How Leaders Assess Intentions Under Uncertainty:

Costly Signaling, Leader Background Experiences, and Nuclear Diplomacy*

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Abstract

How do leaders assess the intentions of their counterparts under uncertainty? This study addresses this question by analyzing the development of nuclear programs. The technology needed to build nuclear weapons and produce nuclear energy is indistinguishable. How, then, can leaders identify a nuclear developer's true intentions? An influential body of literature suggests that costly signals play a key role in shaping states' beliefs about whether a developer of nuclear technology covets energy or bombs. I argue, however, that leader-centric factors could also play a role in how states assess intentions. In particular, the background experiences of leaders – particularly whether they are former rebels – might influence how they are perceived. Leaders with rebel experience are generally seen as aggressive, revisionist, and unreliable, making states more likely to conclude that their intentions are sinister. I test the observable implications of these arguments for military conflict. The findings indicate that former rebels who develop nuclear capacity are significantly more likely than their non-rebel counterparts to be targeted in military disputes, suggesting that countries form impressions about others' intentions based on leader backgrounds. Costly signals, on the other hand, do not seem to influence whether states believe that nuclear-capable states covet bombs or energy. These findings carry implications for the role of costly signaling in world politics and for leader-centric approaches to the study of IR.

Correctly perceiving another country's intentions is critical for security, peace, and conflict (Jervis 1976; Levy 1983; Fearon 1995). Believing that another state's intentions are aggressive when they are, in fact, defensive can lead to costly arms races and war. During the Cold War, for example, the United States and the Soviet Union repeatedly viewed the other's foreign policy behavior as more threatening than it actually was. Underestimating the degree to which a state has revisionist aims can also be dangerous, as underscored by the onset of World War II. Had Britain and France understood Nazi Germany's true intentions in the 1930s, they might have behaved quite differently.

The practical problem, however, is that deciphering another state's intentions is notoriously difficult. A government presumably knows its own true motives, but others cannot observe them directly. Countries must therefore divine the intentions of others based on information that they can readily obtain. How might this be done?

A large literature from the rationalist tradition indicates that countries use costly signals to convey information about their resolve, thereby reducing uncertainty (e.g., Schelling 1960; Fearon 1997; Schultz 1998; Kydd 2005; Fuhrmann & Sechser 2014). Because they sink costs and/or tie-hands, public military threats (e.g., Fearon 1994; Weeks 2008), military mobilizations (e.g., Slantchev 2005), and formal treaty commitments (e.g., Leeds 2003; Morrow 2007) are thought to reveal key information about a state's intentions, particularly its willingness to fight. Costly signals may be important in shaping others' perceptions, but they are by no means the only thing that matters. There is growing recognition, for example, that the attributes and background experiences of individual leaders influence how others perceive their intentions (Horowitz & Stam 2014; Kertzer *et al.* 2015). Who leaders are, therefore, may provide valuable information, in addition to how they behave. We know relatively little, however, about the importance of costly signals vis-á-vis other factors in forming beliefs about others' intentions.[1]

This study analyzes how leaders assess their counterparts' intentions by focusing on one particular context where uncertainty looms large: the development of nuclear programs. The

[1]Existing work in this vein includes Hall & Yarhi-Milo (2012) and Kertzer *et al.* (2015).

technology needed to build nuclear weapons and produce nuclear energy is indistinguishable. Indeed, the peaceful atom and the military atom are "Siamese twins," as Swedish Nobel Prize-winning physicist Hannes Alfvén once put it. Since the same capability can serve two ends, it is difficult for others to assess a nuclear developer's true intentions (see Fuhrmann 2012). Consider the ongoing crisis over Iran's nuclear program. It is indisputable that Iran is developing the *capability* to build nuclear weapons. Whether it actually *intends* to do so, however, is inherently unknowable to anyone outside of Ali Khamenei's inner circle. Foreign leaders, then, must make judgements about Iran's intentions based on things they can observe. In this case, and others like it, perceptions about the nuclear developer's aims carry high stakes; misperceptions can lead to war, as underscored by the 2003 American-led invasion against Iraq.

According to the rationalist school, costly signals play a key role in shaping states' beliefs about whether a developer of nuclear technology covets energy or bombs. In short, a nuclear developer sends signals that others receive and process, allowing them to better understand the signaler's motives. Three costly signals may be particularly informative based on their hand-tying and sunk cost properties: public statements indicating that a leader intends to build nuclear weapons, international nonproliferation commitments, and large investments in nuclear energy. I argue, however, that this is only part of the story. Leader-centric factors could also play a role in how states assess intentions. I focus on one of them: whether the leader developing the capacity to build nuclear weapons is a former rebel. Drawing in part on research from cognitive psychology, I argue that outside observers use a leader's background – particularly whether she has rebel experience – as a heuristic to determine her intentions in a complex international environment. Leaders with rebel experience are generally seen as aggressive, revisionist, and unreliable, making states more likely to conclude that their intentions are sinister.

I test the observable implications of these arguments for military conflict. In particular, I analyze the conditions under which the development of nuclear latency – that is, the capacity

to build nuclear weapons – leads countries to be targeted in disputes.[2] Based on this analysis, countries appear to form impressions about others' intentions based on a leader's background. Former rebels who develop nuclear capacity are significantly more likely than their non-rebel counterparts to be targeted in military disputes. Costly signals, on the other hand, do not seem to influence whether states believe that nuclear-capable states covet bombs or energy. All three of the signals I study are statistically unrelated to the likelihood of nuclear-capable states being targeted in military disputes.

These findings carry two general implications for the study of world politics. First, the notion that costly signaling works is central to theories about crisis bargaining (e.g., Fearon 1994), cooperation (e.g., Kydd 2005), and the efficacy of international institutions (e.g., Koremenos 2001), among other domains. The results of this study suggest, however, that costly signals may not be as effective as many scholars assume. Signals surely matter in foreign policy, but they may be "noisier" than many rationalist theories acknowledge. Prior research has pointed out various ways in which messages can be misperceived, leading to signaling failures (e.g., Jervis 1976; Mercer 1996; Snyder & Borghard 2011; Yarhi-Milo 2014). My findings support this line of thinking and suggest that we need more research that critically evaluates the efficacy of costly signaling in international relations.

Second, international relations research privileges structural factors (e.g., the balance of power) and political institutions (e.g., a country's regime type) while downplaying the importance of individual leaders. To be sure, the vast majority of scholars remain skeptical that leaders matter in a systematic way (this view can be traced back to Waltz (1959)). This study shows, however, that a leader's background influences how others perceive her aims. In at least one way, then, *who* leads a country matters for world politics. More broadly, this

[2]I use the phrases "nuclear latency" and "nuclear-capable" interchangably. Following Fuhrmann & Tkach (2015), I assume that states have nuclear latency if they possess at least one uranium enrichment or plutonium reprocessing plant. These plants are particularly sensitive because they provide states with the capacity to produce fissile material – weapons-grade highly enriched uranium or plutonium – the most critical ingredients for making nuclear bombs.

study suggests the field would benefit from more leader-centric theories and analyses (e.g., Saunders 2011; Horowitz & Stam 2014; Fuhrmann & Horowitz 2015).

