Diplomatic Relations and Conflict Management: A Dynamic Analysis*

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Abstract

Are formal diplomatic relations a cause of peace, and if so, why? I analyze this question using new data on the timing of changes in American diplomatic representation abroad in combination with an integrated formal and statistical model of a dynamic decision problem. Unlike reduced form models, the structural approach allows me to disentangle long-run from short-run influences in the reciprocal relationship between diplomatic ties and peace. The estimation results indicate that a reciprocal relationship indeed exists; diplomatic ties increase the US incentive to behave peacefully, and ongoing conflict makes the US more likely to cut off diplomatic relations. A close examination of the structural parameters suggests that this relationship is best explained by diplomatic ties serving as a long-run commitment device: it is costly for the US to maintain diplomatic ties during a time of crisis, so the US will be relatively hesitant to initiate a dispute with a country once it has established a diplomatic presence there.

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> "[I]f you don't fund the State Department fully, then I'm going to need to buy more ammunition ultimately."
>
> Gen. James Mattis (United States Senate Committee on Armed Services 2013)

How, if at all, do formal diplomatic relations make a difference in international conflict management? At least since Schelling (1966), international relations scholars have been preoccupied with how the most coercive forms of statecraft affect conflict onset and outcomes.[1] Regular and ongoing diplomatic efforts—the kind of diplomacy carried out by diplomats—have received comparatively little attention.[2] Yet policymakers evidently see diplomatic relations as a means of conflict prevention. The United States State Department, which defines conflict management and prevention as one of its top priorities (United States Department of State 2015), spends about 20 percent of its annual budget, or 8 billion USD, on embassies and consulates (United States Department of State 2016). Is Gen. Mattis (quoted above) correct that an investment in diplomatic institutions now may lead to a lower chance of conflict later? If so, what is it about embassies or their staffs that increases the chances of peace?

In this paper, I use a novel empirical analysis to clarify our understanding of the links between diplomatic relations and international conflict. At the core of the analysis is a unified theoretical and statistical model of the United States' diplomatic relations with and military hostility toward each other country in the international system between 1816 and 2007. I treat the United States as a rational, forward-looking actor and, using techniques developed by Rust (1987), estimate its utility for diplomatic and military activities toward each other country as a function of its current diplomatic relations and level of dispute (if any) with that country. I also estimate the effects of, and thereby control for, country-specific characteristics that may affect the US's payoff from diplomatic relations or military conflict, such as the country's material capabilities and regime type. The critical advantage of the structural modeling approach over traditional statistical techniques is that, with careful choices about how to parameterize the model, I can not only estimate the

[1] For a recent review of the coercive diplomacy literature, see Slantchev (2011).

[2] In the formal theoretical literature, Lindsey (2017) is, to my knowledge, the only study specifically of diplomacy as practiced by professionals.

magnitude of the reciprocal relationship between diplomatic ties and peace, but also adjudicate among competing mechanisms that might explain that relationship.

The main finding of the analysis is that diplomatic ties indeed reduce the incentive for militarily hostile behavior and that the best explanation for this effect is that a formal diplomatic presence serves as a kind of commitment device. The dynamic structure of the model allows me to distinguish short- from long-run influences on behavior in the model. I find that the apparent pacific effect of diplomacy can primarily be traced to the long-run costs of maintaining diplomatic ties in the midst of a military crisis. In effect, the US ties its own hands when it establishes an embassy in a foreign capital, as doing so increases the expected costs to the US of any future conflict. Illustrations of the potential political costs of having American diplomats endangered abroad are not hard to come by: the taking of American diplomats as hostages in Iran in 1979–1981 and the assassination of the American ambassador to Libya in Benghazi in 2012 were politically devastating for Jimmy Carter and Hillary Clinton respectively.

I set up the model to allow for alternative explanations of the diplomacy–peace link to emerge, but find that they lack support. First, I allow for the possibility that there is a short-run benefit to be gained from cutting off diplomatic relations in the midst of a crisis. This is consistent with the idea of diplomatic ties as a kind of symbolic politics (Kinne 2014). However, I do not detect such an effect in the data. Nor do I find any effect of diplomatic ties on the immediate payoff for initiating a new crisis or backing down from an ongoing one, as we might expect if diplomatic activity in itself were creating conditions for peace. Second, I estimate the effects of covariates such as relative power and regime type on the incentive to have diplomatic relations or a military dispute with a particular country. The natural concern is that the factors that make the US desire diplomatic relations with a country in the first place also reduce the US's incentives for conflict with that country. The coefficient estimates on the covariates do not support this explanation, though I cannot rule out unobserved sources of confounding.

