence, for resolution over the status quo, and for peace instead of war. Analysis of the model suggests that peaceful resolution can be induced by a sufficiently motivated international community. We consider here four means through which the international community might pursue this end: sanctions against the secessionist region, direct incentives provided to the secessionists in exchange for ceding, enforcement of concessions offered by the home state, and direct coercion of the patron.

Recall that when the international community joins the home state in enforcing sanctions against the unrecognized states, it changes the payoffs as follows:

Table 3.7: Stage Game: Effects of Sanctions

$g \downarrow, s \rightarrow$	Fight	Status Quo	Cede
Cede			$(-), (\downarrow)$
Status Quo	$(\uparrow), (\downarrow)$	$(-), (\downarrow)$	$(-), (\downarrow)$
Fight	$(\uparrow), (\downarrow)$	$(\uparrow), (\downarrow)$	$(-), (\downarrow)$

The intended effect of sanctions is to make the status quo less appealing vis-à-vis ceding. However any sanctions that increase the secessionists' hostility toward reunification will also increase the range of conditions under which war will be chosen. Sanctions that reduce the status quo payoff and the payoff from ceding more than they decrease the secessionists' expected payoffs from war increase the range of conditions under which the secessionists will choose war. Compounding this, sanctions that reduce the secessionists' expected payoffs from war will generally increase the central government's payoffs from war, thereby increasing the range of conditions under which the home state will choose war. In either case, the range of conditions under which war will be initiated becomes broader.[63]

There is a better way. If the international community tries to promote settlement by supplementing the payoffs from unification, they are able to induce negotiated settlement without simultaneously increasing the risk of war. This can be done either through promises of benefits to the unrecognized state provided directly by the international community, like aid, or by a

[63] In most cases, the military position of the home state is stronger than that of the secessionists, so a further tip in the balance of military power toward the home state is more likely to induce war than a similar change in favor of the secessionists.

commitment from the international community to serve as a third-party guarantor of side payments promised by the ceding side. In the case of contingent promises of aid, the calculation is relatively straightforward: 1) the promise of aid must be credibly contingent on negotiated settlement, and 2) the aid offered must be valued more highly than the concessions required to reach an agreement. It is the second condition that is most problematic. Because both sides place such a high value on status (independence vs. reunification), even large amounts of aid are likely to be valued less than the concessions necessary to reach an agreement.

Serving as a third-party guarantor of autonomy rights is a way for the international community to potentially overcome problems of indivisibility and commitment and help the parties reach a credible compromise on status[64] However, this strategy is only tenable when the only impediment to settlement is the unenforcability of a bargain, and when the international community is credible as an enforcer of that bargain.

In Southern Sudan, the international community invested substantial resources to help negotiate a settlement and to ensure that the Sudanese government government both allowed the promised a referendum and respected its results. While the international community acted in Southern Sudan to enforce independence, not autonomy, it has shown itself capable of enforcing difficult concessions by the home state government. This bodes well for the future credibility of the international community as a third-party enforcer. However, the role of the international community in enforcing other past agreements might give secessionists pause. For example, a referendum on independence in Western Sahara, which the UN ruled to be necessary more than thirty years ago, has never come to pass.[65] Nonetheless, it is possible for the international community to invest resources to enforce agreements, allowing for negotiated settlements that would otherwise be impossible to reach.

To show that it is possible for the international community to enforce the terms of negotiated agreements at a reasonable cost is not sufficient to imply that such an outcome is likely. The political will necessary to achieve success in Southern Sudan was motivated largely by the magnitude of the atrocities that accompanied the war of secession, and enforcement was made credible, in part, due to the weakness of Sudan relative to the international community. Enforcing the terms of an agreement between Russia and Georgia, for example, would be more difficult.

It is also possible for the international community to affect the payoffs of the patron through interactions in other games outside of our model. Such actions would manifest them-

[64] Walter 2002

[65] For a thorough analysis of the Western Sahara case, see Zunes and Mundy (2010).

selves within the model as reductions in the patron's willingness to pay to sustain the status quo. If the patron is unwilling to pay to sustain the status quo, the war payoffs and status quo payoffs of the secessionists will decline over time, eventually leading to either war or negotiated settlement. Under these conditions, the within-game costs to the international community of inducing negotiated reunification also fall.