This article proceeds as follows. The next section explains in greater detail why assessing nuclear intentions is difficult and develops the arguments about costly signaling and leader backgrounds. I then articulate the observable implications of these arguments for military conflict. In the subsequent section, I describe the dataset and variables used for the analysis. After that, I present the findings from the core empirical analysis and describe a battery of additional tests designed to address potential objections. The final section concludes with a discussion of implications and directions for future research.

Assessing Nuclear Intentions: Costly Signals and Leader Backgrounds

A state developing nuclear technology holds private information about its intentions. Others may observe the development of nuclear plants, but the same technology can serve peaceful or military ends. When one state develops a nuclear program, therefore, others cannot be sure whether its aims are threatening or innocuous. For example, in the early 1990s, press reports indicated that Algeria had developed a nuclear reactor with assistance from China, prompting a debate within the U.S. government over Algeria's intentions. Some in Washington viewed this revealation as evidence that Algeria intended to build nuclear weapons, but the reactor could also have been part of a legitimate program for nuclear research. This made it difficult for the United States to pinpoint the true purpose of the Algerian plant; the government's conclusions in formerly classified documents were generally guarded and tentative. As one State Department assessment stated, "we do not have sufficient information from which to conclude that the GOA [Algerian Government] has decided to pursue a military nuclear program."[3]

Despite holding incomplete information about another country's intentions, leaders may

[3]http://nsarchive.gwu.edu/nukevault/ebb228/Algeria-20.pdf

correctly identify whether that state covets energy or bombs. Yet it is not uncommon for leaders to misread nuclear-related aims. Sometimes they believe that one of their counterparts has a dedicated bomb program when this is not the case. A formerly top secret U.S. National Intelligence Estimate from October 2002 infamously concluded, for example, "We judge that Iraq has continued its weapons of mass destruction (WMD) programs in defiance of UN resolutions and restrictions . . . if left unchecked, it probably will have a nuclear weapon during this decade."[4] Policymakers can err in the other direction too, believing that other states are not pursuing nuclear weapons when in fact they are. For instance, according to declassified documents, at least some U.S. officials misinterpreted India's intentions in the early 1970s. A formerly secret State Department telegram sent in July 1972 with the subject "Indian Nuclear Intentions" stated, "while India already has advanced nuclear infrastructure . . . GOI (Indian Government) currently has no plans to develop nuclear weapons. There is no evidence GOI has decided to stage 'peaceful' test blast."[5] We now know, however, that India's efforts to carry out a nuclear test were underway at the time this telegram was written, and two years later India detonated a nuclear explosion in the Thar Desert.[6]

These examples underscore that it can be difficult to assess another state's nuclear intentions. At the same time, knowing whether another state will obtain nuclear weapons is important – and in some cases critical – for policy purposes. Governments, then, must ultimately form conclusions about others' intentions, but they must do so in the face of considerable uncertainty. In this section, I develop two views on how leaders forumulate assessments about intentions in an anarchic international environment.

[4]This document is available at http://www.motherjones.com/mojo/2015/03/cia-iraq-bush-wmd-report

[5]http://nsarchive.gwu.edu/nukevault/ebb367/docs/7-26-72.pdf

[6]http://nsarchive.gwu.edu/nukevault/ebb367/

Costly Signals: Public Statements, International Commitments, and Sunk-Cost Investments

According to one school of thought, states assess others' intentions by assimilating information from their surrounding environments (e.g., Schelling 1960; Fearon 1994; Kydd 2005). Uncertainty, based on this line of thinking, is a function of ignorance (Rathbun 2007, 541). By sopping-up information and updating their beliefs as appropriate, leaders can reduce uncertainty and make more informed assessments of others' intentions.

Foreign policy signals are particularly effective at conveying information that is not directly observable. These signals allow others to accurately assess their intentions when they "sink costs" or "tie-hands" (Fearon 1997; Kydd 2005). Put differently, signals communicate meaningful information when they impose *ex ante* or *ex post* costs on the signaler. Signals that are costless, by contrast, may be dismissed as cheap talk, particularly since states often have incentives to misrepresent their intentions.

Costly signals may take two general forms: words and deeds. To begin, things that leaders say may influence how others perceive their intentions. For example, many have argued that verbal threats to use military force – when issued in public – can provide information about a leader's willingness to fight (e.g., Fearon 1994; Weeks 2008). Yet all words are not necessarily created equal: the costs that leaders pay (or could pay in the future) by making a public statement influence the degree to which those words convey meaningful information about their intentions. Whereas statements that are costly for a leader to make may be taken seriously by others, words that are costless to utter may be dismissed out of hand.[7]

Yet words can only convey so much information. Actions might be useful, and perhaps necessary, for backing up public statements. Military mobilizations, for example, are widely seen as a signal of resolve during crises (e.g., Fearon 1997; Slantchev 2005). By doing something that is immediately costly, states separate themselves from non-committed types. A less resolved state, presumably, would not pay the same cost. "Burning money," in other

[7]However, some experimental evidence shows that even "cheap talk" can influence how actors assess the resolve of their opponents (Tingley & Walter 2011).

words, can effectively make verbal threats and promises more believable (e.g., Morrow 2000; Leeds 2003). Recent research supports this intuition: coercive threats are more likely to result in a target's compliance when the challenger mobilizes its forces after making a demand (Sechser & Fuhrmann 2013).

When it comes to nuclear intentions specifically, both words and deeds may communicate useful information. First, things that leaders say publicly could provide clues about whether their nuclear programs are geared towards energy or bombs. Leaders in possession of advanced nuclear technology often talk about their intentions. But which statements actually convey sincere information? Bomb-seekers and energy-producers have incentives to say the same thing: that their program is meant for energy production only. Verbal promises to keep a program peaceful, therefore, may not allow others to distinguish bomb-seekers from energy-producers. In other words, statements like "trust me – our intentions are entirely peaceful" are likely to be dismissed as cheap talk, since observers would expect all states to say something along these lines regardless of their true aims. The promise rings hollow because it is essentially costless for leaders to make it.

Public rhetoric is likely to be more meaningful when it carries costs. A promise to build nuclear weapons – in contrast to a pledge to use a nuclear program for energy only – can be quite costly for leaders. When a leader publicly claims that she will obtain nuclear bombs, she invites international scrutiny. Economic sanctions and other punitive measures, including possibly the use of force, could result from statements that signal aggressive intentions. Given these costs, a nuclear-capable state should generally shy away from pro-bomb rhetoric. When a leader deviates from this expectation, its words are likely to be taken seriously. For example, in 1974 the Shah of Iran said that Iran will build nuclear weapons "without any doubt, and sooner than one might think." This statement raised serious concerns internationally about Iran's nuclear intentions.