A secondary contribution of the analysis here is new, fine-grained data on American diplomatic exchange. The previous state of the art for data on diplomatic exchange is Bayer (2006), which

codes diplomatic exchange only at roughly five-year intervals. Other recent empirical analyses of the diplomatic network rely on this dataset (Kinne 2014; Renshon 2016). However, such a coarse window does not allow for an accurate analysis of the temporal relationship between diplomatic relations and international disputes. In order to enable such an analysis, I collect day-level data on the status of American diplomatic representation with every other country in the international system from 1776 to 2016.[3] Although we still lack global data at this level of granularity, the collection here represents a clear, if incomplete, improvement on the state of the art. The focus on the United States is in keeping with the empirical literature on diplomacy, in which the US has received disproportionate attention (Goldsmith and Horiuchi 2009; McManus 2014; Lebovic and Saunders 2016).

Previous empirical studies on the links between diplomacy and conflict behavior have focused on the role of high-profile actors, typically the president of the United States. Using a large-scale content analysis, McManus (2014) finds that public statements of resolve by presidents are associated with American success in international disputes. In a survey experiment, Trager and Vavreck (2011) find declines in approval for presidents who back down from public threats, as predicted by theories of domestic audience costs as a source of credibility in coercive diplomacy (Fearon 1994). Hall and Yarhi-Milo (2012), in a series of case studies, find that face-to-face interactions between state leaders may shape their assessments of each other's intentions in tense geopolitical moments. Less directly related to conflict, Goldsmith and Horiuchi (2009) identify conditions under which public visits by American presidents increase or decrease foreign public opinion of the United States.

While diplomacy conducted at the highest levels is obviously influential, there are compelling reasons to believe that career diplomats also play a role in crisis management. New research at the intersection of international relations and political psychology argues that face-to-face contact allows diplomatic actors to credibly signal their intentions (Hall and Yarhi-Milo 2012; Holmes 2013), even in settings where cheap talk models would predict no effect. Since a state's leader or

[3]Data currently available on request from the author and will be made publicly available at or before publication of this study.

foreign minister can only be in one place at a time, stationed diplomats have far more opportunities to make this critical type of contact. And at least in the American context, crisis situations do not appear to affect the propensity of high-level political officials to make diplomatic visits (Lebovic and Saunders 2016), so the potential role of career diplomats is not limited to mundane affairs.

The present analysis also draws from—and contributes to—the empirical literature on the determinants of formal diplomatic ties between countries. In an early study, Russett and Lamb (1969) identify regional proximity and great power status as predictors of diplomatic exchange. More recently, Neumayer (2008) confirms the importance of geography and military power, while also finding that ideological affinity predicts the formation of diplomatic ties between states. Kinne (2014) analyzes the network structure of the diplomatic system and finds significant interdependencies: where states establish relations is largely a function of where other states have done so. I innovate on these studies by considering the reciprocal relationship between formal diplomatic representation and conflict behavior, including the effects of expectations of future conflict on the establishment of diplomatic ties. A limitation of my study compared to these is that, due to data availability, I only consider diplomatic ties with the United States.

The use of structural models to solve tricky inferential problems has precedents in the international conflict literature, though this is the first such paper to focus on formal diplomatic relations specifically. In the first application of structural econometrics to international conflict, Signorino (1999) demonstrates how off-the-shelf statistical models might be biased in the presence of strategic interdependency. Structural models have been particularly popular in the study of signaling and other forms of coercive diplomacy in crisis bargaining (Lewis and Schultz 2003; McLean and Whang 2010; Kurizaki and Whang 2015). The work closest to this paper is that of Crisman-Cox and Gibilisco (2017), who use a similar model of dispute escalation as an infinite-horizon dynamic optimization problem in order to estimate audience costs (see Fearon 1994). I build on their work by also modeling choices about the establishment and maintenance of formal diplomatic ties, albeit in the context of a single-player decision problem that is simpler than the dynamic game they estimate.

1 Formal and Statistical Model

I model the United States' choice of diplomatic relations and conflict behavior with each other country in the international system as a stochastic dynamic programming problem.[4] Across numerous points in time, the US decides whether to make or break diplomatic relations and whether to initiate or back down from conflict with the other country. The key assumption is that the US rationally accounts for the effects of each choice on its own future welfare when making a decision. For example, if breaking diplomatic relations today increases the chances of conflict escalating tomorrow, that will enter the US's decision calculus.