In this section we have argued that successful intervention by the international community is possible. The key, however, is motivation: the international community is capable of inducing peaceful settlement when it is willing to invest the resources necessary. However, strong preferences of secessionists against reunification and the opposing intervention of the patron make the costs of such interventions prohibitively high in most cases. Unrecognized statehood is a stable equilibrium because the international community is unwilling to invest sufficient resources to outspend the patron and induce its preferred outcome.

3.17 Conclusions

In this paper we establish unrecognized states as an outcome of interest in international relations and provide a unified framework for analyzing that outcome and its alternatives. While the importance of outside actors in civil conflict has been widely acknowledged in the empirical literature, it is rarely modeled formally. We introduce a unique four-player model that captures the core strategic interactions of the secessionist elite and the home state central government, as well as the interventions of the international community and the patron. This allows us both to examine the means through which the patron sustains unrecognized statehood as a stable equilibrium, and to rigorously analyze the strategies available to the international community to pursue peaceful settlement. It is not always in the interests of the international community to bear the costs of inducing peaceful settlement, but we identify the mechanisms through which this is possible, and the thresholds that must be overcome.

In the model we present, the patron is pivotal in perpetuating stalemate. Home states are larger and wealthier than the unrecognized states attempting to separate from them, and enjoy all the benefits of membership in the international system. In the internal stage game is skewed in favor of the home state (and military reconquest). It is the patron that offsets this home-state advantage. By providing calibrated levels of military aid to the unrecognized state, the patron keeps the likelihood of outright military victory for both sides low enough to prevent war. By providing economic and other aid to the unrecognized state, the patron keeps the secessionist

elite's payoffs from the status quo high enough to prevent a negotiated settlement. The stability of this equilibrium is abetted by the indivisible nature of independence and the difficulty of enforcing autonomy as a condition of reunification. In cases where there is no patron or where the patron eventually becomes unwilling to continue its support, the result has almost always been violent reconquest by the home state.

Our model also suggests, however, that the historical pattern of costly stalemate followed by violent resolution is not the only possible path. We show that the stabilizing effect of the patron can be overcome by a sufficiently motivated international community. While some of the means available to the international community to induce settlement (i.e. sanctions) also increase the risk of war, we show that it is possible for the international community to induce negotiated reunification without running this risk. In particular, we suggest that the international community can provide positive inducements for settlement and serve as a third-party guarantor of negotiated settlements in which unrecognized states rejoin the home state as autonomous regions. It is not the lack of available means that prevents the international community from inducing peaceful settlement, it is the lack of will.

3.18 Technical Appendix

To formally characterize equilibria and to conduct proper comparative statics analysis, we will first be explicit in defining the elements of the game not formally outlined in the main text. There are four players: s, g, p, c. The game starts in period 1 and continues until an absorbing state is reached.

Each player has one action per period. The set of actions in period n for each player $i \in \{s, g\}$ consists of $A_{in} = \{fight, cede, status\ quo\}$ and only one action can be chosen per period. The set of actions in period n for each player $i \in \{p, c\}$ consists of resources expended by player i in round n. This action $R_{in} \in \mathbb{R}^+$. Stage game payoffs are common knowledge for all players $\in \{s, g, p, c\}$ and for players $\in \{s, g\}$ in round n can be reflected as:

Table 3.8: Stage Game Payoffs in Round *n*

$g \downarrow, s \rightarrow$	Fight	Status Quo	Cede
Cede	L_{gn}, W_{sn}	L_{gn}, W_{sn}	Q_{gn}, Q_{sn}
Status Quo	Ω_n	Q_{gn}, Q_{sn}	W_{gn}, L_{sn}
Fight	Ω_n	Ω_n	W_{gn}, L_{sn}

For probabilities p_1 of outright victory, p_2 of loss and $1 - p_1 - p_2$ of non-decisive war,

player $i \in \{p, c\}$ in period n with a fixed cost of war ζ_i[66] faces war lottery $\omega_{in} \equiv (p_1(W_{in} - \zeta_i), p_2(L_{in} - \zeta_i), 1 - p_1 - p_2(Q_{in} - \zeta_i))$. $\Omega_n \equiv (\omega_{gn}, \omega_{sn})$.

In the absence of other actions, $Q_{sn} = Q_{sn+1} + \mu/2$, which captures deterioration of the status quo payments of the secessionists. Likewise $\omega_{sn} = \omega_{s,n+1} + \mu/2$. Other payoffs remain unchanged unless affected by the actions of players p or c, who can take actions to increase a payoff at the rate γ, such that the payoff Q_s becomes $Q_s + \gamma n$.

