Detecting Audience Costs in International Crises*

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Abstract
We present observational evidence of audience costs. Selection effects in crisis bargaining make it difficult to directly observe audience costs because when state leaders anticipate larger audience costs they attempt to avoid incurring them. We use a structural statistical model to estimate the size of audience costs, both incurred and not incurred, in international crises. We show that while audience costs exist for state leaders of various regime types, democratic leaders face larger audience costs than nondemocratic leaders do. Audience costs can be so large that war might be preferable to concessions especially for leaders of highly democratic states. Audience costs also increase a state’s bargaining leverage in crises because the target state is more likely to acquiesce if the challenge carries larger audience costs. We also find evidence that audience costs generate selection effects. These results establish an empirical foundation for audience cost propositions.

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Measuring the existence and effect of “audience costs” has been a fundamental quest in the study of international relations since Fearon proposed the audience cost (AC) model.\(^1\) This model proves useful because it provides a coherent answer to several fundamental questions in the field. It explains why state leaders can rationally go to war even if war is inefficient, why state leaders go public and provoke dramatic confrontations in communicating resolve, and why coercive threats are rare.\(^2\) In addition, an auxiliary hypothesis—audience costs are higher in democracies than in non-democracies—allows scholars to explain why political institutions affect state leaders’ ability to send signals and make commitments in a wide range of issues beyond military crises.\(^3\)

Despite its importance and influence, the AC model has recently met an array of empirical challenges and skepticism.\(^4\) Reassessing historical and statistical evidence, several authors conclude that audience costs either do not exist or have little effect in international politics.\(^5\) The critics argue that unlike other influential theories with abundant evidence, the AC model rests on thin and indirect evidence.\(^6\)

This article presents the observational evidence of audience costs. We estimate the size of audience costs using data on states’ decisions to initiate, resist, and follow through on challenges in international crises. Our analysis shows that state leaders of both democracies and non-democracies alike face potentially large audience costs. In particular, audience costs can be so large that fighting might be preferable to backing down, especially for leaders of highly democratic states. Confronted with a challenge in a crisis, the

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\(^1\)Fearon 1994a.

\(^2\)Fearon 1995, 1994a; Schultz 2012.

\(^3\)In recent years, the AC model has been applied to explain how central bank independence affects inflation in democracies (Broz 2002), how democracies behave in economic disputes under GATT (Busch 2000), why globalization reduces the risk of war (Gartzke and Li 2003), why democracies tend to cooperate with each other (Leeds 1999), and why economic sanctions imposed by democracies last longer (Dorussen and Mo 2001; see also Martin 1993).

\(^4\)See, for example, the forum on the topic in Security Studies, Vol. 21, No. 3.

\(^5\)Snyder and Borghard 2011; Trachtenberg 2012; Downes and Sechser 2012.

\(^6\)Mercer 2012. In addition to the lack of empirical evidence, the perennial question of why and when a political audience would punish their leaders for getting caught in a bluff has not been adequately answered theoretically (Gowa 1999; Desch 2002). Several studies have proposed formal models to answer this question (Ashworth and Ramsay 2010; Slantchev 2006; Smith 1998).
target state is more likely to acquiesce if the challenger has larger audience costs. These results are consistent with the AC model.

Scholars have considered direct and unbiased observation of audience costs as beyond reach because of selection effects in strategic interactions in international crises. This is because each time leaders make decisions in international crises, they have an incentive to avoid choices that would lead to outcomes with high audience costs. Consequently, state leaders are less likely to incur audience costs as those costs become higher. In particular, when state leaders actually back down from their public challenges, they do so probably because they suffer only marginal audience costs. Thus, as long as we study only observable audience costs that are incurred by state leaders, we would only obtain the ex post measure of those costs that systematically biased smaller than the ex ante measure.

Since the ex ante measure of audience costs requires observing those costs that are both incurred (hence observable) and not incurred (hence unobservable), scholars have developed innovative research designs, ranging from indirect statistical analysis to non-observational studies such as Monte Carlo simulations and to survey experiments. Though innovative and rigorous, these studies fall short of delivering definitive evidence since they work around, rather than account for, selection bias inherent in observational studies of audience costs.

Our research design fully takes into account selection effects. Recall that audience costs are the term Fearon coined to describe the utility a state receives when it backs down in international crises relative to its utility in the status quo. Then, the most obvious way to measure audience costs is to estimate the underlying utility the state would receive in each of these possible crisis outcomes. Although previous statistical tests interpret crisis behavior as “revealed preferences,” our strategy to accomplish this task is

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7Schultz 2001; Tomz 2007; Trachtenberg 2012; Trager and Vavreck 2011.

8Partell and Palmer 1999; Schultz 1999; Gelpi and Griesdorf 2001; Schultz 2001; Tomz 2007; Trager and Vavreck 2011; Levendusky and Horowitz 2012.
to use the “structural” approach, which has proven useful for estimating the parameters of an underlying theoretical model. While structural estimation has a long tradition in economics, the recent EITM approach in political science has developed fully structural models to estimate game-theoretic models of politics using observational data. With the fully structural approach, we can estimate the state preferences (and hence the \textit{ex ante} measure of audience costs) using the data on the choices and outcomes in crises.

The intuition is as follows. Game-theoretic analysis deduces conflict behavior and outcomes from preferences that are given by assumptions. On the other hand, statistical analysis estimates preferences from conflict behavior and outcomes that are given by data. For example, an equilibrium of a discrete choice model describes that if the utility of a public challenge is at least as good as the utility of the status quo for a state, then the state will choose to make a public challenge. In estimating utilities, since we observe the state’s decision to (or not to) make a challenge, we can determine what utilities would make this observed outcome most likely if the equilibrium had generated the data. Because we model utilities as a combination of covariates and coefficients in the statistical analysis, the maximum likelihood estimates give us an empirical measurement of audience costs. Moreover, because the equilibrium in this game model generates strategic selection, our statistical model derived from this equilibrium internalizes selection effects in itself.

This article reports our structural estimation of a canonical crisis bargaining game. Our analysis uses Coercive Diplomacy Database, a new collection of data on coercive bargaining in the interwar period (1919-1939). Our findings provide an empirical foundation for the AC model along four dimensions:

\textit{Existence}. Audience costs are said to exist if the payoff that a state receives when it backs down after making a challenge is less than its payoff in the status quo. Estimating these payoffs, we show that the existence of audience costs, defined as the payoff difference

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10Marschak 1953; Signorino 1999; Lewis and Schultz 2003; Whang 2010.
11Schultz, Lewis and Zucco 2012.
in the “back down” and the “status quo” outcomes, is statistically significant and robust against various empirical specifications of these payoffs. Because the AC model does not presume any specific form in which leaders incur audience costs, we also deliver evidence of a generic form free of any specific source of the costs. We do not anticipate a priori whether this payoff difference holds domestically or internationally.

*Regime Type.* Our evidence for the existence of audience costs is upheld for a wide range of regime types including democracies and non-democracies alike. This result is consistent with the claim that audience costs exist even in non-democracies. We also test, and find evidence for, the widely accepted Fearon conjecture that audience costs are on average higher in democracies than in non-democracies.

*Magnitude.* We find that the magnitude of audience costs is statistically indistinguishable from the value for war. This implies that the political cost of backing down after making a challenge may be enormous because it is at least as large as the cost of war that often entails the loss of human lives and socioeconomic infrastructure. Our finding of large audience costs offers support for a core argument of the rationalist literature—i.e., audience costs are at times so high that going to war can be preferable to backing down.

*Coercive Effect.* The analysis demonstrates that audience costs have non-negligible impacts on crisis behavior. We find that the target state is more likely to capitulate if the challenging state has higher audience costs. This effect is also substantively significant relative to a common indicator of state’s bargaining power—i.e., their value for war. Our finding provides evidence against the recent claims that audience costs have little effect on crisis behavior (Snyder and Borghard 2011; Trachtenberg 2012; Downes and Sechser 2012). Moreover, our analysis provides evidence that selection effects are indeed at work, implying that the critics’ claims that downplay the importance of audience costs result from their research designs that overlook selection bias.

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12 Fearon 1994a; Weeks 2008.
13 Fearon 1994a; see also Morrow 1989; Trager and Vavreck 2011.
In the next section, we first introduce a theoretical model of audience costs, the parameters of which we will estimate using observational data. We also use this theoretical model to define audience costs, determine what exactly needs to be tested, and identify strategic selection effects. Through a review of previous empirical tests, we clarify common inferential problems that we must address in our empirical analysis.