In general, then, countries should be more likely to perceive hostile intentions when nuclear-capable leaders publicly claim that they are going to build bombs. Yet pro-bomb rhetoric does not necessarily provide definitive proof that a leader harbors bomb-related

desires. Leaders may use aggressive rhetoric to look tough in front of domestic (and international) audiences. Consider Egyptian leader Gamel Abdel Nasser's 1961 statement that "we will secure atomic weapons at any cost" if Israel were to obtain nuclear weapons (quoted in Solingen 2007, 239). These words likely conveyed a sincere desire to obtain a nuclear arsenal, but Nasser may also have been pandering to the Egyptian public and other Arab leaders. Moreover, what a leader says is only one indication of her intentions. Outsiders might look to other factors to get a complete sense of its nuclear aims.

This brings us to the second type of costly signal – deeds. When it comes to nuclear programs, a formal treaty commitment to remain nonnuclear is probably the most salient deed-related signal a state can send. Treaty commitments, in general, may sink costs and tie-hands (Martin 2000; Morrow 2007; Leeds 2003; Fuhrmann & Sechser 2014). The nuclear Nonproliferation Treaty (NPT) does both of these things. It requires most states to refrain from pursuing nuclear weapons, and to accept international inspections designed to detect cheating. Joining the NPT ties-hands by putting a state's reputation on the line. If non-compliance occurs and is detected, states may develop a reputation for being untrustworthy. This could carry material consequences. Research shows, for instance, that governments that violate alliance treaty commitments have a harder time finding alliance partners in the future (Gibler 2008). NPT-related Cheating can occur – as in the case of North Korea – but ratifying the treaty nonetheless generates *ex post* costs for non-compliers. Treaty commitments sink costs by requiring states to expend time and energy in order to negotiate a deal and be in compliance with their pledges. Ratifying the NPT forces states to open up their nuclear plants to inspections. Regardless of whether non-compliance occurs or is detected, it is costly for countries to provide foreigners with nearly unfettered access to their nuclear plants. In addition, the increased transparency provided by inspections makes it more likely that noncompliance will be observed, thereby increasing the probability that non-compliers will pay costs *ex post*.

Because of these costs, how a country treats the NPT may provide others with meaningful information about its intentions. If a state enters the treaty, others are more likely to

infer peaceful intentions. Many observers in Moscow and Washington considered the West German nuclear question settled, for instance, once Bonn ratified the NPT in 1975, but were exceedingly anxious about West Germany's intentions prior to that. On the other hand, failure to ratify the treaty is likely to be equated with having bomb-related desires. Although there is significant debate about this now, at the time, many inferred from Argentina's refusal to ratify the NPT during the Cold War that it had a nuclear weapons program. Why would Argentina stay outside the regime, analysts asked, unless it had something to hide?

There is a second deed-related signal that nuclear developers can send: they can "burn money" by making substantial investments in nuclear energy. States with the capacity to build nuclear weapons should also possess sizeable energy-related infrastructure if their intentions are, in fact, peaceful. Indeed, developing the most sensitive nuclear technology – the same plants needed to produce fissile material for bombs – makes economic sense only if a state has (or intends to develop) a sizeable commerical nuclear power program. The central "peaceful" purpose of these plants is to make fuel for nuclear power plants. But unless a country has a large number of such plants, it is surely more efficient to import fuel from another country with an existing fuel-production program, like France. Countries do not necessarily need a large number of nuclear power plants, however, to make nuclear bombs; the United States, for instance, built nuclear weapons well before its first nuclear power plant came online. By sinking costs in a commercial nuclear power program, therefore, countries may be able to signal that their intentions are peaceful, since a state with more sinister motives may not be willing to pay those costs. The case of Iran provides a useful illustration. Many view Iran's development of sensitive nuclear plants suspiciously because it does not have a large commercial nuclear power program. As two experts concluded in 1998, "In the absence of a large civilian nuclear power program, activities such as plutonium reprocessing and laser enrichment research are hard to justify unless they are for weapons-related purposes" (Koch & Wolf 1997).

The preceding discussion does not exhaust the signals that states use to assess others' intentions. There is surely lots of other information that policymakers would account for,

based on rationalist arguments, when trying to determine whether a nuclear-capable state wants to produce energy or bombs. I have focused above on three signals that should be particularly meaningful based on the logic of costly signaling. The following predictions emerge:

1. Countries are more likely to perceive that a nuclear-capable state covets nuclear weapons if it publicly reveals an interest in obtaining a nuclear arsenal.

2. Countries are more likely to perceive that a nuclear-capable state has peaceful intentions if it makes an international nonproliferation commitment.

3. Countries are less likely to perceive that a nuclear-capable state has peaceful intentions if it has a relatively small nuclear energy production capacity.

Leader Backgrounds: Rebel Experience

Other scholars are less sanguine about the utility of costly signals. When a country sends a foreign policy signal, these scholars argue, it may be misinterpreted by the target or missed altogether. This happens, in part, because information is filtered through pre-existing beliefs about the signaler's type (Jervis 1976, chapter 4). Psychologists have long recognized that people selectively perceive information based on how they view a particular actor or group (e.g., Hastrof & Cantril 1954). This applies in the realm of international relations, too: leaders see what they expect to be present based on their image of the signaler (Jervis 1976, 68). When information is inconsistent with leaders' beliefs about the signaler, it may be dismissed, even when it comes to costly signals. At the same time, decision-makers will latch on to information of questionable reliability – for example, cheap talk – if it supports their beliefs about the signaler (Yarhi-Milo 2014, 4).

One's image of a country, then, influences how it perceives that state's intentions. When a leader believes that someone is aggressive or untrustworthy, they are likely to view her intentions as hostile. Most scholars argue (or assume) that negative beliefs about a peer stem from a history of military conflict (e.g., Levy 1983; Mercer 1996). This is surely one

way in which states determine whether another country is a "friend" or an "adversary." Yet images may also be tied to individual leaders and their experiences (Hall & Yarhi-Milo 2012). Consider, for example, George W. Bush's famous assessment of Russian leader Vladimir Putin in 2001: "I looked the man in the eye. I found him to be very straightforward and trustworthy ... I was able to get a sense of his soul." There was something about Putin specifically – not just his country, Russia – that caused Bush to hold this view. Personal attributes and experiences – such as gender, age, level of education, and political ideology – could contribute to leaders' beliefs about their counterparts. One background experience, in particular, is likely to produce a negative image: a leader's participation in a rebellion against the government.