The set of payoffs for player p in period $n \equiv U_{pn} = \alpha X + \lambda Y - R_p$, denoted in currency units. The set of payoffs for player c in period $n \equiv U_{cn} = \beta X + \nu Y - R_c$, denoted in currency units.

X is a binary variable representing reunification ($X = 0$ in the status quo and $X = 1$ if the secessionists rejoin the home state). Y is a binary variable representing resolution the outcome two independent recognized states (Y=1 if the home state recognizes the secessionists as independent, Y=0 otherwise). These two binary variables allow us to reflect the preferences among the three outcomes (status quo, reunification, recognition by the home state) for both the patron and international community. α, β, λ and ν) parameterize preferences. $\alpha < 0$, $\beta > 0$, $\lambda > 0$ and $\nu < 0$.[67]

Future payoffs are discounted with parameter δ_i, where $1/\delta_i$ is player i's discount rate for $i \in (g, s, c, p)$, $0 \leq \delta_i \leq 1$. Therefore payoffs for the entire game for player $i \in \{s, g, p, c\}$ can be expressed by the discounted stream of payments $\Sigma_{n=1}^{\infty} U_{in} \delta_i^{n-1}$.

Existence and characterization of equilibrium involving status quo

There are various potential equilibria in the game. As discussed in the text, we are interested particularly in the outcome of long-term unrecognized statehood. Therefore, the existence of an equilibrium of unrecognized statehood must be shown. We will use the solution concept of subgame perfect equilibrium.

*L*emma 1: In a status quo equilibrium, p will invest.

Proof: Per the definition of a status quo equilibrium, actions by s and g must be to play *status quo* in every period; p or g may potentially invest so long as incentives for s and g do not stray from the status quo. Therefore, status quo payoffs must be high enough to incentivize s and g's

[66] Baseline costs of war are fixed here but additional costs of war based on war's result are captured in W_i and L_i.

[67] In the perhaps more likely scenario where the patron's most-preferred outcome is the status quo, $\lambda < 0$. This naturally makes a status quo equilibrium easier to achieve. For the purposes of this exposition we will examine the case where $\lambda > 0$.

decisions to play *status quo*. If these incentives exist initially, the only exogenous change in payoffs comes from the continual degradation of payoffs of s in every period, which in the absence of investment will eventually give incentives either to g to play *fight* of for s to play *cede*. Such actions lead to outcomes that are not in the interest of p, so investment may be in $p's$ interest if its preferences and budget constraint are compatible. Therefore, a status quo equilibrium will necessarily have investment by p. ■

*L*emma 2: Failure for a buffer to exist on the status quo payoffs of s in any period can give incentives to immediately enter an absorbing state. [68]

Proof: We define buffer as excess payoff with respect to the next best option for s. Given parameters, preferences, and budget constraint of c, there is a discrete largest one-period rational investment F^* that c would be willing to make to achieve reunification, its desired outcome. Given the relationship between variables given above, $F^* = \frac{\beta}{1-\delta_c}$, which is calculated based on how much c would be willing to invest in one period to enter its preferred absorbing state from a status quo equilibrium.[69] Since p moves first in play, if this buffer does not exist at $n = 1$, p may use the first investment opportunity to create this buffer of size F^* and can do so so long as it will not exceed its budget constraint B_{p1}.[70] Since parameters are common knowledge, if $B_p \geq R_p$, then c is aware that p can afford to avoid reunification. If also a two-state outcome is more important for the international community to avoid than for the patron to achieve, i.e. $\frac{-\nu}{1-\delta_c} \geq \frac{\lambda+\mu}{1-\delta_p}$, and a single-state outcome is more important for the patron to avoid than for the international community to achieve, i.e. $\frac{-\alpha-\mu}{1-\delta_p} \geq \frac{\beta}{1-\delta_c}$, then a status quo is a happy medium. If the buffer at $n = 1$ does not already exceed F^*, and failing an initial investment by p to achieve this level, c is faced with the option of taking an action to invest. Knowing that equilibrium behavior will have p investing in the following round given the preceding conditions, thus knowing that this one period will be the only opportunity to do so, c will have the incentive to invest enough in that period to achieve its desired outcome reunification: the best response of c is to invest

[68] The buffer would have to exist on g's payoffs if the order of investment is reversed. If p and c were allowed to answer each other's investment in continuous time, as might be more realistic, there is no buffer required in the limit as response time goes to 0.