1 A Common Audience Costs Model

There are two classes of crisis models in which scholars assume that audience costs exist. The first is Fearon’s original model based on a war of attrition game, where audience costs increase at possibly differing rates as a crisis escalates. The second is based on a canonical crisis bargaining game, where leaders incur differing levels of audience costs if they back down in the face of the adversary’s resistance.\(^\text{14}\) Note that these classes of models are equivalent in a one-shot situation because the distinction between the rate and the level of audience costs is immaterial unless bargaining takes place over multiple stages. Since nearly all previous tests of audience costs invariably adopt a single-shot crisis game, we also use the crisis game as our underlying theoretical model to facilitate comparison with

\(^{14}\) There is another class of models in which audience costs arise endogenously as a result of voters’ sanctions (e.g., Ashworth and Ramsay 2010, Slantchev 2006, and Smith 1998) or leaders’ choices (e.g., Leventoglu and Tarar 2005). Because empirical studies have yet to incorporate these endogenous models, we follow previous tests and focus on models with exogenous audience costs.

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**Figure 1:** Crisis Game with Audience Costs.

\[\begin{align*}
\text{State 1} & \quad \text{State 2} & \quad \text{State 1} \\
\text{Challenge} & \quad \text{Resist} & \quad \text{Fight} \\
\text{~Challenge} & \quad \text{~Resist} & \quad \text{~Fight} \\
\text{Status Quo} & \quad \text{Concession} & \quad \text{Back Down} \\
& \quad & \quad \\
& u_i(SQ) = 0 & u_i(CD) = 1 & u_i(BD) = -a_i \\
& u_2(SQ) = 1 & u_2(CD) = -a_2 & u_2(BD) = 1 \\
& \quad & & u_i(SF) = w_i \\
& & & u_2(SF) = w_2
\end{align*}\]
previous findings.\textsuperscript{15}

1.1 Model

The game has the structure depicted in Figure 1. Two states, State 1 and State 2, are in a dispute over some international good in the shadow of armed conflict. The value of the good to both is normalized to 1. This good belongs to State 2 in the status quo. In the event that war occurs, State 1’s payoff is given by its expected value for war $w_1 = p - c_1$, where $p \in [0, 1]$ and $c_1 \geq 0$ represent State 1’s probability of victory and expected costs, respectively. Notice that the costly lottery assumption underlies the definition of war payoffs. State 2’s war payoff is given by $w_2 = 1 - p - c_2$. States are incompletely informed about each other’s relative war costs. Nature randomly selects $c_1$ and $c_2$ from independent distributions on intervals $[0, \tilde{c}_1]$ and $[0, \tilde{c}_2]$, respectively. Thus, the $w_i \in [w_i, \bar{w}_i]$ are distributed according to the cumulative distribution function $F_i(x) = Pr(w_i \leq x)$, whose support is $[p - \tilde{c}_1, p]$ for State 1 and $[1 - p - \tilde{c}_2, 1 - p]$ for State 2. Each state observes its own value for war $w_i$, but neither observes the other’s $w_j$, $j \neq i$. The probability distributions are common knowledge, so each state forms pre-crisis beliefs about $w_j$ as well as the posterior belief after observing the choices made by the other state.

A crisis begins with State 1’s decision to challenge State 2 for possession of the good. If challenged, State 2 either concedes or resists. If State 2 concedes, then the good is transferred to State 1 and the game ends. Thus, in this concession outcome State 1 obtains the value for the good, which is 1, and State 2 not only loses the good but also incurs some political cost, receiving the payoff of $-a_2 < 0$. If State 2 resists, on the other hand, State 1 must decide whether to back down or fight. If State 1 fights, war occurs. In the event that State 1 backs down after after State 2 resists, the status quo ante remains so that State 1 receives the payoff of 0 and State 2 keeps the status quo payoff of 1. Additionally, State 1 also pays some additional political costs, or \textit{audience costs}, equal to

\textsuperscript{15}Schultz 1999, 2001; Snyder and Borghard 2011; Tomz 2007; Trager and Vavreck 2011; Weeks 2008.
\( a_1 > 0 \). Hence, State 1 derives utility of \(-a_1 < 0\) from this back-down (BD) outcome.

**Definition (Audience Costs).** *Audience costs are the cost that State 1 incurs if it backs down, relative to its status quo payoff. We say audience costs exist if and only if \( u_1(BD) < u_1(SQ) \).*

To detect the existence of audience costs, therefore, we must uncover this payoff relation in the observational data. Note that this common definition does not restrict the source of audience costs to domestic or international audiences. Audience costs, as they are defined in this common model, are free of any specific mechanism, through which state leaders incur such costs. Although Fearon’s seminal work suggests various plausible sources of audience costs and ways in which those costs may be paid, there is no consensus among authors of theoretical models. The gist of the AC model, which scholars agree upon, is that there is *some* nonzero political costs that State 1 must pay when its bluff is called so that \( u_1(BD) < u_1(SQ) \). We use this minimalist definition.

### 1.2 Equilibrium

We derive the perfect Bayesian equilibrium to this game in the appendix. The full range of information revelation—separating, semi-separating, and pooling—occurs in the equilibrium, depending on the relative magnitude of audience costs for State 1. If State 1 has sufficiently high audience costs (i.e., \( a_1 \geq \bar{a}_1 \)), the signal fully separates State 1 types in terms of their resolve (or lack thereof).\(^{16}\) If, on the other hand, State 1’s audience costs are not very high (i.e., \( a_1 < \bar{a}_1 \)), they allow irresolute types to engage in bluffing behavior and to run the risk of backing down. This results in the semi-separating equilibrium. If the audience costs that State 1 will incur are very low (i.e., \( a_1 < \bar{a}_1 \)), the costs cannot offset the irresolute types’ temptation to gamble so that all types of State 1 will make a threat. This pooling signal conveys no additional information about State 1’s resolve.

\(^{16}\)The appendix characterizes the equilibrium conditions \( \bar{a}_1, \hat{a}_1, \) and \( \tilde{a}_1 \).
level so that no learning occurs for State 2.

1.3 Strategic Selection

At the core of the AC mechanism is strategic selection, as it determines the size and the observability of audience costs. Thus, the equilibrium shows that crisis behavior is shaped by the relative magnitude of audience costs for State 1. Figure 2 illustrates how, as the crisis unfolds in three stages, the equilibrium selects State 1 out of equilibrium escalation according to the size of audience costs.

At the first stage of the game, State 1 will be more imprudent and hence less likely to issue clear military threats if State 1 faces higher audience costs. This is because, as Fearon suggests, the risk of getting “locked” into crisis escalation makes State 1 with high audience costs more cautious about initiating threats. Hence, as Panel (a) shows, the probability that State 1 makes a threat drastically decreases as audience costs become higher than the first threshold \( \tilde{a}_1 \).

At the second stage where State 2 decides whether to resist, State 2’s (conditional)
probability of resistance also monotonically decreases as $a_1$ increases.\textsuperscript{19} In consequence, the probability that the final decision node is reached gets even lower as audience costs increase. Panel (b) describes this second-stage selection effect: the probability that State 1 gets to decide whether to fight or back down decreases as $a_1$ increases.

Once the third stage is reached, State 1 is also increasingly less likely to back down as it faces higher audience costs. Since audience costs can only be observed when State 1 backs down along the equilibrium path, higher audience costs make it extremely less likely that State 1 will incur those costs. In fact, as Panel (c) indicates, audience costs will never arise in equilibrium if they are sufficiently high, i.e., $a_1 \geq \bar{a}_1$; the vast majority of audience costs that arise in equilibrium are likely to be small, i.e., $a_1 < \tilde{a}_1$.

Strategic selection, therefore, occurs at each of the three stages of crisis initiation and escalation. This equilibrium behavior has an implication for empirical investigation:

**Implication** (Selection bias). *The audience costs that are possibly observable are likely to be small, while higher audience costs are unobservable in data on international disputes.*

2 Inference Problems in Detecting Audience Costs

It is difficult to overstate the importance of strategic selection bias in adequately interpreting data and designing empirical tests. To highlight the inferential problems in testing the AC model, we review the previous empirical investigations.

2.1 Process Tracing Case Study

Snyder and Borghard offer one of the first case studies to evaluate the AC model. They find that “domestic audience costs mechanisms rarely play a significant role.”\textsuperscript{20} This would certainly be an important finding if true. However, they misinterpret the findings

\textsuperscript{19}Formally, $\partial(1 - F_d(\beta^*))/\partial a_1 \leq 0$. See the appendix for the formal solution.