1.1 Formal Model

I model the diplomatic and conflict decisions the US makes toward another country across an infinite sequence of discrete periods, denoted $t = 0, 1, \ldots, \infty$. The US discounts the future at a constant rate $\delta \in (0, 1)$.

At the beginning of each time period t, the current status of the relationship is characterized by the *state* variable $S_t = (R_t, D_t)$. The first component, $R_t \in \{0, 1\}$, denotes whether the US has formal diplomatic relations with the other country at the beginning of time t. The second component, $D_t \in \{0, 1\}$, denotes whether the US is an ongoing military dispute with the other country at this time. The *state space* is the set of all four possible states, $\mathcal{S} = \{0, 1\}^2$. The *initial state* S_0 is exogenous, while all future states $\{S_t\}_{t=1}^{\infty}$ depend stochastically on the US's choices of actions.

In each period, the US makes a pair of decisions about diplomatic relations and military disputes. Let $a_t = (r_t, d_t)$ denote the US's choices toward the other country at time t, where r_t denotes diplomatic relations and d_t a military dispute. These actions correspond to the respective states, so $r_t \in \{0, 1\}$ (no relations, relations) and $d_t \in \{0, 1\}$ (no dispute, dispute). Let $\mathcal{A} = \{0, 1\}^2$ denote the *action space*, and for each $S \in \mathcal{S}$ let $\mathcal{A}(S)$ denote the set of actions available to the US in state S.

[4] For an introduction to dynamic programming, see Stokey, Lucas and Prescott (1989).

The only state-induced restriction on the US's action is that it cannot initiate new diplomatic relations during an ongoing military dispute:

$$\mathcal{A}(S) = \begin{cases} \{(0,0),(0,1)\} & S = (0,1), \\ \{(0,0),(0,1),(1,0),(1,1)\} & S \neq (0,1). \end{cases}$$

After taking its actions in each period, the US receives a payoff that depends on the current state and its choices that period. I separate this *static utility* function, denoted $u(S,a)$, into three additive components:

$$u(S,a) = \underbrace{f_S(S)}_{\text{state payoff}} + \underbrace{f_r(r \mid S)}_{\text{relations action payoff}} + \underbrace{f_d(d \mid S)}_{\text{dispute action payoff}}. \tag{1}$$

The first component, $f_S(S)$, is the US's payoff for being in state S. The other two components, $f_r(r \mid S)$ and $f_d(d \mid S)$, denote the US's immediate payoff from its relations and dispute action respectively in state S. In the statistical model described below, I rewrite each of these three components as a function of observed country-specific covariates and of unknown parameters to be estimated.

In addition to this deterministic component of the US's per-period payoff, I assume there is also a random shock that varies over time. As in Rust (1987, 1988), the introduction of a stochastic utility shock is critical for the eventual estimation of the utility parameters.[5] Let $\epsilon_t(a)$ denote the random shock to the US's payoff for taking action a at time t, so that its overall utility for the period is $u(S_t, a_t) + \epsilon_t(a_t)$. Following standard practice (Rust 1987, 1988), I assume that each $\epsilon_t(a)$ is independent and identically distributed across actions and time, that the US does not observe the realized value of each $\epsilon_t(a)$ until the start of period t, and that the distribution of each shock is type 1 extreme value.

Besides yielding these immediate payoffs, the US's actions in each period affect the state of

[5] For a clear explanation of why the estimation of formal models requires stochastic payoff shocks, see Signorino (1999).

the world in the next period. For each pair of states $S, S' \in \mathcal{S}$ and each feasible action $a \in \mathcal{A}(S)$, let $\pi(S' \mid S, a)$ denote the probability of transitioning to S' when the US chooses a in state S. Transitions are Markovian, in that the distribution of S_{t+1} directly depends only on S_t and a_t, not on any states or actions further in the past. This stochastic transition process reflects the US's uncertainty about how the other country's behavior will affect diplomatic and conflict outcomes, as described in further detail below.

When the US chooses its actions each period, it balances the short-run payoff of each potential choice with its long-run consequences. The state-specific portion of the static payoff, $f_S(S)$, represents long-run influences on US behavior. In particular, since the current state S_t is already "sunk" at the start of time t and cannot be affected by the US's choices at t, this portion of the static payoff only enters the US's decision calculus through its expectations over future states. As such, it is best interpreted as long-run influences. Conversely, the action-specific components $f_r(r_t \mid S_t)$ and $f_d(d_t \mid S_t)$ represent the short-run incentives to take particular actions.