[69] Here we reference the construction of a specific status quo equilibrium, perhaps the most obvious. In this equilibrium, which will be explained fully in the Theorem, we create the buffer for p to make conditions (payoffs) for the status quo for s better. In the first period p creates a sufficient buffer F^* on the payoffs of s that prevents c from spending resources to change payoffs in a way that incentivizes actions other than the status quo (and that would lead to an absorbing state).

[70] If a buffer greater than F^* exists, there is room for payoffs to degrade for the secessionists and still have the status quo remain the preferred outcome without full (or perhaps any) investment by the patron. Since there is no uncertainty, if at n=1 the buffer is larger than F^*, the patron can let payoffs fall to F^* the minimum possible that does not give incentives for the international community to act.

sufficiently to create incentives for s to play *cede*.[71] ■

*L*emma 3: In a status quo equilibrium, investment by c is off of the equilibrium path.

Proof: Because there is no uncertainty, players can pinpoint their equilibrium actions and play efficiently. Because $\alpha < 0$, $\beta > 0$, $\lambda > 0$ and $\nu < 0$, the interests of p and c are in opposition. We can thereby establish whether it is worthwhile to invest to achieve both c and $p's$ second best outcome: a perpetual status quo. Per Lemma 1, p will invest to achieve this second best outcome, the perpetual status quo, rather than allowing reunification. It is also on p's equilibrium path for a status quo equilibrium to create a buffer (lemma 2) if it can overcome a potential spending barrage by c, i.e. if $B_{p(n+1)} \geq \frac{\beta}{1-\delta_c} + \mu$. If a buffer of size smaller than F^* exists under the conditions in Lemma 2, the status quo is not an equilibrium as c's one shot best response is to invest enough to enter into the absorbing state of reunification. A buffer of size F^*, if it exists, will mean the largest one-shot rational investment by the international community is not effective in moving incentives away from the status quo. Without investment by c, a status quo equilibrium is possible if p invests enough to maintain a buffer of size F^*. Since c's myopic best response involves not investing and allowing the status quo, and any investment less than F^* is futile because it can and will be counteracted by p then any strategy by c that involves investment in any period is not a best response in a status quo equilibrium. ■

Theorem: An equilibrium including perpetual unrecognized statehood exists.

Proof:[72] If in some period n for both players $i \in \{s, g\}$, $Q_{in} \geq L_{in}$ both players will not be given incentives to play cede unless the payoffs are altered. Likewise, if for both players $i \in \{s, g\}$ $\frac{Q_{in}}{1-\delta_i} \geq -\zeta_i + \frac{(L_{in}(p_2)+W_{in}(p_1)+Q_{in}(1-p_1-p_2))\delta_i}{1-\delta_i}$ holds in the some period n, both players would prefer to play the status quo rather than the war lottery. Without loss of generality, assume these relationships between variables exist at the start of the game (n=1). Assume that the parameterization and payoff relationship at n is such that s's next best option (after the status quo) to be ceding.[73]

Forward-looking players g and c have their chances to alter the relationship between these variables by investing R_{in} in period n. In order for one player's interest to not dominate the other's, a two-state outcome is more important for the international community to avoid than

[71] Essentially the international community knows the patron made a mistake if the buffer falls below the critical level, so should seek its preferred outcome immediately by investing.

[72] There are many potential status quo equilibria. This outlines one equilibrium and gives conditions for its existence.

[73] If the next best option is instead *fight*, similar analysis and results hold.

for the patron to achieve, i.e. $\frac{-\nu}{1-\delta_c} \geq \frac{\lambda+\mu}{1-\delta_p}$, and a single-state outcome is more important for the patron to avoid than for the international community to achieve, i.e. $\frac{-\alpha-\mu}{1-\delta_p} \geq \frac{\beta}{1-\delta_c}$. Both these parameterizations must hold in any status quo equilibrium.

Both p and c would be potentially willing to invest to achieve their preferred outcome. However their incentives are not aligned and there is common knowledge of all parameters, so in an equilibrium a maximum of one player will invest to achieve the preferred outcome. (Lemma 1). Because c knows p's payoff function, it believes that p will keep paying to keep s's payoff from the status quo above the buffer (Lemma 2). Therefore, c chooses not to invest (Lemma 3).