\textsuperscript{20}Snyder and Borghard 2011, 437.
from their case studies because they underestimate threats to causal inference posed by
selection bias. For example, the authors note that strategic selection does not cause
inferential bias as long as “leaders . . . fail to carry out their threats in a crisis, and the
consequences of those empty threats can in fact be observed.” But selection bias is not
about whether empty threats and their consequences are observable. The real problem
is whether those observable outcomes represent the true distribution. As Panel (c) in
Figure 2 indicates, while the back-down outcome can indeed occur in equilibrium, the
observable distribution of audience costs is truncated above $\bar{a}_1$ and the vast majority of
states that back down face low audience costs ($a_1 < \tilde{a}_1$). This implies that the leaders
who actually make it to the “back-down” outcome are likely to be those who suffer little
punishment for failing to follow through on their threats. Hence, Snyder and Borghard’s
finding about the lack of “examples of called bluffs leading to domestic punishment of
democratic leaders” is not evidence against the AC model but actually in support of it.\(^{22}\)

Similarly, Panel (a) indicates that the probability that State 1 makes a threat drops
drastically if audience costs are sufficiently high (i.e., $a_1 \geq \tilde{a}_1$). Hence, Snyder and
Borghard’s finding about the rarity of clear committing threats is not evidence against
the AC model, but is evidence that is consistent with it. This misinterpretation is not
uncommon.\(^{23}\) Downes and Sechser also claim that the rarity of clear military threats
is problematic for assessing democratic credibility and, by extension, AC mechanisms.\(^{24}\)
This claim misplaces the nature of selection effects—indeed, this rarity is not only pre-
dicted by audience costs mechanisms but also a reason for scholars to propose the concept
of audience costs in the first place.\(^{25}\)

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\(^{21}\)ibid, p. 441.
\(^{22}\)ibid, p. 445.
\(^{23}\)For example, Trachtenberg 2012.
\(^{24}\)Downes and Sechser 2012.
\(^{25}\)Fearon 1992, 1994a; see also Schultz 2012.
2.2 Indirect Statistical Tests

The partial observability of audience costs has led scholars to look for indirect evidence of the costs through observable implications concerning how political regimes affect states’ behavior in international disputes.\textsuperscript{26} This research design is based on the belief that we cannot directly observe, or estimate, preferences.\textsuperscript{27} Instead these indirect tests interpret crisis behavior as a manifestation of preferences. However, this empirical strategy invokes the problem of “revealed preferences.” Frieden notes that inferring preferences from observation risks confounding preferences with their effect because observed behavior may result “only partially, perhaps misleadingly, from underlying preferences.”\textsuperscript{28} The strategic interdependence of choices in international disputes ensures that the preferences revealed through observed behavior are almost always misleading.

Moreover, since this research design lacks a measure of audience costs, scholars often use a democracy index to approximate audience costs. However, this practice is based on a potentially problematic untested conjecture about the correlation between regime type and audience costs. Audience costs are essentially expected costs that are a function of the severity of punishment and the probability of being punished. While authoritarian leaders are less likely to be punished politically than are democratic leaders, they are often subject to harsher punishments when they leave office, at which point they may face imprisonment or even assassination.\textsuperscript{29} The expected cost of a failed policy for authoritarian leaders can thus be significantly higher than is commonly conjectured. This reasoning suggests that domestic audience costs may not be confined to democratic regimes. Weeks has recently demonstrated that some dictators can also raise these costs in a dispute that generate the kind of impacts on crisis outcomes that the AC model predicts.\textsuperscript{30} Since a large volume of

\textsuperscript{26}Schultz 1999; Partell and Palmer 1999; Gelpi and Griesdorf 2001; Prins 2003; Weeks 2008; Downes and Secher 2012.
\textsuperscript{27}See Bueno de Mesquita 1981; Gartzke 2000.
\textsuperscript{28}Frieden 1999, 59.
\textsuperscript{29}Goemans 2000.
\textsuperscript{30}Weeks 2008.
empirical research adopts this conjecture, it is crucial to find its evidence.

2.3 Experiments

Survey experiments are the state of the art strategy for testing AC mechanisms as they are designed to overcome the issues of selection bias and the partial observability of preferences. Measuring audience costs in terms of approval ratings embedded in opinion surveys, these experiments successfully measure the size of audience costs that are both incurred and not incurred by state leaders.\(^{31}\)

While external validity and exaggerated effects of the stimuli are often questioned, the use of survey experiments in measuring the size of audience costs raises an additional problem.\(^{32}\) The choice of “approval rating” as the form of audience costs may inflate the size of audience costs. For example, consider two ways in which leaders may incur audience costs: electoral removal from office and forceful removal from office. Goemans suggests that the likelihood that leaders get electorally defeated is higher than the likelihood of server punishment such as exile or death.\(^{33}\) Similarly, it is more likely to receive unfavorable approval rates than to lose the election. Indeed, focusing on simulated approval ratings, Trager and Vavreck find that audience costs are larger than the cost of fighting a war. On the other hand, focusing on more severe types of domestic punishment in a case study, Snyder and Borghard find little evidence that audience costs were paid after backing away from a threat.\(^{34}\) Thus, scholars may reach different conclusions on the existence or magnitude of audience costs, depending on the form of audience costs. To enhance external validity of inference, therefore, it is important to measure audience costs of a generic form free of any specific form through which leaders may pay such costs.

\(^{31}\) Tomz 2007; Trager and Vavreck 2011; Levendusky and Horowitz 2012.

\(^{32}\) On the external validity of survey experiments, see Barabas and Jerit 2010. Snyder and Borghard note that survey designs tend to make foreign affairs too salient for respondents to be true in the real world and also make respondents more attentive to foreign issues than they truly are in reality. See Snyder and Borghard 2011, 441.

\(^{33}\) Goemans 2000.

\(^{34}\) Snyder and Borghard (2011).
3 Empirical Strategy

To detect the existence and effects of audience costs, we directly estimate the costs, rather than inferring them ex post from conflict behavior as a manifestation of the underlying audience costs. As noted earlier, audience costs are defined as the difference between the payoffs that a state receives if it backs down after making a challenge and in the status quo, i.e., \( u(BD) < u(SQ) \). Thus, our goal of the empirical analysis is to measure each of these underlying payoffs \textit{ex ante} that states would receive in the crisis game depicted in Figure 1 and test the statistical significance of the difference among them. By doing so, we can detect audience costs regardless of whether those costs are incurred or not along the equilibrium path. Moreover, since our measure of audience costs does not depend on any particular form or source from which audience costs arise, it will be free of this type of bias in inference that the previous experimental studies suffer.

3.1 Structural Estimation Approach

To measure payoffs in the underlying crisis game, we use the “fully structural estimation” approach, a well-established approach to estimate the parameters of theoretical models from data.\(^{35}\) The structural approach differs from the common “reduced-form” approach in that it estimates a theoretical model itself rather than tests comparative static predictions in isolation from the theoretical model. Following the seminal work by Signorino on the use of Quantal Response Equilibrium, the recent Empirical Implications of Theoretical Models (EITM) movement spurred the development of structural estimation of game-theoretic models of politics based on Perfect Bayesian Equilibrium.\(^{36}\)

To measure audience costs, we use the equilibrium model in constructing a statistical model. If theory (i.e., the game-theoretic analysis) deduces behavior and outcomes in crises from assumed state preferences, empirics (i.e., the structural estimation) does

\(^{35}\)Heckman 2000; Nevo and Whinston 2010.
\(^{36}\)Signorino 1999; Lewis and Schultz 2003; Wand 2006; Whang 2010.
exactly the opposite: we infer state preferences from observed crisis behavior and outcomes. More specifically, the perfect Bayesian equilibrium to the crisis game describes, for example, that if State 1’s expected payoff from a challenge, $u_1(CH)$, is greater than or equal to its status quo payoff, $u_1(SQ)$, State 1 is expected to make a challenge ($CH$).

With the structural approach, in turn, we ask “given the observed crisis outcomes in data, what payoffs would make this observation most likely according to the perfect Bayesian equilibrium?” Assuming that each payoff is a linear combination of covariates and their coefficients, we can estimate a set of coefficients for each payoff that maximizes the likelihood of the observed outcomes. The maximum likelihood estimates of preferences (and hence audience costs) as a function of tangible covariates allow us to directly infer how, for example, the democracy level of a state affects the size of its audience costs. Our estimates of audience costs account for selection bias because we derive our estimators directly from the underlying equilibrium model that generates strategic selection.

### 3.2 Statistical Model of Audience Costs

Intuitively, we construct our statistical model of audience costs by embedding a likelihood function of a binary choice at each decision node in the theoretical model (Figure 1). We take the following steps: (1) translate the theoretical model to a statistical model; (2) solve the statistical model for the perfect Bayesian equilibrium; and (3) derive a log-likelihood function as a multinominal logit or probit and obtain the maximum likelihood estimates. We briefly explain each step in turn.