The US's objective each period is to choose the action that maximizes its present discounted utility, accounting for both the choice's immediate payoff and its effect on future payoffs via the state transition. Formally, each period it faces the problem

$$\max_{a \in \mathcal{A}(S_t)} \{u(S_t, a) + \epsilon_t(a) + \delta EV(S_t, a)\}, \tag{2}$$

where $EV(S, a)$ denotes the US's expected future payoff following a choice of a in state S. Under the assumption that the action-specific payoff shocks are i.i.d. type 1 extreme value, the US's decision rule is optimal if and only if the continuation value function EV is the unique solution to the functional equation

$$EV(S, a) = \sum_{S' \in \mathcal{S}} \log \left[\sum_{a' \in \mathcal{A}(S')} \exp\left(u(S', a') + \delta EV(S', a')\right) \right] \pi(S' \mid S, a) \tag{3}$$

(Rust 1987). Given specific functional forms for the static utility function u and the transition function π, solving for the US's optimal decision rule amounts to finding the fixed point of (3)

(Stokey, Lucas and Prescott 1989).

1.2 Statistical Model

The formal model described above is sparse by design. In the absence of particular parameter values, it does not yield definite behavioral predictions. However, unlike in most applications of formal models in political science, the goal here is not to derive predictions *a priori* from the model. Instead, it is to structure the empirical analysis in a way that allows us to discern among competing explanations of diplomatic behavior. Moreover, after obtaining the parameter estimates, we can plug them back into the model to make the kinds of counterfactual predictions that are typical in formal modeling studies. I now describe how I integrate the model with data and estimate it.

The data are time series of interactions between the US and each of a set of other countries, denoted $m = 1, \ldots, M$. Although the US's time horizon remains infinite as concerns its decision-making, we only observe each time series up to time T_m.[6] The observations therefore consist of finite sequences of states and actions for each other country, $\{(S_t^m, a_t^m)\}_{m=1,\ldots,M;t=0,\ldots,T_m}$. In the statistical model, the US's discount factor is fixed at $\delta = 0.95$.[7]

To incorporate data into the formal model, I introduce observed covariates and unknown parameters (to be estimated) into the static utility and transition functions. For each country m, there is a vector of K observed covariates, denoted $x^m \in \mathbb{R}^K$. The covariates are constructed to be time-invariant; otherwise, they would need to be incorporated into the state space of the model, and completion of the model would require assuming or estimating transition distributions for each covariate. For covariates that vary over time, such as relative military strength, I take the average over the sample period. As the period covered here is rather long (1816–2007), I run robustness checks on substantively relevant subperiods to examine both how the effects of covariates change over time and whether the main results are sensitive to the sample period.

[6] A time series ends at the latest time for which data is available or when a country leaves the international system. Since countries enter the international system at different times in the data, the value of t is not necessarily comparable across time series.

[7] While discount factors can in theory be estimated in these models, in practice they are poorly identified (Aguirregabiria and Mira 2010, 39).

The goal of the statistical procedure is to estimate a vector of L parameters, denoted $\theta \in \mathbb{R}^L$. These parameters characterize how the covariates affect the static payoffs and transition probabilities. The deterministic component of the immediate payoff to country m of taking action a_t in state S_t is now

$$u(S, a \mid x^m, \theta) = f_S(S \mid x^m, \theta) + f_r(r \mid S, x^m, \theta) + f_d(d \mid S, x^m, \theta), \tag{4}$$

a modification of (1). Similarly, the probability of transitioning to S' after taking action a in state S is $\pi(S' \mid S, a, x^m, \theta)$.

Estimation proceeds by maximum likelihood, as in Rust (1987). Under the assumption of type 1 extreme value payoff shocks, the probability that the US chooses a in state S with country m, which I denote $P(a \mid S, x^m, \theta)$, follows a multinomial logit:

$$P(a \mid S, x^m, \theta) = \frac{\exp\left(u(S, a \mid x^m, \theta) + \delta EV(S, a \mid x^m, \theta)\right)}{\sum_{a' \in \mathcal{A}(S)} \exp\left(u(S, a' \mid x^m, \theta) + \delta EV(S, a' \mid x^m, \theta)\right)}, \tag{5}$$

where EV is the unique solution to the functional equation (3). A likelihood function can be constructed from these *conditional choice probabilities*. Specifically, the likelihood of the parameter vector θ given the states $\mathbf{S} = \{S_t^m\}_{m=1,\ldots,M;t=0,\ldots,T_m}$, actions $\mathbf{a} = \{a_t^m\}_{m=1,\ldots,M;t=0,\ldots,T_m}$, and observed covariates $\mathbf{x} = \{x^m\}_{m=1}^M$ is

$$\ell(\theta \mid \mathbf{S}, \mathbf{a}, \mathbf{x}) = \prod_{m=1}^{M} \prod_{t=1}^{T_m} P(a_t^m \mid S_t^m, x^m, \theta) \pi(S_t^m \mid S_{t-1}^m, a_{t-1}^m, x^m, \theta). \tag{6}$$