Our status quo equilibrium requires that p invests in every period enough to maintain F^* by offsetting the $\mu/2$ decline in the secessionists' status quo payoffs. The s's military will also need to be funded to make sure it does not get weak enough that the home state will have a better expected payoff from war than from the status quo, which would trigger war. Therefore when the expected payoffs from war for the home state approach its payoffs from the status quo, the patron must also pay to replace the lost $\mu/2$ of the s's military strength every period. The total per-period equilibrium investment R_{pn}, a flow payment, in the long run is thus $\gamma\mu$ per period in this steady state. In a status quo equilibrium c need not invest at all since stage game payoffs of g do not deteriorate.[74]

A status quo equilibrium constructed here requires that p uses a strategy of investing resources if the buffer shrinks below F^*. Equilibrium strategies for this status quo equilibrium are for s and g to in every period play $status\ quo$ as long as it yields the highest expected payoff, and to play $cede$ or $fight$ if payoffs from either exceeds the status quo payoffs using rational expectations (see conditions above). The strategy for c is to invest in period n only if either (1) investment R_{cn} will affect payoffs in that period so s prefers $cede$ to $status\ quo$ in that period n or (2) if it can reduce payoffs to a point so that when the degradation μ is taken into account, i.e it can invest enough so that $B_{p(n+1)} < \frac{\beta}{1-\delta_c} + \mu$. In other words, if c can invest enough so that its investments incentivize s to play *cede*. In such a case it invests the required amount to achieve this outcome, otherwise it invests nothing. The strategy for p is to "outspend" c to achieve the incentives for its preferred outcome in period n. When this is impossible, p will invest nothing until payoffs for $status\ quo$ for s fall so that the expected payoff of $status\ quo$ is F^* higher

[74] In the absence of the assumption in the model setup above that the international community does not want war, the patron would need to retain a second buffer against international community funding war. The expected value of war for the home state would need to be maintained at a level lower than the status quo payoff by a buffer of $F* = \frac{\beta}{1-\delta_c}$. If this buffer did not exist in the first round of the game, the patron would fund the alteration of payoffs to create the buffer, thus assuring payments by the international community would be ineffective at trying to change the home state's payoffs to make war more attractive than the status quo.

than its payoff for $cede$. In the following periods and all periods after, p invests $\gamma\mu$ per period. Contingencies for p are to counteract any investment by c in the previous period so that the buffer is returned to F^* before c's play each round.

Equilibrium actions are thus for p to maintain the status quo by investing $\gamma\mu$ each period; for c to not invest and for both g and s play $status\ quo$ each period. ■

In summary, the existence of an equilibrium where *status quo* is the repeated stage game action of both parties s and g can be summarized with the following conditions:

(1) For both players g and s, $Q_i \geq L_i$ which states that remaining in the status quo forever is better than ceding.

(2) For both players g and s, $\frac{Q_i}{1-\delta_i} \geq -\zeta_i + \frac{(L_i(p_2)+W_i(p_1)+Q_i(1-p_1-p_2))\delta_i}{1-\delta_i}$ which states that the expected outcome under war is worse than the status quo.

(3) $\frac{-\nu}{1-\delta_c} \geq \frac{\lambda+\mu}{1-\delta_p}$, which states that a two-state outcome is more important for the international community to avoid than for the patron to achieve.

(4) $\frac{-\alpha-\mu}{1-\delta_p} \geq \frac{\beta}{1-\delta_c}$, which states that a single-state outcome is more important for the patron to avoid than for the international community to achieve.

(5) $\forall n, B_{pn} \geq \mu$, which states that the patron can afford to pay to maintain the status quo in every period.

(6) $\forall n, B_{p(n+1)} \geq \frac{\beta}{1-\delta_c} + \mu$, which states that the patron can afford to deter the international community inducing reunification.[75]

There are many other potential equilibria, including, under the right parameters, potentially immediate ceding by either party as well as fighting. But given this above set of six sufficient conditions, at least one status quo equilibrium, as outlined here, will exist.

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[75] Depending on parameters, only condition (6) would tend to be binding while (5) is more likely to be redundant. If there is great variance in budget between periods for the patron, such as a greatly increased budget in period $n+1$ as compared to period n, (5) would be binding

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