First, to derive a statistical model from the theoretical model, we assume that all the payoffs are a linear function of a systematic component that is common knowledge and a stochastic component that represents private information. The systematic component of a payoff is a function of covariates and coefficients to estimate. For example, State 1’s
payoff for the stand firm (SF) outcome is defined as

\[ u_1(SF) = \bar{u}_1(SF) + \epsilon_{SF_1} \]

\[ = X_{\pi_1(SF)}\beta_{\pi_1(SF)} + \epsilon_{SF_1}, \]

where \( \bar{u}_1(SF), \epsilon_{SF_1}, X_{SF_1}, \) and \( \beta_{SF_1} \) respectively denote the average value of \( u_1(SF) \), the stochastic term of \( u_1(SF) \) (which is drawn from a normal distribution with mean zero), a set of the covariates for \( u_1(SF) \), and a vector of coefficients that we estimate using maximum likelihood. This setup implies that, unlike the theoretical model, all outcomes occur in equilibrium with positive probabilities due to unbounded stochastic shocks included in each utility.\(^{37}\) The redefined payoffs in the statistical model of audience costs are shown in Figure 3.

Second, we derive the equilibrium probabilities of the four outcomes in the statistical model. These probabilities are a product of choice probabilities that State 1 and State 2 make at each decision node. For example, the probability of the SF outcome, \( \Pr(SF) \), is given by the probability State 1 initiates a challenge, \( \Pr(CH) \), the probability that State

\(^{37}\)This inclusion of unbounded shocks to utilities, which Morton (1999) recommends as an effective way to evaluate formal models, is necessary for any random utility model to resolve the zero-likelihood problem in statistical estimation.
2 resists, \(\Pr(RS|CH)\), and the probability State 1 fights \(\Pr(F|CH)\). The probability of
decision is dictated by the perfect Bayesian equilibrium. For example, the probability
that State 1 fights is given by the probability that the \(SF\) payoff is at least as good as the
\(BD\) payoff for State 1, i.e., \(\Pr(F) = \Pr(u_1(SF) \geq u_1(BD))\). In the appendix, we detail
the equilibrium probabilities of the outcomes, \(\Pr(SQ)\), \(\Pr(CD)\), \(\Pr(BD)\), and \(\Pr(SF)\).

Third, we construct the log-likelihood function as a multinominal discrete choice model
by summing up the equilibrium log-likelihoods of four outcomes:

\[
\ln L = \sum_{i=1}^{N} \left[ Y_{SQ_i} \ln \Pr(SQ_i) + Y_{CD_i} \ln \Pr(CD_i) + Y_{BD_i} \ln \Pr(BD_i) + Y_{SF_i} \ln \Pr(SF_i) \right],
\]

where \(Y_z\) denotes a binary variable that represents a crisis outcome \(z \in \{SQ, CD, BD, SF\}\).
This function is exactly the same as the log-likelihood function of conventional discrete
choice models, except that the outcome probabilities (e.g., \(\Pr(SQ_i)\)) are determined by
the perfect Bayesian equilibrium as we note above.

In summary, the structural estimation of the theoretical model boils down to this
log-likelihood function. This function consists of the outcome probabilities, which are
a function of the choice probabilities (e.g., \(\Pr(F)\)), which are a function of the relative
payoffs (e.g., \(\Pr(u_1(SF) \geq u_1(BD))\)), which in turn are a linear function of covariates
and coefficients (e.g., \(X_{\pi_1(SF)} \beta_{\pi_1(SF)}\)). Hence, the maximum likelihood estimates of the
\(\beta\)s obtained by maximizing this log-likelihood function provide an empirical measure of
each latent payoff.

### 3.3 Payoff Specification

Since we estimate the coefficients (\(\beta\)s) using a set of covariates (\(X\)s), we need to specify the
\(X\)s that determine each player’s payoff for each crisis outcome. We derive the empirical
specification of the payoffs directly from the theoretical specification in Figure 1. To do
so, we minimize the number of control variables outside of the theoretical model, since
we are estimating the theoretical AC model itself rather than testing the reduced-form
Table 1: Explanatory Variables

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<thead>
<tr>
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<td>Log of energy consumption per capita for State 2 (Mean = -1.275, Min = -10.171, Max = 1.953)</td>
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<td>Log of the age (+1) of the older state in the dyad (Mean = 4.532, Min = 0.693, Max = 4.820)</td>
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Note: The source of Democracy<sub>1</sub> and Democracy<sub>2</sub> is Polity IV data set and the rest of variables is found from Correlates of War project.

implications derived from the model.\textsuperscript{38} Table 1 summarizes the assignment of covariates to each payoff.

The war payoffs in the theoretical model are given by $u_1(SF) = p - c_1$ and $u_2(SF) = 1 - p - c_2$, both of which are a function of the probability that State 1 prevails in armed conflict and the cost of fighting. The probability of winning, $p$, in the costly lottery formulation of the war outcome is commonly interpreted as the relative share of military capabilities.\textsuperscript{39} We use CapShare<sub>1</sub> to measure State 1’s share of capabilities in the dyad.

\textsuperscript{38}Achen 2002.
\textsuperscript{39}Powell 2002.
The cost of war, $c_i$, $i = 1, 2$, is often understood to be smaller if state $i$ is economically more developed because superior military technologies reduce the relative cost of war. We use $\text{Develop}_i$, $i = 1, 2$, to measure the material (or financial) cost of war for each state. In addition to material capabilities, the democratic peace literature suggests that regime type influences political costs and political will (i.e., resolve) to go to war.\footnote{Morgan and Campbell 1991; Reiter and Stam 2002.} Thus, we also include $\text{Democracy}_i$, $i = 1, 2$, as another proxy for $c_i$ in the equation of $u_i(SF)$.

The back-down payoff for State 1 in the theoretical model is $u_1(BD) = 0 - a_1$, where State 1 not only fails to obtain the disputed good but also suffers audience costs. To evaluate Fearon’s conjecture that audience costs are higher in democracies than in non-democracies, we use $\text{Democracy}_1$ to measure $a_1$.

We normalize State 2’s back-down payoff, $u_2(BD)$, because model identification requires that we normalize a constant term in at least one of the payoff specifications for each player. We place this restriction on $u_2(BD)$ without loss of generality because the $BD$ outcome is not an immediate result of State 2’s deliberate decision and it is equivalent to the status quo outcome from State 2’s perspective.\footnote{It would be problematic to impose this restriction on the war payoff because it determines the range of peaceful (prefer-to-war) settlements in the bargaining framework, and thereby is theoretically interesting. Similarly, the concession payoff reflects the coercive pressure imposed by State 1’s audience costs and the underlying hands-tying (commitment) mechanism.}

The status quo payoffs in the theoretical model are given by $u_1(SQ) = 0$ and $u_2(SQ) = 1$. The constant term for the equation of $u_1(SQ)$ is normalized to zero due to the identification requirement. We choose to normalize $u_1(SQ)$ because this payoff is also normalized in the theoretical specification and because State 1 does not possess the disputed good in the $SQ$ outcome (as in the $BD$ outcome).\footnote{One might wonder if forcing the constant for $u_1(SQ)$ to be zero undermines our ability to test whether the payoff relation $u_1(SQ) > u_1(BD)$ holds—i.e., whether audience costs for State 1 exist. This is not the case because the payoffs are von Neumann-Morgenstern utilities, which are defined to be ordinal utilities, normalization simply means that the payoff scale is shifted (a linear transformation) without affecting the relations among the payoffs.} We drop $u_2(SQ)$ from our estimation because it never determines equilibrium choices or the calculation of the equilibrium probabilities—
whether the status quo is maintained or challenged is solely decided by State 1 in the
game. Thus, there is nothing to infer about \( u_2(SQ) \).

The concession payoffs in the theoretical model are \( u_1(CD) = 1 \) and \( u_2(CD) = 0 - a_2 \). Since the theoretical model is of little help for our specification choice, we include three
covariates that control for strategic factors that may influence the utilities that each state
may derive from the concession outcome. First, the value of the disputed good is influenced
by the similarity of strategic interests between the states. Thus, we include \( \text{Alliance} \) to
control for the similarity of alliance portfolio in a disputing dyad. The historical record
shows that a number of international disputes occur when the target country is involved in
civil wars.\(^{43}\) This implies that civil wars influence the strategic assessment of the disputed
good for both states, as they make the target country vulnerable to the coercive pressure
from other states. Thus, \( \text{CivilWar}_2 \) indicates whether State 2 is involved in a civil war.
Finally, Huth and Allee show that countries with a shared border have higher risks of
dispute escalation.\(^{44}\) Hence, we use \( \text{Contiguity} \) indicating whether two states share a
border.

Note that some political or diplomatic costs, \(-a_2\), incurred by State 2 in the concession
outcome are also considered some sort of “audience costs.” While different than the
original formulation, it would be interesting to examine if such audience costs for State
2 are also associated with its regime type. Hence, we estimate an alternative model with
\( \text{Democracy}_2 \) for \( u_2(CD) \) as part of the robustness check.