I use the nested fixed-point algorithm developed by Rust (1987, 1988) to estimate θ. Briefly, the estimation algorithm entails gradient-based maximization of the logarithm of the above likelihood function, including iteratively solving for optimal US behavior via the fixed point condition (3) at each candidate value of θ. I employ full information maximum likelihood, so the parameters of the transition function are estimated simultaneously with those of the static utility function.

1.3 Parameterization

I now describe the specific parameters to be estimated and their connection to various substantive explanations for the diplomacy–peace relationship.

Static Utility: Long Run. Recall that the US's immediate payoff for taking action a in state S is given by the static utility function (4). This is the most critical part of the model for substantive interpretation, as the various competing explanations for the diplomacy–peace relationship can each be explained in terms of the state and action payoffs.

I begin with the long-run influences on US behavior, as captured by its utility for being in state S with country m, denoted $f_S(S \mid x^m, \theta)$. Without loss of generality, I normalize the payoff for having no relations and no conflict to zero. I allow the incremental payoff to diplomatic relations and military disputes each to depend on the covariates, x^m. Finally, I allow for the presence of an ongoing dispute to affect the incremental payoff to diplomatic relations (and vice versa). Formally, the parameterization of f_S is

$$f_S(S \mid x^m, \theta) = (x^m \cdot \alpha_{\text{rel}})R + (x^m \cdot \alpha_{\text{disp}})D + \alpha_{\text{rel}\times\text{disp}}RD, \tag{7}$$

where α_{rel}, α_{disp}, and $\alpha_{\text{rel}\times\text{disp}}$ are subcomponents of the parameter vector θ to be estimated.

The interaction coefficient, $\alpha_{\text{rel}\times\text{disp}}$, is perhaps the most critical parameter of the model. It represents the ongoing cost (if negative) or benefit (if positive) to maintaining a diplomatic presence in a country with which the US has an ongoing dispute. If $\alpha_{rel\times\text{disp}} < 0$, meaning it is costly to have diplomats present amid conflict, then there is a selection effect: the US is less likely to establish diplomatic relations with partners that are likely to initiate conflict. Moreover, depending on the other parameter values, there may also be a commitment, or hands-tying, effect. In particular, if diplomatic relations are sticky (i.e., it is costly to the US to cut off relations) and it is costly to maintain diplomats in a time of crisis, then the US will be less likely to initiate disputes once it has established diplomatic contact with another country.

Meanwhile, the coefficients on the covariates in (7) capture the extent to which any diplomacy–peace relationship is driven by spurious correlation, at least on observable variables. Specifically, if an observable country-level factor influences the US incentive for both diplomatic relations and for peace, then it should have nonzero coefficients with opposite signs in α_{rel} and α_{disp}. Of course, as with any observational statistical technique, there remains the possibility of spurious correlation due to unobservables. Ideally, there would be an instrument or other source of quasi-random variation in diplomatic relations or militarized disputes to use for causal identification. Given that changes in diplomatic status and in military hostility are infrequent and are decided at high political levels, it is doubtful that any source of quasi-random variation would be a powerful enough influence to allow for precise inference. Conditioning on observables is a second-best approach, and the results should be interpreted with the usual caution.

Static Utility: Short Run. The static utility function also includes immediate payoffs for taking particular diplomatic or conflict actions, which represent short-run influences on US behavior. Without loss of generality, for both diplomatic relations and military disputes, I normalize the payoff for choosing to maintain the status quo ($r = R$ or $d = D$) to zero. The parameters therefore represent the incremental payoff to attempting various changes in the status quo.