Rebel movements seek to overthrow the existing government through unconventional means. Joining a rebellion is an inherently risky venture that can result in death, imprisonment, or exile. Not surprisingly, many people have little interest in becomming rebels. Those that do join or lead rebellions tend to display certain traits: they are often aggressive, risk-acceptant, and defiant towards rules. Assuming that policymakers recognize this, knowing that a leader is a former rebel provides information about her type – namely, that she has revisionist tendencies. In practice, governments routinely draw a connection between rebel experience and capricious or otherwise undesirable behavior in office. Consider the CIA's assessment of Fidel Castro in December 1961: "Castro has a constant need to rebel, to find an adversary, and to extend his personal power by overthrowing existing authority."[8]

Once policymakers identify a foreign leader as a "rebel," they expect her to behave like one in office. Leaders therefore calculate that rebels have a higher probability of seeking nuclear weapons and engaging in other risky ventures. This argument has its roots in cognitive psychology. In a classic study, Tversky & Kahneman (1974) argue that decisionmakers rely on heuristics when assessing the likelihood of events under uncertainty. One of these heuristics, which they call the "representativeness heuristic," is particularly relevant here. Whether people believe that *process B* will generate *event A*, they argue, depends on the

[8]https://research.archives.gov/id/7065385

degree to which A resembles B. For example, people are more likely to believe that John Doe is an accountant if he has a strong affinity for number-crunching or resembles the stereotypical accountant in another way. So it is with nuclear proliferation. Leaders generally see "proliferators" as actors who do not play by the rules and have a high tolerence for risk. Because rebels resemble a leader's perception of a prototypical proliferator, they are more likely to assume that rebels covet nuclear bombs when they develop dual-use nuclear technologies.

Scholars often use heuristic-based arguments to explain deviations from rationality. It is important to note, however, that leaders are not necessarily wrong to infer hostile intentions based on rebel experience. Recent research shows that rebels are, in fact, more aggressive than their nonrebel counterparts, on average, when it comes to various foreign policy outcomes (Horowitz & Stam 2014; Fuhrmann & Horowitz 2015). At the same time, beliefs about leaders formed based on their status as a former rebel can sometimes lead policymakers astray. Once leaders see a counterpart as a "rebel" they are likely to downplay or ignore information suggesting that she has peaceful intentions, while seeing information that indicates defiance as confirmation of their pre-existing beliefs.

The preceding argument leads to the following prediction:

1. States are more likely to perceive that nuclear-capable states covet nuclear weapons when the leader is a former rebel.

Observable Implications for Military Conflict

How do we know if the arguments developed above are correct? Each theory makes a prediction about leaders' perceptions – something that is difficult to study systematically because it is unobservable to scholars. This is an issue with which all studies on assessing intentions must grapple. There are three main ways that we could test the above predictions. First, we could analyze declassified documents and other primary sources to see how leaders and other key decision-makers perceived others' intentions (e.g., Yarhi-Milo 2014). A second

approach would be to conduct an experimental analysis to assess how ordinary people determine whether states' aims are aggressive or peaceful (e.g., Kertzer *et al.* 2015). Third, we could test one or more of the behavioral consequences of perceptions about intentions using observational data (e.g., Downes & Sechser 2012). In this approach, one would analyze the ways in which we would expect leaders to behave if they believed that a nuclear-capable state intended (or did not intend) to build nuclear bombs. These behaviors are observable, even if the actual perceptions are not, making it possible to collect and analyze observational data.

Each of these approaches has value, and a comprehensive assessment of the above predictions would include all three kinds of analysis. As a starting point, in this study I take the third approach. I focus, in particular, on the implications of the above arguments for military conflict. One advantage of this approach is that it highlights the real world consequences of leaders' perceptions. Scholars study perceptions in part because we think that what leaders believe influences how they behave; if this is not true, the study of how leaders assess intentions carries fewer real world implications. By studying the use of military force, I am able to assess one key behavioral consequence of states' perceptions about others' nuclear intentions. Of course, this requires me to make some assumptions about the link between a leader's views about whether a nuclear-capable state wants bombs or energy and her propensity to use military force.

To understand how perceptions about another state's nuclear intentions might influence the onset of interstate disputes, we must first consider how nuclear latency could affect conflict. On one hand, prior research shows that having nuclear latency *reduces* the likelihood that countries will be targeted in military disputes, on average (Levite 2002/03; Fuhrmann & Tkach 2015). Having the capability to build nuclear bombs, therefore, may have deterrent effects that we normally associate with nuclear arsenals. Scholarly understanding of *why* we observe this relationship remains incomplete. One possibility, however, is that nuclear-capable countries can deter military conflict by implicitly threatening to build nuclear weapons if their security environment deteriorates (Fuhrmann & Tkach 2015, 11). In

other words, states may be cautious when dealing with latent nuclear powers because they do not want to provide those states with additional incentives to proliferate.

On the other hand, in some cases nuclear latency appears to *increase* the risk of conflict. Throughout the atomic age, countries have used – or considered using – military force to weaken others' capacity to build nuclear weapons (Fuhrmann & Kreps 2010). For example, Israel carried out preventive attacks against nuclear facilities in Iraq (1981) and Syria (2007). Iraq later reciprocated, firing Scud missiles at Israel's main nuclear plant during the Persian Gulf War. On other occasions, countries have threatened to use military force against states that were developing nuclear capabilities: the United States issued threats against Iran, Iraq, and North Korea at various points over the last 25 years; Egypt threatened Israel in the 1960s; and Pakistan threatened to raze nuclear plants in India during the 1980s. As these examples illsutrate, the development of advanced nuclear capabilities can be a source of military conflict.

Whether latency has positive or negative effects on conflict depends, in part, on how states perceive the nuclear developer's intentions. All else being equal, countries should be more likely to initiate disputes against nuclear-capable states that they believe are pursuing nuclear weapons, compared to nuclear-capable states that they perceive to have innocuous intentions. There are two main reasons why this might be the case. First, if states believe that a country intends to build nuclear weapons, they may use or threaten to use military power to curtail the target's nuclear ambitions. Second, and more generally, believing that another state is building bombs could cause leaders to view it more suspiciously overall, potentially triggering disputes that are seemingly unrelated to the nuclear program. In other words, a belief that another state intends to proliferate could produce a "conflict spiral" (see Jervis 1976; Kydd 2005).

By contrast, a major source of conflict is eliminated when states perceive others' nuclear intentions as peaceful. In addition, states do not want to see a program that they believe to be geared towards energy production be converted to bomb-making. They therefore may have incentives to refrain from targeting nuclear-capable states under these circumstances

so they do not give those states a reason to proliferate.

In sum, factors that make countries more likely to believe that another nuclear-capable state intends to build nuclear weapons should also be positively associated with conflict. Conversely, those factors that make countries more likely to view nuclear programs as peaceful should reduce the risk of conflict. This leads to the following hypotheses:

Costly Signaling Hypothesis 1. *Nuclear-capable states that make public pledges to build nuclear weapons are more likely than states that refrain from making these pledges to be targeted in military disputes.*

Costly Signaling Hypothesis 2. *Nuclear-capable states that make international nonproliferation commitments are less likely than states that do not make these commitments to be targeted in military disputes.*

Costly Signaling Hypothesis 3. *Nuclear-capable states that invest heavily in nuclear energy are less likely than states with smaller investments to be targeted in military disputes.*

Leader Background Hypothesis 1. *States are more likely to initiate military disputes against nuclear-capable states led by former rebels than similar countries led by non-rebels.*

Dataset and Variables

I construct a dataset that pairs nuclear-capable states with potential initiators of military disputes from 1945 to 2000. The unit of analysis is the directed-dyad-year, meaning that the dataset distinguishes between challengers and targets and includes yearly observations for each country pair.