A caveat is in order. Note that the empirical specification of the payoffs, or the choice
of which covariate to be included in which utility equation, does not significantly alter
the empirical implications that we draw from the estimation result. This is because the
payoffs are normalized by construction in the theoretical model and so is in the empirical
model. Since all the payoffs are relative, all the covariates affect all the payoffs in the

\(^{43}\)Gleditsch, Salehyan and Schultz 2008.\
\(^{44}\)Huth and Allee 2002. See also Braithwaite and Lemke 2011; Bennett and Stam 2003.
empirical model.\textsuperscript{45} For example, even if $\text{Develop}_1$ is included only for $u_1(SF)$, it still affects all the decisions in the model. This is true in the underlying theoretical model and hence our construction of the empirical model. Since the decision to fight depends on the relative magnitude of $u_1(SF)$ and $u_1(BD)$ in the theoretical model, the effect of $\text{Develop}_1$ also affects $u_1(SF)$ and $u_1(BD)$ in a relative way in the empirical model as well. Moreover, because the decision to fight is also conditional on the decision to issue a challenge, the decision to fight also depends on relative magnitude of $u_1(SF)$, $u_1(BD)$, and $u_1(SQ)$ as well both in the theoretical and empirical models.

3.4 Data

To estimate our statistical model Figure 3, we analyze states’ decisions to initiate, resist, and follow through on challenges to the status quo. The existing data sets, such as the Militarized Interstate Dispute (MID) data, the International Crisis Behavior (ICB) data, and the Militarized Compellent Threats (MCT) dataset, provide no information on whether the challenger followed through or backed down on its threat.\textsuperscript{46} Our data set is based on \textit{Coercive Diplomacy Database} (CDDB) compiled by Schultz, Lewis, and Zucco.\textsuperscript{47} CDDB records episodes of crisis bargaining as it is characterized in Figure 1 for seventy seven crises for the interwar period (1919-1939) that are drawn from the ICB and MID data sets. CDDB defines a challenge as any act that is made deliberately by a central state authority with the intent of altering the pre-crisis relationship between itself and at least one other state and that is backed by the threat of military force. If a challenge is identified, CDDB maps the outcome of each crisis episode to one of the three crisis outcomes, $CD$, $BD$, and $SF$, in the crisis game depicted in Figure 3.

We also include a series of non-challenge observations in which a challenger does not challenge the status quo. We use the coding rule developed by Huth and Allee and adopted

\textsuperscript{45}Baumol 1958.
\textsuperscript{46}Ghosn, Palmer and Bremer 2004; Brecher and Wilkenfeld 1997; Sechser 2011.
\textsuperscript{47}Schultz, Lewis and Zucco 2012.
by Lewis and Schultz to identify the status quo observations.\textsuperscript{48} If a politically relevant dyad has not experienced a crisis episode for three years according to CDDB, it is coded as a “status quo” (SQ) outcome during that time period.\textsuperscript{49} Hence, the unit of analysis is dyad-three-years if the outcome variable is coded as SQ and crisis-dyads if the outcome is either CD, BD, or SF. The distribution of the outcomes is SQ = 2025, CD = 35, BD = 11, and SF = 35. In addition to the dyad-three-year rule, we also employed the dyad-years, dyad-two-years, and the dyad-four-years to identify the SQ observations. We found the results to be stable and robust regardless of the coding rules we employ for identifying the SQ observations.

4 Estimation Results

Table 2 displays the maximum likelihood estimates of the Main Model. We report the coefficient and standard error for the constant term and covariates (if applicable) in each of the equation for the utility over the crisis outcomes. The $\chi^2$ statistic suggests that our payoff specifications in the Main Model significantly improve on the null model in which all the coefficients are jointly restricted to zero. The test of hypotheses reported below concerning the existence, magnitude and effects of audience costs are primarily based on the Main Model, where the selection rule for the SQ observation employs the dyad-three-year. The findings are robust in any empirical specifications of the payoffs with different coding rules for the SQ observations.

Table 3 shows the estimation result for some of the key alternative models. The Territorial Model controls for State 1’s incentives to initiate a crisis or to maintain the status quo. An important issue that loomed large during the interwar period is the boom of the newly created states and corresponding boundary disputes in the wake of World

\textsuperscript{48}Huth and Allee 2002; Lewis and Schultz N.d..

\textsuperscript{49}Two states are defined as politically relevant if their homelands, colonies or other dependencies are contiguous or separated by less than 150 miles of water. A major power is also politically relevant to (1) other major powers and (2) all other states in its respective home geographic region.
War I. The restriction of the analysis to “politically relevant dyads” attempts to control for the opportunity for conflict; we also include two control variables to the equation of State 1’s status quo payoff, $u_1(SQ)$, to control for the willingness for conflict. The first control variable is $MinAge$ that measure the age of the age of the younger state in the dyad since a new state tends to face greater strategic imperatives for a territorial change in this period. The second control is $MaxAge$ that measures the age of the older state to control for the status quo bias, and thereby disincentives for territorial claims, of a more established state. The result shows that while $MinAge$ is not statistically significant, the coefficients on $MaxAge$ are consistently positive and significant in all the models, indicating that an older state has a stronger incentive to maintain the status quo. Estimated coefficients on other covariates (especially those for $u_1(BD)$ and $u_1(SF)$) largely remain unchanged from the Main Model. As discussed below, we also assess the effectiveness of these controls in the Sunk-Cost Model that includes other factors that may affect State 1’s incentives to initiate a crisis.

The Second Audience Cost (AC) Model adds $Democracy_2$ to the equation of State 2’s concession payoff, $u_2(CD)$. The non-significance of this covariate indicates that the political costs, or audience costs, of public concessions for State 2 are not associated with its regime type. The coefficients of key covariates in the equations for $u_1(BD)$ and $u_1(SQ)$ are generally consistent with those in the Main Model. The Democracy Model includes $Democracy_1$ in State 1’s payoffs for all three crisis outcomes, $u_1(CD)$, $u_1(BD)$, and $u_1(SF)$.

The Sunk-Cost Model includes $Democracy_1$ only in the equation for $u_1(SQ)$. This specification is equivalent to including $Democracy_1$ in the equation for all three crisis payoffs (as in the Democracy Model) but constraining it to have the same effects in the three equations. Therefore, $Democracy_1$ captures sunk costs that State 1 pays in initiating a crisis. The estimation result of this model confirms the robustness of the effect of

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50 Schweller 1996.
MaxAge on the status quo payoff \( u_1(SQ) \), since the sign and significance of the coefficient on MaxAge are consistent after controlling for the potentially confounding factors. Note also that the estimation result for this model provides a coherent interpretation across the models. For example, the positive coefficient of Democracy_1 in the \( u_1(SQ) \) equation suggests that State 1’s incentive to stay out of a crisis increases as it becomes more democratic, implying that State 1 is more reluctant to make a challenge as it becomes more democratic. This result is consistent with the negative coefficients of Democracy_1 on both \( u_1(BD) \) and \( u_1(SF) \) across all the other models. That is, democracies consistently incur higher costs both when they fight and back down than non-democracies do, so that democracies find it preferable to staying out of a crisis to initiating one.\(^{51}\)

### 4.1 The Existence of Audience Costs

To test the existence of audience costs for State 1, we use the estimation result to evaluate whether the payoff relation, \( u_1(BD) < u_1(SQ) \), holds in the data. In the Main Model, the estimated BD payoff for State 1, \( \pi_1(BD) \), is given by the constant term of \(-5.967\) and the coefficient of \(-0.323\) for Democracy_1. The estimated SQ payoff, \( \pi_1(SQ) \), is simply given by zero due to normalization. Thus, audience costs exist if

\[
-5.967 - 0.323 \times \text{Democracy}_1 < 0. \tag{1}
\]

This inequality always holds because Democracy_1 takes values between \(-10\) and 10. To see if normalizing the status quo payoff to zero undermines the falsifiability of the existence hypothesis \( u_1(BD) < u_1(SQ) \), we also examine the payoff relation in the Territorial Model with MaxAge. Given the estimated coefficients for \( u_1(BD) \) and \( u_1(SQ) \), audience costs

\(^{51}\)Interestingly, the positive coefficient on Democracy_1 for \( u_1(CD) \) in the Democracy Model suggests that democracies may have mixed motives in initiating a crisis. On one hand, democracies have a stronger incentive to initiate a crisis because their payoff is higher if State 2 concedes than the payoff for non-democracies. On the other hand, democracies have weaker incentive to initiate a crisis because they suffer more if State 2 resists.
exist in the Territorial Model if

\[-4.092 - 0.411 \times Democracy_1 < 0 + 0.575 \times MaxAge.\]

When \( Democracy_1 = -10 \), the estimated \( BD \) payoff, \( \pi_1(BD) \), is 0.018 so that this inequality would not hold if \( MaxAge < 0.031 \). However, since the sample minimum of \( MaxAge \) is 0.693, this inequality holds for \( Democracy_1 = -10 \). When \( Democracy_1 \geq -9 \), \( \pi_1(BD) \) is strictly less than \( \pi_1(SQ) \) regardless of \( MaxAge \). Hence, the payoff relation \( \pi_1(BD) < \pi_1(SQ) \) always holds in the Territorial Model as well.