The immediate payoff function for diplomatic relations actions is parameterized as

$$f_r(r \mid S, x^m, \theta) = \beta_{\text{US-cutoff}}(1 - r)R + \beta_{\text{disp}\times\text{US-cutoff}}D(1 - r)R. \tag{8}$$

The first coefficient, $\beta_{\text{US-cutoff}}$, represents the baseline payoff to the US for cutting off relations relative to maintaining them.[8] If it is costly to cut off relations once they have been established, meaning the diplomatic status quo is sticky, then $\beta_{\text{US-cutoff}} < 0$. The second coefficient, $\beta_{\text{disp}\times\text{US-cutoff}}$, represents the influence of ongoing conflict on the short-run incentive to cut off diplomatic rela-

[8] As noted above, there is not data on cases in which the US intended to establish new relations but failed to get the other country's permission. Statistically, then, the immediate payoff to choosing $r = 1$ cannot be identified separately from the long-run payoff to being in the state $R = 1$. That is why (8) does not include terms for the immediate payoff to establishing new relations.

tions. If there is a political or symbolic incentive for US policymakers to express displeasure by cutting off relations in the midst of a crisis, then we would expect this interaction to be positive.

The short-run payoff function for dispute actions is similar:

$$\begin{aligned} f_d(d \mid S, x^m, \theta) = \beta_{\text{US-init}} d(1-D) + \beta_{\text{rel}\times\text{US-init}} Rd(1-D) \\ + \beta_{\text{US-quit}}(1-d)D + \beta_{\text{rel}\times\text{US-quit}} R(1-d)D. \end{aligned} \tag{9}$$

The main terms here, $\beta_{\text{US-init}}$ and $\beta_{\text{US-quit}}$, represent the baseline incremental payoffs to the US to initiating a new dispute and backing down from an ongoing dispute respectively. As with $\beta_{\text{US-cutoff}}$ in the diplomatic relations equation, these will be negative insofar as the dispute status quo is sticky. The interaction terms, $\beta_{\text{rel}\times\text{US-init}}$ and $\beta_{\text{rel}\times\text{US-quit}}$, capture how diplomatic relations alter the respective short-run incentives to seek changes in the conflict status quo. If the presence of formal diplomatic relations has a direct or immediate influence on conflict management, it should show up in these terms. If embassy staffs can identify clever bargains or solutions to thorny political problems, thereby decreasing the US's incentive to resort to force, then we would expect $\beta_{\text{rel}\times\text{US-init}} < 0$ or $\beta_{\text{rel}\times\text{US-quit}} > 0$.

Transition Function. To complete the model, I now describe the function that governs the probability distribution over the state variable. In most successive country–months, the state at time t will reflect the US's action at time $t-1$. However, from the US's perspective, there is some randomness in state transitions due to uncertainty over how the other country will behave. The following actions by m may result in $S_t^m \neq a_{t-1}^m$:

- m cuts off ongoing diplomatic relations with the US.
- m initiates a militarized dispute against the US.
- m backs down from an ongoing dispute with the US.

As there is not enough data to model countries besides the US as strategic actors, I assume the US forms expectations over the probability of m's actions, which enter via the transition function.

These expectations are functions of covariates and thereby vary systematically across countries.

I separate the transition probability into two functions, one for diplomatic relations and one for military disputes:[9]

$$\pi(S' \mid S, a, x^m, \theta) = \pi_r(R' \mid R, r, x^m, \theta)\pi_d(D' \mid D, d, x^m, \theta). \tag{10}$$

I first consider transitions in diplomatic relations. The transition is deterministic whenever the US chooses not to maintain relations with m, or $r_t^m = 0$. In this case, there are sure to be no diplomatic relations in the following period. Similarly, the transition is deterministic when there are not existing diplomatic relations and the US chooses to establish them.[10] The only truly random transition is when the US has ongoing relations with m, which m may choose to cut off. I use a logit to model this probability as a function of country-level covariates:

$$\pi_r(1 \mid R, r, x^m, \theta) = \begin{cases} 0 & r = 0, \\ 1 & r = 1, R = 0, \\ 1 - \text{logit}^{-1}(x^m \cdot \gamma_{m\text{-cutoff}}) & r = 1, R = 1, \end{cases} \tag{11}$$

where $\gamma_{m\text{-cutoff}}$ is a subcomponent of the parameter vector θ. The coefficients in $\gamma_{m\text{-cutoff}}$ represent influences on the probability that m will cut off ongoing relations with the US.

The parameterization of the dispute transition function is similar. The dispute transition is deterministic when the US chooses to initiate a new dispute. However, the other country may choose to initiate a dispute when the US seeks peace, or to back down from an ongoing dispute when the US would otherwise remain in conflict. I model each of these probability distributions

[9] This functional form implies the distribution over diplomatic relations states does not depend directly on the military dispute state or action, and vice versa. This restriction is placed for ease of interpretation and is not required for identification of the model parameters.