The dataset includes all nuclear-capable states as potential targets of conflict, excluding states that do not have the capacity to build nuclear weapons and existing nuclear powers. The arguments developed above assume that a state has advanced nuclear technology in place. Given that this is the case, I am interested in explaining how a state assesses the nuclear developer's intentions. It would therefore be inappropriate to include non-nuclear-capable states in the analysis as targets. Nuclear-capable countries are listed in Table 1. Moreover, it makes little sense to include targets that openly joined the nuclear club by carrying out a public nuclear test. In that case, there is no uncertainty about its intentions.

For example, it makes sense to include France when its intentions may have been perceived unclear, but not after the country carried out its first test in 1960.

The logic advanced in the previous section assumes that nonproliferation is a salient issue for potential attackers. This assumption may not always hold. For instance, while South Korea cares deeply about keeping Japan nonnuclear, it does not have strong preferences about Algeria's nuclear policy. I therefore limit potential attackers to geographic neighbors and major powers. These are the cases in which states are most likely to have a preference for nonproliferation, in part, because the challenger should be able to project power over the target (Kroenig N.D.).

Dependent Variable: Military Disputes

The dependent variable is military conflict, which I code based on the Correlates of War's (COW) Militarized Interstate Dispute (MID) dataset (Maoz 2003). MILITARY CONFLICT is a dichotomous variable that is coded 1 if a challenger initiates a dispute against a target in a given year and 0 otherwise. The MID dataset includes threats, uses, and displays of military force (Ghosn *et al.* 2004). This is important because perceptions of hostile intent should make conflict more likely at all levels, ranging from threats and mobilizations to war. Yet wars are rare – and wars resulting in part from nuclear programs are even rarer. Most MIDs resulting from perceptions of hostile intent are likely to be threats and lower-level displays of force. For example, India's belief that Pakistan coveted nuclear weapons in the 1980s did not cause New Delhi to launch a war, but it did contribute to the 1987 Brasstacks crisis, during which India carried out a massive military exercise that threatened Pakistan (Narang 2014, 260-265).

Some might object to this approach, however, on the grounds that many MIDs seemingly have little to do with perceptions of nuclear intentions or nuclear programs more generally. To address this concern, I supplement my main analysis with an alternate dependent variable that measures cases in which countries used or seriously considered using preventive military force against nuclear facilities. This measure is based on data compiled by Fuhrmann &

Country	First Year of Nuclear Latency
Algeria	1992
Argentina	1968
Australia	1972
Belgium	1966
Brazil	1979
Canada	1944
China	1960
Czechoslovakia	1977
Egypt	1982
France	1949
Germany	1964
India	1964
Iran	1974
Iraq	1983
Israel	1963
Italy	1966
Japan	1968
Libya	1982
Netherlands	1973
North Korea	1975
Norway	1961
Pakistan	1973
Romania	1981
Russia	1941
South Africa	1967
South Korea	1979
Sweden	1954
Taiwan	1976
United Kingdom	1952
United States	1941
Yugoslavia	1955

Table 1. *Countries with Nuclear Latency*

Kreps (2010).

Independent Variables: Costly Signals and Leader Backgrounds

The rationalist school suggests that three costly signals might influence how states perceive the intentions of nuclear-capable countries: public threats to build nuclear weapons, commitment to the NPT, and large investments in nuclear energy. My measurement of the latter two concepts is straightforward. NONPROLIFERATION COMMITMENT is a dichotomous variable indicating whether a state ratified the NPT.[9] NUCLEAR ENERGY INVESTMENT is the amount of electricity produced by a country's nuclear power plants in kilowatt hours.[10]

The first variable – promises to proliferate – requires a bit more explication. My coding of this measure is based on two criteria. First, the words must unambiguously convey an *intent* to get nuclear weapons. "We are going to obtain a nuclear bomb" would count; "it is the right of all sovereign nations to defend themselves with nuclear weapons if they so desire" would not. Second, the statement must be made by a leader or cabinet-level official. Parliamentarians sometimes engage in pro-bomb rhetoric, but these statements do not necessarily represent the views of the most important decision-makers in the government. To identify the relevant set of cases, I consulted media reports and the relevant secondary literature. Based on my search, 13 different countries publicly indicated an intent to build nuclear weapons at a point when their nuclear status was ambiguous. Some of these states – for example, Iraq, Pakistan, and South Korea – made bomb-acquisition promises more once. NUCLEAR PROMISE is a dummy variable that is coded 1 if a state made a pro-bomb statement in the previous five years and 0 if not.[11]

[9]The measure is taken from Fuhrmann (2012).

[10]This variable is based on data from the World Bank, with missing data for some countries (e.g., the Soviet Union) obtained from other sources. A full list of sources used to construct this measure is available from the author upon request.

[11]I expect that these statements would have effects that persist for some time, but that would become meaningless after a while. The five-year cutpoint is admittedly somewhat arbitrary, but it captures this basic idea. The results are consistent when I use other lengths of time to code this

A leader's background experiences – particularly whether she is a former rebel – may also influence how others perceive her intentions. REBEL EXPERIENCE is a dichotomous variable indicating whether a leader in the target state previously participated in a rebellion against the government (Fuhrmann & Horowitz 2015).

Bivariate Comparisons

As a first cut at the data, I conduct simple bivariate comparisons between military conflict and the four main independent variables (Figure 1). The results lend initial support to all of the above hypotheses. Leaders are about twice as likely to be targeted in disputes after they make public statements revealing an intent to build nuclear bombs, consistent with COSTLY SIGNALING HYPOTHESIS 1. International treaty commitments and investments in nuclear energy reduce the risk of conflict by about 40 percent and nearly 30 percent, respectively, as expected by COSTLY SIGNALING HYPOTHESES 2 and 3. Rebel experience also appears to play an important role, based on this preliminary analysis. In support of LEADER BACKGROUND HYPOTHESIS 1, former rebels with the capacity to build nuclear weapons are three times as likely to be targeted in disputes as non-rebels.

Multivariate Analysis

The above results are informative, but they do not account for confounding variables – those factors that might cause conflict and make states more (or less) likely to send costly signals or have former rebels as leaders. In any observational study, it is important to control for these factors to the extent possible, since the independent variables are not randomly assigned. The literature identifies the following controls as potentially important:

- MILITARY SERVICE is a dummy variable indicating whether the leader in the target state served in the military before coming into office. Although I expect participation

variable.