Since the estimated payoff relations in (1) and (2) are based on the estimated constants and coefficients, it is possible that these payoff relations result from random chance. We, thus, examine whether the estimated payoff difference, \( \pi_1(BD) - \pi_1(SQ) < 0 \), is statistically significant by generating 95% confidence intervals for the difference between the two payoffs, using bootstrapping methods.\(^{52}\) If the upper bound of the confidence interval is greater than zero, audience costs are not statistically significant (i.e., \( \pi_1(BD) - \pi_1(SQ) > 0 \)). Table ?? in the appendix displays the upper bound of the confidence interval for the Main Model as well as four alternative models.

It shows that in three specifications (Main Model, Territorial Model, and Sunk-Cost Model), the 95% confidence upper bound is strictly negative, implying that the payoff relation \( u_1(BD) < u_1(SQ) \) is statistically significant and thus audience costs exist regardless of the values of \( Democracy_1 \) and \( MaxAge \). However, in the Second AC Model, when \( Democracy_1 \leq -9 \), the confidence upper bound exceeds zero and hence audience costs do not exist unless \( MaxAge \) is sufficiently high. The same pattern is observed in

\(^{52}\)We generate 10,000 data sets by resampling the original data set (with replacement). For each data set, we estimate the coefficients as we did in Tables 2 and 3. For each set of coefficients, we calculate the estimated payoffs for every value of the 21-point scale of \( Democracy_1 \) and for each five-number summary statistic (i.e., sample minimum, first quartile, median, third quartile, and sample maximum) of \( MaxAge \) and \( MinAge \) if applicable. This gives 10,000 sets of estimated payoffs and, therefore, the bootstrapped distribution of each of the estimated payoffs for a \( 21 \times 5 \) matrix of \( Democracy_1 \) and \( MaxAge \) (or \( MinAge \)) values. We then construct the 95% confidence bands of \( u_1(BD) \) and \( u_1(SQ) \) distributions for each case in the \( 21 \times 5 \) matrix.
the Democracy Model, where the 95% upper bound exceeds zero when \( Democracy_1 \leq -6 \) unless \( MaxAge \) is sufficiently high. These results indicate that state leaders of a wide range of regime types including democracies and non-democracies alike, will incur audience costs on average if they back down in a military crisis. The existence of audience costs is especially robust unless State 1 is a highly non-democratic young state.

Finally, our finding also provides support for Fearon’s (1994a) conjecture that audience costs are higher in democracies than in nondemocracies. In all the models except the Sunk Cost Model, the coefficient on \( Democracy_1 \) for \( u_1(BD) \) is always negative and statistically significant, implying that State 1’s \( BD \) payoff decreases as State 1 becomes more democratic.\(^{53}\) This result indicates that that State 1 on average suffers higher audience costs as its democracy score increases.

### 4.2 The Magnitude of Audience Costs

Fearon shows that high audience costs can explain “how and why states might rationally come to conclude that fighting [is] preferable to . . . concessions.”\(^{54}\) We test this core tenet of rationalist explanations for war by estimating the magnitude of audience costs relative to the value of fighting for State 1. The hypothesis that audience costs can be so high that the decision to go to war is preferable to backing down is falsifiable in the form of the following payoff relation:\(^{55}\)

\[
\bar{u}_1(BD) - \bar{u}_1(SQ) < \bar{u}_1(SF) - \bar{u}_1(SQ)
\]

\[
\bar{u}_1(BD) < \bar{u}_1(SF).
\] \( (3) \)

In the Main Model (Table 2), the constant term and \( Democracy_1 \) in the equation of \( u_1(SF) \) are statistically significant, while \( CapShare_1 \) and \( Develop_1 \) fall short of the con-

\(^{53}\)In the Sunk Cost Model, \( Democracy_1 \) only appears

\(^{54}\)Fearon 1994a, 579.

\(^{55}\)Since the payoffs are assumed to be von Neumann-Morgenstern utilities and are linear-transformed due to normalization, we obtain the estimated war value for State 1 as the difference between the \( SF \) payoff and \( SQ \) payoff, \( u_1(SF) - u_1(SQ) \equiv w_1 \).
ventional significance level. The estimated payoff relation, therefore, is:

\[-5.976 - 0.323 \times \text{Democracy}_1 < -3.331 - 0.094 \times \text{Democracy}_1.\]  \hspace{1cm} (4)

This inequality holds for any value of \( \text{Democracy}_1 \). Figure 4 visually displays the relative magnitudes of estimated audience costs (in the solid line) and estimated war values (in the dotted line) as a function of \( \text{Democracy}_1 \) based on the four models: Main, Territorial, Second AC, and Democracy Models with MaxAge. Note that each panel shows the case where the difference between these two quantities is the largest (i.e., where \( \text{CapShare}_1 \) and \( \text{Develop}_1 \) are at their sample maximum).

Although the difference between audience costs and war values appears substantial in the Main Model, the bootstrapped confidence intervals (not shown in the figure) indicate that the difference is not statistically significant at the 95% level for any value of \( \text{Democracy}_1 \). In three other models, the estimated audience costs do not appear to be substantively different than the war values. The bootstrapped analysis confirms that the two quantities are statistically indistinguishable for any \( \text{Democracy}_1 \) values in any of the models. We also found this result—that audience costs and the values of fighting are statistically comparable—to be stable and robust with any coding rules we employed for the defining \( SQ \) observations and with the models with MinAge instead of MaxAge.

This result is one of the key findings in this article: audience costs are at least as large as war values. To be sure, this finding itself is counter-intuitive because the values of war are taken to include the cost of human lives, the destruction of social infrastructure, and financial and other material costs incurred by a nation as a whole, while audience costs are considered as political costs for state leaders. Our results, therefore, suggest that political leaders could potentially face substantially large audience costs in international crises. This result provides suggestive evidence that large audience costs explain why state leaders can abandon negotiated settlements (such as the \( BD \) outcome) and rationally choose to go to war. It would take enormous audience costs to compel state leaders to
Figure 4: Magnitude of Audience Costs and War Values. Note: The estimated values of audience costs and war values are calculated for the case where the difference between the two quantities is maximized (i.e., when CapShare1 and Develop1 are at their respective sample maximum).
bring their nation to war.\textsuperscript{56}

It is, however, important to notice that political leaders will not always incur such large audience costs. Recall that we have theoretically demonstrated that large audience costs are less likely to be incurred because both States 1 and 2 have a strong incentive to avoid outcomes that entail large audience costs. Our empirical results in Tables 2 and 3 offer evidence for this selection effect. The negative and statistically significant coefficient on $\text{Democracy}_1$ for $u_1(BD)$ suggests that State 1 is less likely to incur audience costs as it becomes more democratic.

\subsection*{4.3 The Effects of Audience Costs}

The AC mechanism coerces State 2 to concede at a higher rate in the crisis game (see Panel (b) in Figure 2). Since the $BD$ outcome is no longer a rational choice for State 1 if it faces high enough audience costs, State 1’s initial decision to relinquish the status quo will force State 2 to choose between concession and armed conflict. Upon receiving such challenges, State 2’s concession is the only feasible peaceful settlement at this point in the crisis game, and hence State 2 will be solely responsible for avoiding military confrontation.\textsuperscript{57} Consequently, all else equal, State 2 is more likely to be compelled to concede at a higher rate than in the absence of audience costs. The AC mechanism amplifies coercive effects of State 1’s threat in a crisis. By threatening war, State 1 establishes the \textit{fait accompli} that forces State 2 to choose between concession and armed conflict. By invoking audience costs, State 1 forfeits its option to back down, which increases the credibility of its threat and thereby arguments coercive pressure on State 2 to capitulate. Thus, all else equal,

\textsuperscript{56}Our finding of large audience costs does not imply that war is \textit{highly} profitable. We find that a statistically significant result that staying out of a crisis is strictly preferable to fighting a war after making a threat (i.e., $u_1(SQ) > u_1(SF)$). While this result is consistent with common crisis games, it contradicts with experimental evidence reported by Trager and Vavreck (2011). They find that a war is more profitable than backing down and keeping the status quo. Their result implies that State 1’s threats are always expected to be credible \textit{ex ante} so that audience costs cannot convey any additional information in crisis bargaining.

\textsuperscript{57}Schelling (1960) refers to this mechanism as an irrevocable commitment.
since high audience costs make backing down no longer a rational choice for State 1, its
decision to challenge the status quo makes State 2’s concession the only feasible peaceful
settlement at this point in the crisis game. Consequently, larger audience costs make it
more difficult to back down and thereby increase the credibility of the threat.