[10] In principle, there could be cases in which the US attempts to establish relations but is rebuked, so in terms of the model $r_t^m = 1$ but $R_{t+1}^m = 0$. Since such instances are not systematically recorded, there is no way to incorporate them in practice.

over m's actions as a logit:

$$\pi_d(1 \mid D, d, x^m, \theta) = \begin{cases} \text{logit}^{-1}(x^m \cdot \gamma_{m\text{-init}}) & d = 0, \\ 1 & d = 1, D = 0, \\ 1 - \text{logit}^{-1}(x^m \cdot \gamma_{m\text{-quit}}) & d = 1, D = 1, \end{cases} \tag{12}$$

where, again, $\gamma_{m\text{-init}}$ and $\gamma_{m\text{-quit}}$ are subcomponents of the parameter vector θ. Their coefficients represent the influence of covariates on the probabilities that m will initiate a dispute with the US and that m will back down from an ongoing dispute, respectively.

2 Data and Specification

The unit of observation is the country–month. The data contain each country in the international system between February 1816 and November 2007, as defined by the Correlates of War State System Membership data, v2016 (Correlates of War Project 2017). I exclude countries below the population threshold of 500,000 for inclusion in the Polity IV dataset (Marshall, Gurr and Jaggers 2017). Countries that leave and re-enter the international system within the time frame are treated as separate countries for purposes of analysis,[11] resulting in $M = 205$ time series. The panel is unbalanced, with just eight countries appearing in the international system for all 2,302 possible months.[12] In total, there are 154,768 country–month observations.

2.1 States and Actions

Diplomatic representation. To code the status of US diplomatic representation in each country–month, I collect comprehensive data from the records of the Office of the Historian of the US State Department (United States Department of State 2018). For each country with which the US has

[11] For example, Estonia leaves the international system in June 1940 and re-enters in September 1991. Without separating Estonia into two time series, I would have to treat the transition between these months like any normal month-to-month transition.

[12] These are Italy, Portugal, Russia, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

ever had formal diplomatic contact, the Office of the Historian has a digital page recording the dates of recognition, the opening of diplomatic relations, and the establishment or closure of permanent missions like consulates, legations, and embassies. These documents are not quite well structured enough for machine coding to be reliable, so my research assistants and I hand-code the date and nature of each change in status with each country. For details on the mapping between the State Department identifiers and the Correlates of War country codes, see the Appendix.

I dichotomize the diplomatic relations variable by coding relations as present, or $R_t^m = 1$, whenever the US has an embassy or legation open in the country's capital, or when the head of another American embassy or legation has been designated to represent the US with m. Otherwise, $R_t^m = 0$. When the status changes during a particular month, for example due to an embassy closure, the minimal value is used. Diplomatic presence below the level of full representation, such as consulates and interests sections, are coded as $R_t^m = 0$ in the absence of a legation or embassy. Diplomatic relations are coded as present in about 87% of the country–months in the data. The US has diplomatic relations for at least one month with 197, or 96%, of the 205 countries in the data. For additional details on the coding of diplomatic status, see the Appendix.

Diplomatic relations may be severed at the behest of either party. Therefore, when relations exist at t, $R_t^m = 1$, the action in the preceding period is coded as the US choosing to maintain relations, $r_{t-1}^m = 1$. Similarly, when there are no relations in two successive periods, $R_{t-1}^m = R_t^m = 0$, the earlier period is coded as the US choosing no relations, $r_{t-1}^m = 0$. Finally, when relations are cut off, $R_{t-1}^m = 1$ and $R_t^m = 0$, the coding of the action r_{t-1}^m depends on which party is identified as responsible in the State Department records. In particular, when US diplomats are described as having been expelled or otherwise unwillingly removed by m, the coding is $r_{t-1}^m = 1$.

Military disputes. I code the US as being in a dispute with m, or $D_t^m = 1$, when there is an ongoing Militarized Interstate Dispute between them, as coded by Gibler, Miller and Little (2016), v2.02. Any month with at least one day in dispute is coded as $D_t^m = 1$. Disputes comprise about 1.6% of country–months in the data. The US is involved in at least one dispute with 62, or 30%,

Variable	Units	Min	Mean	Max	SD
US Relative Power	probability	0.54	0.71	0.84	0.06
Distance	$\sinh^{-1}$(miles/10000)	0.00	0.49	0.84	0.16
Major Power	binary	0	0.05	1	0.23
Alignment	S-score (-1 to 1)	-0.37	0.22	0.88	0.28
Democracy	Polity score (-10 to 10)	-10	-0.62	10	5.96

Table 1. Descriptive statistics for each covariate.

of the 205 countries in the data.