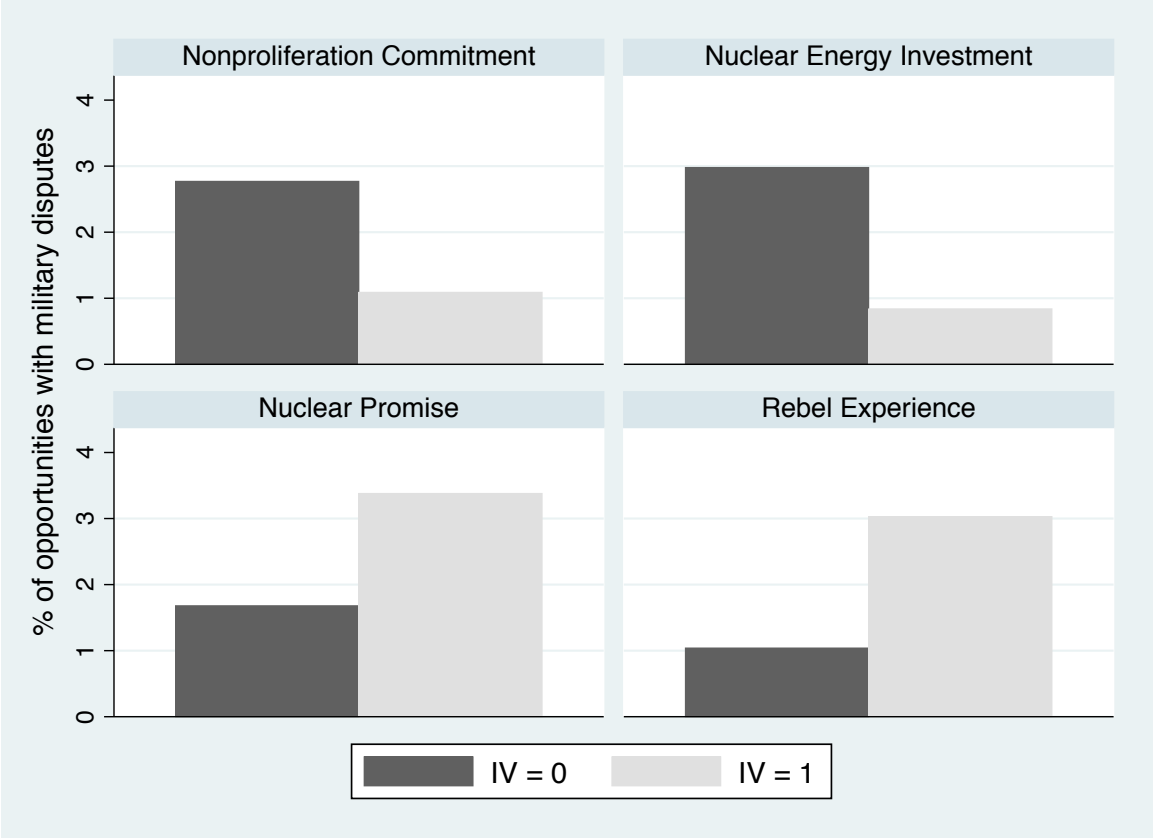

Figure 1. *Bivariate comparisons.*

in rebellions to be a particularly salient background experience in the context of this study, other experiences could matter as well. By including this variable, I can compare the effects of REBEL EXPERIENCE to another experiential factor that the leader-centric literature indicates is important (e.g., Sechser 2004; Horowitz & Stam 2014).

- CHALLENGER CAPABILITIES, TARGET CAPABILITIES, and CHALLENGER CAPABILITIES × TARGET CAPABILITIES. These variables together control for the capabilities of both states in a dyad as well as the relative disparity in power between them based on the COW Compositie Index of National Capabilities (CINC) index (Singer *et al.* 1972).

- DISTANCE measures the geographic distance between the challenger and the target.

- TRADE DEPENDENCE measures the challenger's total trade with the target as a function

of its GDP using data from Gleditsch (2002).

- FOREIGN POLICY SIMILARITY is the degree to which the challenger and target have similar alliance portfolios.

- CHALLENGER DEMOCRACY, TARGET DEMOCRACY, and CHALLENGER DEMOCRACY × TARGET DEMOCRACY control for the possibility that democracies are less likely to initate disputes against other democratic regimes. I code regime type based on data from the Polity IV project.[12]

- PRIOR AGGRESSION is a variable measuring the total number of military disputes the targeted initiated in the previous five years. This variable helps me distinguish challengers' perceptions about the target from actual aggression from that country.

- PREVIOUS DYADIC CONFLICT measures the total number of military disputes in the previous five years between the challenger and the target. This variable serves two purposes. First, it controls for the fact that states are more likely to fight in the present if they experienced disputes in the past. Second, as noted previously, a history of conflict could lead the challenger to form a negative image of the target, potentially increasing the probability that it perceives hostile nuclear-related intentions.

- PEACE YEARS, SPLINE 1, SPLINE 2, and SPLINE 3 control for possible temporal dependence in the data (Beck *et al.* 1998).

Table 2 displays the results from logit regressions that include the main independent variables and all of the above controls. The baseline model (Model 1) shows that NUCLEAR PROMISE, NONPROLIFERATION COMMITMENT, and NUCLEAR ENERGY INVESTMENT fail to achieve conventional levels of statistical significance. Costly signals sent by nuclear-capable states, therefore, do not appear to influence the likelihood that those states will be targeted in military disputes once we account for confounding variables. This suggests that signals

[12]I code states as democracies if they score at least 7 on the 21-point composite indicator of regime type, which ranges from -10 to +10.

do not significantly affect how observers assess nuclear-capable states' intentions. These findings fail to support COSTLY SIGNALING HYPOTHESES 1-3.

However, REBEL EXPERIENCE is positive and statistically significant in Model 1, indicating that nuclear-capable states led by former rebels are more likely to be targeted in disputes than nuclear-capable states headed by non-rebels. Thus, LEADER BACKGROUND HYPOTHESIS 1 continues to find support after we account for other key variables. REBEL EXPERIENCE is substantively important in shaping the probability of conflict initiation. Holding all other factors constant at their median values, shifting REBEL EXPERIENCE from 0 to 1 leads to a 67 percent increase in the probability of military conflict. It is helpful to put this effect in perspective. The effect produced by REBEL EXPERIENCE is 1.5 times greater than the effect produced by a one-unit increase in PREVIOUS DYADIC CONFLICT (from 0 to 1). This is significant given that previous conflict is widely recognized as a strong predictor of present conflict. Yet the effect of democracy on conflict is substantially larger than the effect of leader backgrounds: moving from a dyad with two democracies to one that contains a democratic challenger and a non-democratic target produces an effect on conflict that is about 5.5 times the size of the effect of REBEL EXPERIENCE. So while leader backgrounds seem to play a key role in this process, they are by no means the most important factor when it comes to explaining when countries target nuclear-capable states in military disputes.