Testing the coercive effects in the AC model, Snyder and Borghard conclude that
“audience costs . . . have at most a very small effect on crisis behavior.”58 As we discussed
earlier, however, since they do not account for selection effects, their research is designed
only to observe the cases in which audience costs have only little effect.59

Since our empirical model embeds selection effects generated by audience costs, we
use our estimates of audience costs to reexamine their coercive effect on State 2’s decision
to resist in crises. Panel (a) of Figure 5 graphs the estimated probability that State 2
resists following State 1’s challenge as a function of estimated audience costs based on
the Main Model. To help clarify the substantive significance of the effects of audience
costs, we also include Panel (b) in Figure 5, which shows State 2’s resistance rate as a
function of estimated war values for State 1. This allows us to compare the impact of
State 1’s audience costs on State 2’s crisis behavior to that of war values. We choose
this comparison because a state’s bargaining power is typically interpreted as its outside
option, i.e., the value for war.60 In each panel, the dashed, solid, and dotted curves
represent these effects when the capability balance is 1:3, 1:1, and 3:1 between States 1
and 2, because the 3:1 rule in the balance of power has important implications for the
prospect for victory.61

As Figure 5 shows, audience costs for State 1 do have a substantively significant impact

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58 Snyder and Borghard 2011, 455; See also Downes and Secher 2012; Trachtenberg 2012.
59 Our analysis presents evidence that selection effect is at work. The positive coefficient on Democracy1
for u1(SQ) in the Sunk-Cost Model indicates that democracies incur higher costs of making public threats,
implying that democracies (and hence countries with higher audience costs) are discouraged from selecting
themselves into a crisis in the first place. This result also helps to explain why audience costs make public
60 Powell 2002.
(a) Effect of audience costs
(b) Effect of war values

Figure 5: **Effect of Audience Costs on Probability of Resist.** *Note:* The scale on the x-axis is reversed. The estimated values of audience costs and war values are based on the Main Model.

on the likelihood that State 1 prevails in international crises.\(^\text{62}\) As the estimated average audience costs rise from -3 to -9, the probability that State 2 resists decreases roughly by 20%. The size of these effects are roughly the same with that of war values shown in the right panel. As the estimated war value for State 1 changes from -2 (the maximum) to -4 (minimum), the probability of resistance drops by 20%. The right panel also indicates that the shift in the capability balance from 1:3 (dashed curve) to 3:1 (dotted curve) produces at most 25% change (when \(ChapSgare_1 \simeq -2.5\)) in the probability that State 2 resists in crises.

These results indicate that the coercive effect of audience costs is at least as sizeable as the effect of war values. Adequately addressing strategic selection effect not only at

\(^{62}\)Table 4 in the appendix shows 95% confidence interval for the probability that State 2 resists.
the second stage where State 2 responds to State 1’s challenge but also at the initial stage where State 1 decides to initiate a crisis, our results support the common hypothesis that audience costs have significant coercive effects and help the challenger prevail in international crises. Our statistical evidence runs counter to the recent claim that audience costs have a very small effect on crisis behavior.\textsuperscript{63}

5 Conclusion

This article provides the observational evidence for a theoretical model that is central to the field of international relations. Selection bias and other inferential problems have prevented scholars from observing audience costs directly. The lack of direct evidence of audience costs has caused skepticism about the evidentiary basis for the AC model. To fill this gap, we provide an \textit{ex ante} measure of audience costs by estimating the underlying state preferences in a canonical crisis bargaining game. Our estimate of audience costs fully takes into account selection effects as it measures those costs that were actually incurred and not incurred. With these estimated audience costs, the first of its kind, we also find empirical evidence for several propositions and questions that are central to the study of international relations.

First, this analysis demonstrates the existence of audience costs. Our estimate of audience costs is statistically significant for a wide range of regime types, democracies and non-democracies alike, with the exception of highly autocratic regimes.

Second, our analysis shows that the magnitude of audience costs is correlated with the level of democracy. This finding confirms a working hypothesis, conjectured by Fearon and widely cited by a large number of scholars, that leaders in democracies face higher audience costs than leaders in non-democracies do.

Third, we offer empirical evidence for a core tenet of rationalist explanations of why war occurs. We find that audience costs and fighting costs are comparable in magnitude

\textsuperscript{63}Snyder and Borghard 2011; Downes and Sechser 2012.
for any regime type. This statistically significant result implies that the cost of backing down after making a challenge in a crisis can be so high that war may be preferable to concessions. This may help explain why state leaders abandon peaceful settlements and resort to war.

Fourth, our result strongly indicates that audience costs cause selection effects in international crises. Audience costs make it less likely that a state backs down from a publicly issued challenge, and less likely that a state makes such a challenge in the first place. Thus, audience costs partly explain why clearly committing threats are rarely observed in international politics and why audience costs, when and if they are actually incurred and hence observed, are very small.

Finally, we show that the target state is less likely to respond militarily as audience costs for the challenging state increase. This effect is substantively nontrivial in comparison to the effect of the war values. The result suggests that audience costs render bargaining leverage that influences the course and outcome of international crises.

These findings are robust across all of the alternative specifications that we tested with different coding rules for the status quo observations. Altogether, these results provide an empirical evidence for the AC model.

Nevertheless, much further work remains to be done. In particular, the common theoretical model that underlies our empirical analysis in this article is agnostic about the source of audience costs, or the way in which the costs are incurred. Accordingly, all that we have shown in this article is that a state incurs, or would incur, some additional nonzero costs free of any specific form. As Schultz writes, audience costs are like the “dark matter” of international relations: something we can detect but not understand. They remain enigmatic political factors that shape international processes and outcomes. We know audience costs exist, but we do not know what they are.

Schultz 2012.
6 Appendix

Appendix A: Formal Solution

We characterize the equilibrium with cut-point strategies that define the following decision rules. State 1 of any type below $\alpha$ strictly prefers backing down ($BD$) to standing firm ($SF$); all types above $\alpha$ strictly prefer standing firm. State 1 of any type below $\beta$ prefers accepting the status quo to making a challenge; all types above $\beta$ prefer to challenge State 2. Similarly, if challenged, State 2 of any type below $\gamma$ strictly prefers conceding the disputed good to resisting the challenge; all types above $\gamma$ prefer resisting. Throughout, the equilibrium concept we adopt is perfect Bayesian equilibrium, which requires that State 1 and State 2’s strategies be sequentially rational given the other’s strategy and beliefs, and that beliefs be consistent with each other’s strategy and with Bayes’ Rule whenever relevant.

The equilibrium takes three forms depending on the relative magnitudes of $\alpha$ and $\beta$. For each configuration case, the equilibrium is effectively unique. If $\alpha \leq \beta$, all challenges are genuine and State 1 will always stand firm if resisted. This case results in the separating equilibrium, where all the threats issued along the equilibrium path are genuine. If $\alpha > \beta$, on the other hand, the mid-valuation types in $[\beta, \alpha]$ will back down if resisted, resulting in the semi-separating equilibrium, where some threats are bluffs. Finally, the equilibrium is pooling over $S_1$ types if $\alpha > w_1 \geq \beta$, where all the types issue a challenge. Given State 1’s cutpoint strategy, when State 2 receives a threat, she will resist if and only if her expected payoff from doing so is greater than that from conceding. This means that all types of $D$ above $\gamma$ will resist the challenge, while all types below $\gamma$ will make a concession. $D$ chooses her optimal resistance rate $\gamma^*_\text{pub}$ so that the type of $C$ with $w_1 = \kappa^*_\text{pub}$ is indifferent between public and private threats. The following proposition establishes the equilibrium.
Proposition 1. Let $\tilde{a}_1 = \frac{F_2(-a_2)}{1-F_2(-a_2)}$, $\hat{a}_1 = \frac{F_2^{-1}(1)+a_2}{1-F_2^{-1}(1)}$, and $\tilde{a}_1$ be the unique solution of $F_1(\beta^*) = 0$ with $\alpha > \beta$.