Based on these results, a factor that is widely viewed as important in the IR literature (costly signaling) does not seem to matter much in this context, while something that is rarely emphasized in extant research (leader backgrounds) appears to be quite important. It is possible, however, that signaling affects perceptions in ways that are not captured by my preliminary analysis.

First, rationalist theories sometimes indicate that a state's domestic institutions influence the degree to which signals convey meaningful information. In particular, democracies are thought to be better at signaling than non-democracies because of greater transparency and the fact that the public can hold leaders accountable for deviating from a threat or promise (e.g., Fearon 1994). The existing literature suggests, in particular, that the information

Table 2. *Logit analysis of military conflict initiation*

	(1)	(2)	(3)
NUCLEAR PROMISE	0.295	0.484	-0.00244
	(0.269)	(0.508)	(0.303)
NONPROLIFERATION COMMITMENT	-0.0584	-0.175	-0.190
	(0.271)	(0.365)	(0.292)
NUCLEAR ENERGY INVESTMENT	0.00321	0.00554^{+}	0.00299
	(0.00267)	(0.00288)	(0.00297)
REBEL EXPERIENCE	0.544*	0.766**	0.137
	(0.231)	(0.272)	(0.242)
MILITARY SERVICE	-0.140	-0.208	0.0427
	(0.212)	(0.288)	(0.238)
CHALLENGER CAPABILITIES	3.227	1.028	-3.300*
	(1.993)	(4.190)	(1.612)
TARGET CAPABILITIES	-15.27^{+}	-22.55	-8.841
	(9.212)	(15.01)	(5.674)
CHALLENGER CAPABILITIES X TARGET CAPABILITIES	150.8*	251.2^{+}	83.19^{+}
	(64.39)	(129.0)	(43.07)
DISTANCE	-0.234***	-0.246***	-0.0645*
	(0.0305)	(0.0438)	(0.0288)
TRADE DEPENDENCE	3.993	8.182	-3.803
	(11.73)	(8.397)	(31.19)
FOREIGN POLICY SIMILARITY	-0.649^{+}	-0.382	-0.715*
	(0.354)	(0.452)	(0.346)
CHALLENGER DEMOCRACY	0.832*	-1.824***	0.589*
	(0.333)	(0.323)	(0.290)
TARGET DEMOCRACY	1.177**		0.730*
	(0.370)		(0.308)
CHALLENGER DEMOCRACY X TARGET DEMOCRACY	-2.553***		-0.719
	(0.421)		(0.550)
PREVIOUS DYADIC CONFLICT	0.330*	0.467***	0.0637
	(0.134)	(0.133)	(0.0720)
PRIOR AGGRESSION	-0.0141	-0.0526	0.00951
	(0.0148)	(0.0367)	(0.0201)
PEACE YEARS	-0.238***	-0.254**	-0.111^{+}
	(0.0633)	(0.0914)	(0.0641)
SPLINE 1	-0.000742	-0.000959	-0.000378
	(0.000503)	(0.000717)	(0.000560)
SPLINE 2	0.000281	0.000407	0.000152
	(0.000309)	(0.000440)	(0.000369)
SPLINE 3	0.0000152	-0.00000191	0.00000358
	(0.0000584)	(0.0000836)	(0.0000823)
CONSTANT	-1.607*	-0.512	-0.763^{+}
	(0.645)	(0.648)	(0.409)
Observations	9857	6739	855

Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

conveyed via another state's nonproliferation commitment might vary based on the signaler's regime type. Whereas some non-democracies have cheated on their nonproliferation pledges, it is exceedingly rare for a democracy to do so. Yet the findings are similar when I limit the sample to democratic targets only (Model 2). Thus, signals sent by democracies do not seem to influence the behavior of potential challengers in the manner expected by the rationalist school.

Second, it is possible that states perceive others' intentions based on the signals they send, as the rationalist school expects, but only *act* on their beliefs under certain conditions. For example, a potential challenger could believe that a state intends to build nuclear weapons and still refrain from using military force; the degree to which a state is threatened by another country's acquisition of a nuclear arsenal may influence their response. I sought to address this possibility by limiting the analysis to cases in which countries are most likely to have a vested interest in nonproliferation (neighbors and country-pairs with major powers as challengers). To get at this potential problem in another way, I limit the sample to rivals only (Model 3). In all of these cases, states should be particular threatened by nuclear proliferation, and therefore more willing to use (or threaten to use) military force when they perceive hostile intentions. The results show, however, that none of the signaling variables influence the likelihood of conflict initation among rivals. REBEL EXPERIENCE loses its statistical significance in Model 3. Thus, once states are in a rivalry, the background experiences of a leader in the target state are not associated with military conflict. This finding could emerge because states simply drown out factors that are otherwise significant, like whether their counterpart is a former rebel, when assessing their rivals' intentions.

Empirical Extension: Targeting Nuclear Programs

I argued above that uncertainty about a state's nuclear intentions can color its relationships with others. This means that if a state believes that a nuclear developer intends to build nuclear weapons they may experience disputes that seemingly have little to do with the nuclear program – as, for example, in the Brasstacks crisis. It is also possible, though, that

some disputes are in fact totally unrelated to perceptions of nuclear intentions. I therefore use an alternate dependent variable (TARGETING NUCLEAR PROGRAM) that measures serious attempts to curtail a state's nuclear ambitions through the use of military force. This variable includes cases where states seriously considered using force against another's nuclear plants or actually attacked nuclear infrastructure, based on the measure in Fuhrmann & Kreps (2010).[13]

Table 3 displays the results from this analysis. I include the same covariates as in the preceding models. The results are broadly similar to those reported in Table 2. NUCLEAR PROMISE, NONPROLIFERATION COMMITMENT, and NUCLEAR ENERGY INVESTMENT are statistically unrelated to the targeting of nuclear programs. REBEL EXPERIENCE, by contrast, seems to raise the risk of military conflict over nuclear ambitions. This variable does not achieve conventional levels of statistical significance in Model 4 ($p = 0.160$). However, this null finding appears to arise because some of my coding rules caused several important cases to be excluded. Given that the targeting of nuclear programs occurs infrequently (in a total of 40 dyad-years not counting World War II), losing even a single case is potentially problematic. In Model 1, due to various coding rules described below, more than half (21 of 40) of the relevant cases were dropped.

Israel's plans to bomb nuclear plants in Pakistan are not part of the analysis in Model 1 because those two states are too far away to be classified as "politically relevant dyads." When I change the sample to allow for this dyad to be included, REBEL EXPERIENCE is statistically significant in the expected direction (Model 5). The variable remains significant when I code North Korea as having nuclear latency in 1994 (Model 6) and China having latency in 1964 (Model 7).[14] This permits the inclusion of U.S. considered attacks against

[13]I add two additional cases to their measure to account for ambiguity surrounding Israel's nuclear status: Libya's 1981 attempt to take out a nuclear plant in Israel, and Iraq's launching of Scud missiles at Israel's Dimona plant in 1991.

[14]North Korea temporarily ceased operation of its nuclear plants during (and after) the 1994 crisis with the United States. It is reasonable to assume, however, that the country still possessed nuclear latency even though its facilities were not technically operating. Because China acquired nuclear

North Korea and China during years. Finally, my initial coding of latency excluded Iraq after 1991 based on the fact that many of its key nuclear plants were not operating. Assuming that Iraq still had latency after the Gulf War, however, enables me to add cases in which the United States and the United Kingdom targeted Baghdad in 1993 and 1998. REBEL EXPERIENCE continues to be significant when I add these cases (Model 8).

Conclusion

This study used the development of nuclear programs to analyze a central question in international relations: how do leaders assess the intentions of their counterparts under uncertainty? I developed and tested two main arguments. First, drawing on rationalist literature, I argued that costly signals may convey useful information about a nuclear developer's intentions when they tie-hands or sink costs. I suggested that three costly signals are likely to play a key role – public statements indicating bomb-related desires, international nonproliferation commitments, and large investments in nuclear energy. Second, I explored how leader backgrounds – something that is not traditionally emphasized in scholarship – might influence one's beliefs about whether a nuclear developer covets bombs or energy. I argued that rebel experience is one particularly salient aspect of a leader's background that could play a role in this context. Former rebels might be seen as revisionist risk-takers, making others more likely to assume that their intentions are hostile when they develop dual-use nuclear technology.

I tested the observable implications of these theories for military conflict. The findings revealed that costly signals do not "work" to the degree that the existing literature might lead us to believe: none of the signals I identify are statistically associated with the likelihood of a state being targeted in military disputes. However, rebel experience was positively correlated with conflict, suggesting that countries may be more suspicious of former rebels' intentions

weapons in 1964, I had coded it as *not* having latency in that year (and every year thereafter). However, the United States considered using force earlier in 1964, before China's nuclear test.

Table 3. *Logit analysis of targeting nuclear programs.*

	(4)	(5)	(6)	(7)	(8)
NUCLEAR PROMISE	-0.286	0.453	0.598	0.637	0.416
	(0.740)	(0.609)	(0.549)	(0.536)	(0.557)
NONPROLIFERATION COMMITMENT	0.575	-1.677	-1.525	-1.552	-1.423
	(1.084)	(1.034)	(0.978)	(0.973)	(1.068)
NUCLEAR ENERGY INVESTMENT	-0.0809	-0.0458	-0.0561	-0.0497	-0.0551
	(0.0794)	(0.0831)	(0.0879)	(0.0812)	(0.0860)
REBEL EXPERIENCE	1.208	2.047*	2.073*	2.028*	2.047*
	(0.859)	(0.882)	(0.885)	(0.890)	(0.889)
MILITARY SERVICE	0.525	0.694	0.748	0.768	0.615
	(0.831)	(0.692)	(0.686)	(0.680)	(0.641)
CHALLENGER CAPABILITIES	8.819*	9.803*	10.14**	9.934**	10.25***
	(3.514)	(4.072)	(3.720)	(3.702)	(3.044)
TARGET CAPABILITIES	1.489	21.34	22.63	19.56	16.99
	(13.04)	(14.32)	(14.58)	(12.35)	(12.09)
CHALLENGER CAPABILITIES	82.68	-27.07	-39.61	-15.97	-29.09
X TARGET CAPABILITIES	(55.76)	(75.06)	(71.20)	(59.25)	(54.08)
DISTANCE	-0.291***	-0.189^{+}	-0.195^{+}	-0.198^{+}	-0.204^{+}
	(0.0880)	(0.112)	(0.109)	(0.103)	(0.105)
TRADE DEPENDENCE	-2073.4	-3532.2	-3856.7	-3976.1	-3769.1^{+}
	(1542.7)	(2594.7)	(2790.6)	(2423.3)	(2069.6)
FOREIGN POLICY SIMILARITY	-1.545^{+}	-0.314	-0.611	-0.632	-0.997
	(0.850)	(1.152)	(1.036)	(1.034)	(0.993)
CHALLENGER DEMOCRACY	0.336	0.806	0.859	0.867	0.901^{+}
	(0.575)	(0.589)	(0.572)	(0.531)	(0.497)
TARGET DEMOCRACY	-0.493	-0.983	-0.935	-0.931	-0.980
	(0.883)	(0.790)	(0.830)	(0.828)	(0.817)
PREVIOUS DYADIC CONFLICT	0.348	0.201	0.197	0.184	0.209
	(0.257)	(0.261)	(0.258)	(0.221)	(0.225)
PRIOR AGGRESSION	0.0530	0.0697*	0.0582^{+}	0.0594*	0.0532^{+}
	(0.0345)	(0.0339)	(0.0307)	(0.0302)	(0.0319)
PEACE YEARS	-0.974**	-1.019***	-1.049***	-1.032***	-0.867***
	(0.313)	(0.220)	(0.219)	(0.211)	(0.209)
SPLINE 1	-0.00970*	-0.00864**	-0.00910**	-0.00889**	-0.00702*
	(0.00456)	(0.00306)	(0.00310)	(0.00318)	(0.00323)
SPLINE 2	0.00622^{+}	0.00478^{+}	0.00521*	0.00506*	0.00395
	(0.00353)	(0.00244)	(0.00248)	(0.00254)	(0.00252)
SPLINE 3	-0.00129	-0.000567	-0.000745	-0.000714	-0.000553
	(0.00110)	(0.000820)	(0.000827)	(0.000836)	(0.000790)
CONSTANT	-2.494	-4.015*	-3.826*	-3.749*	-3.437*
	(1.700)	(1.735)	(1.659)	(1.671)	(1.639)
Observations	10192	17743	17755	17774	18243

Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

than their non-rebel counterparts.

I close by revisiting some general implications that emerge from this study. Costly signaling plays a key role in theories about military conflict, crisis bargaining, international institutions, alliance politics, and many other areas. Its widely assumed in scholarship that when a country sends a signal it is received and properly interpreted by the target. Yet we still know relatively little about the degree to which costly signals convey information effectively. Signals are undoubtedly relevant for world politics, but this study suggests that they may be less effective than previous research suggests. It would be fruitful to carry out further research designed to understand the conditions under which costly signals work, focusing in particular on the target's ability to receive and process signals.

Based on this study, countries seem to form beliefs about others' intentions based on who the leader is and less so on how she behaves. The has implications for debates in the field about (un)importance of individual leaders. The overwhelming majority of IR research over the last 50 years explains political outcomes by focusing on what Kenneth Waltz (1959) termed second and third image factors. A dominant view in scholarship is that the institutions and structures in which leaders are embedded – not the leaders themselves – influence outcomes ranging from war to trade policy. Scholars are beginning to recognize, however, that individuals leaders matter for international politics in systematic ways. This study provides some additional evidence to substantiate this view.

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