Then, if $a_1 \geq \tilde{a}_1$, there exists a unique perfect Bayesian equilibrium to the crisis game with the following strategies and beliefs. State 1 makes a challenge if $w_1 \geq \beta^*$. When $a_1 \geq \bar{a}_1$, State 1 always stands firm if the challenge meets resistance. When $a_1 < \bar{a}_1$, on the other hand, State 1 stands firm if $w_1 \geq \alpha^*$, and backs down otherwise. $D$ resists the challenge if $w_2 \geq \gamma^*$, where

$$\alpha^* = -a_1,$$
$$\beta^* = \begin{cases} -\frac{F_2(-a_2)}{1-F_2(-a_2)} & \text{if } a_1 \geq \tilde{a}_1, \\ F_2^{-1}\left( \frac{F_2^{-1}(\alpha)}{1+q_2}(1-F(\alpha)) + F_1(\alpha) + a_2 \right) & \text{if } \tilde{a}_1 \leq a_1 < \bar{a}_1, \\ p - \bar{a}_1 & \text{if } \bar{a}_1 \leq a_1 < \tilde{a}_1 \end{cases},$$
$$\gamma^* = \begin{cases} -a_2 & \text{if } a_1 \geq \bar{a}_1, \\ \frac{F_1(\beta)(1+a_2)-F_1(\alpha)-a_2}{1-F_1(\beta)} & \text{if } \bar{a}_1 \leq a_1 < \tilde{a}_1, \\ \frac{F_1(\alpha)-a_2}{1-F_1(\alpha)} & \text{if } \tilde{a}_1 \leq a_1 < \bar{a}_1 \end{cases}.$$

On receiving the challenge, State 2 believes that State 1 will stand firm with probability 1 if $a_1 \geq \bar{a}_1$, $\frac{1-F_1(\alpha)}{1-F_1(\beta)}$ if $a_1 \in [\tilde{a}_1, \bar{a}_1)$, and $1 - F_1(\alpha)$ if $a_1 \in [\tilde{a}_1, \tilde{a}_1)$.

Proof. Since numerous versions of this model have been studied elsewhere and the constructive proofs of this equilibrium and its various variants are readily available, we only sketch the proof here. Interested readers should refer to the proofs presented by Schultz (1999) and Kurizaki (2007).

By subgame perfection, State 1 will stand firm (SF) at the final node if and only if $w_1 \geq -a_1 \equiv \alpha^*$. Now, receiving a challenge, State 2 will resist if and only if $EU_2(RS) \geq EU_2(\sim RS)$, or $qw_2 + (1-q) \geq -a_2$, where $q$ denotes State 2’s posterior belief that State 1 will stand firm: $q = 1$ if $\alpha \leq \beta$, $q = \frac{1-F_1(\alpha)}{1-F_1(\beta)}$ if $\alpha > \beta > w_1$, and $q = 1 - F_1(\alpha)$ if $\alpha > w_1 \geq \beta$.

Solving State 2’s decision rule for $w_2$ and substituting $q$’s yields $w_2 \geq -a_2 \equiv \gamma^*$ if $\alpha \leq \beta$, $w_2 \geq \frac{F_1(\beta)(1+a_2)-F_1(\alpha)-a_2}{1-F_1(\beta)} \equiv \gamma^*$ if $\alpha > \beta > w_1$, and $w_2 \geq \frac{F_1(\alpha)-a_2}{1-F_1(\alpha)} \equiv \gamma^*$ if $\alpha > w_1 \geq \beta$.

For State 1’s signals to be sequentially rational, it must hold that $EU_1(CH) \geq EU_1(SQ)$ for $\beta$, which implies the following IC conditions: $(1-F_2(\gamma))w_1 + F_2(\gamma) \geq 0$ for
\( \alpha \leq \beta \), and \((1 - F_2(\gamma))(a_1) + F_2(\gamma) \geq 0 \) for \( \alpha \geq \beta \). Substitution and rearrangement gives \( w_1 \geq -\frac{F_2(a_2)}{1 - F_2(a_2)} \equiv \beta^* \) if \( \alpha \leq \beta \), and \( \beta^* \equiv \frac{F_1^{-1}\left(\frac{a_1}{1 + a_2}(1 - F(\alpha)) + (1 - F_2(a_2))\right)}{1 + a_2} \) if \( \alpha \geq \beta \).

For State 1’s signals to be sequentially rational, it must hold that \( EU_1(CH) \geq EU_1(SQ) \) for \( \beta \), which implies the following IC conditions: \((1 - F_2(\gamma))w_1 + F_2(\gamma) \geq 0 \) for \( \alpha \leq \beta \), and \((1 - F_2(\gamma))(a_1) + F_2(\gamma) \geq 0 \) for \( \alpha > \beta \). Substitution and rearrangement gives \( w_1 \geq -\frac{F_2(a_2)}{1 - F_2(a_2)} \equiv \beta^* \) if \( \alpha \leq \beta \), and \( \beta^* \equiv \frac{F_1^{-1}\left(\frac{a_1}{1 + a_2}(1 - F(\alpha)) + F_1(a_1 + a_2)\right)}{1 + a_2} \) if \( \alpha > \beta \).

\[ \text{Appendix B: Outcome Probabilities in the Statistical Model} \]

We derive the equilibrium outcome probabilities in the statistical model of audience costs. These probabilities are characterized by three choice probabilities: the probability that State 1 challenges, \( Pr(CH) \), the probability that State 2 resists given State 1’s challenge, \( Pr(RS|CH) \), and the probability that State 1 fights given State 2’s resistance, \( Pr(F|CH) \).

We will characterize these probabilities in turn. First, consider State 2’s choice at the second node. State 2 will resist if its expected payoff is greater than or equal to the \( CD \) payoff. Hence, State 2 resists with probability

\[
Pr(RS|CH) = Pr(Pr(F | CH)u_2(SF) + (1 - Pr(F | CH))u_2(CD) \geq u_2(CD)) \equiv \Phi \left( \frac{E[\Delta U_{RS}]}{\sqrt{\text{Var}[\Delta U_{RS}]}} \right)
\]

where \( \Delta U_{RS} = Pr(F | CH)u_2(SF) + (1 - Pr(F | CH))u_2(CD) - u_2(CD) \).

At the first node, State 1 will resist if its expected payoff is greater than or equal to the \( SQ \) payoff. The probability that State 1 makes a challenge is

\[
Pr(CH) = Pr((1 - Pr(RS|CH))u_1(CD) + Pr(RS|CH)\max(u_1(BD), u_1(SF)) \geq u_1(SQ)) \equiv 1 - \Phi_2 \left( \frac{E[\Delta U_{SQ,BD}]}{\sqrt{\text{Var}[\Delta U_{SQ,BD}]}} - \frac{E[\Delta U_{SQ,SC}]}{\sqrt{\text{Var}[\Delta U_{SQ,SC}]}} \right) \cdot \text{Corr}[\Delta U_{SQ,BD}, \Delta U_{SQ,SC}],
\]

35
where $\Delta U_{SQ,BD} = u_1(SQ) - (1 - \Pr(RS|CH))u_1(CD) - \Pr(RS|CH)u_1(BD)$ and $\Delta U_{SQ,SF} = u_1(SQ) - (1 - \Pr(RS|CH))u_1(CD) - \Pr(RS|CH)u_1(SF)$.

Finally, the probability that State 1 stands firm after challenging the status quo is

$$\Pr(F | CH) = \Pr(u_1(SF) \geq u_1(BD) | A_1 = \text{Challenge})$$

$$= \Phi_2 \left[ \frac{E[\Delta U_{SF,BD}]}{\sqrt{\text{Var}[\Delta U_{SF,BD}]}} , \frac{E[\Delta U_{SF,SQ}]}{\sqrt{\text{Var}[\Delta U_{SF,SQ}]}} , \text{Corr}(\Delta U_{SF,BD} , \Delta U_{SF,SQ}) \right] / \Pr(CH),$$

where $A_i$ is an action at the $i$th node, i.e. $A_1 = \{\text{Challenge, Not}\}$, $A_2 = \{\text{Resist, Not}\}$, and $A_3 = \{\text{Fight, Not}\}$, and $\Delta U_{SF,BD} = u_1(SF) - u_1(BD)$ and $\Delta U_{SF,SQ} = (1 - \Pr(RS|CH))u_1(CD) + \Pr(RS|CH)u_1(SF) - u_1(SQ)$.

Given these choice probabilities, we obtain the equilibrium probabilities of the four outcomes: $\Pr(SQ) = 1 - \Pr(CH)$; $\Pr(CD) = \Pr(CH)(1 - \Pr(RS|CH))$; $\Pr(BD) = \Pr(CH)\Pr(RS|CH)(1 - \Pr(F | CH))$; and $\Pr(SF) = \Pr(CH)\Pr(RS|CH)\Pr(F | CH)$.
### Table 2: Estimation Result of the Main Model

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**N**: 2102

Log likelihood: -368.894

$\chi^2$: 77.02**

$**p < .05$ (two-tailed)
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**Note:** The estimates of variance and covariance are suppressed. *p < 0.05, **p < 0.1 (two-tailed)
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Table 4: The 95% Confidence Interval for the Probability that State 2 Resists. Note: The upper and lower bounds of the 95% confidence interval for the estimated probability that State 2 resists Pr($RS$) conditional on State 1’s threat depicted in panel (a) of Figure 5. The confidence interval is obtained via the bootstrap analysis of the Main Result for the case of two-tail test. All variables are held constant at their respective mean values.
References


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