I use data on the initiation and outcomes of disputes to code the US's actions. As with the diplomatic relations actions, whenever the dispute state is the same in two successive months, $D^m_{t-1} = D^m_t = D$, I code the earlier action as $d^m_{t-1} = D$. When a dispute begins anew, $D^m_{t-1} = 0$ and $D^m_t = 1$, I code $d^m_{t-1} = 1$ if and only if the US is coded as being on "Side A" in the Militarized Interstate Dispute data. When a dispute ends, $D^m_{t-1} = 1$ and $D^m_t = 0$, I code $d^m_{t-1} = 1$ (i.e., the US would have chosen to keep fighting had m not backed down) if and only if the US is coded as a victor or m is coded as having yielded.

2.2 Covariates

In the equation for the US's long-run payoffs, I adjust for covariates that might plausibly account for both diplomatic ties and conflict behavior, as identified in previous literature.[13] Those that are also included in the transition probability functions are marked with an asterisk. Table 1 provides descriptive statistics about each covariate.

US Relative Power (*). Military power is a well-known predictor of interstate conflict (Singer, Bremer and Stuckey 1972; Bremer 1992) and has also been identified as a factor in diplomatic tie formation (Neumayer 2008; Kinne 2014). I operationalize relative power the probability that the US would be victorious in case of a militarized dispute with m. I use the Dispute Outcome

[13] A notable exclusion from the model is bilateral trade flows. Promotion of trade is an explicit goal of the US diplomatic system, and Pollins (1989) finds that diplomatic ties indeed predict greater trade. Given the degree of endogeneity, it is prudent to exclude trade from the model.

Expectations (DOE) scores developed by Carroll and Kenkel (2017), which are more accurate than the traditional capability ratio at predicting dispute outcomes. Specifically, the *US Relative Power* variable for country m equals the annual average of $p_{\text{US}}/(p_{\text{US}} + p_m)$, where p_{US} and p_m are the (undirected) DOE estimates of the probability of victory by the US and by m in the given year.[14]

Distance. Naturally, states are disproportionately likely to interact—positively and negatively—with their neighbors and other nearby states. Diplomatic networks are relatively dense within geographical regions (Russett and Lamb 1969), and the probability of a bilateral diplomatic tie decreases with the distance between states (Neumayer 2008; Kinne 2014). However, disputes are also much more likely between proximate states than between distant ones (Bremer 1992).

To adjust for the effects of distance on both diplomatic relations and military hostility, I include a distance variable in the specification. I use the capital-to-capital distance between the US and country m in miles, as calculated by the NewGene software, v1.0.1 (Bennett, Poast and Stam 2017). For states that share a land border with the US, namely Canada and Mexico, the distance is coded as zero. For cases in which the distance changes due to the capital moving, I use the minimum distance across the sample period. I then form the *Distance* variable by taking an inverse hyperbolic sine transformation of the raw distance so as to roughly normalize the distribution (Burbidge, Magee and Robb 1988).[15]

Major Power. Whereas minor powers tend to interact mainly within regional networks, major powers have a global reach. Diplomatic ties are disproportionately likely between major powers (Russett and Lamb 1969; Kinne 2014), as are conflicts (Bremer 1992). I code major power status according to the Correlates of War designation (Correlates of War Project 2017). *Major Power* is an indicator for whether m is ever a major power during the sample period.[16] From most of the sample period (1898 onward), the US itself is a major power.

[14]DOE also provides an estimate of the probability of a stalemate, so $p_{\text{US}} + p_m < 1$.
[15]Specifically, $Distance = \sinh^{-1}(y/10000)$, where y is the raw distance in miles.
[16]The major powers are Austria, China, France, Germany, Italy, Japan, Russia, and the United Kingdom.

Alignment. Whereas geographical proximity and major power status are thought to increase states' propensity for both diplomatic contact and militarized conflict, ideological affinity should have opposite effects. Prior empirical work yields mixed results on the effects of shared interests on bilateral diplomatic ties, with Neumayer (2008) finding a positive effect and Kinne (2014) obtaining a null result. I use the standard measure of ideological affinity, namely alliance portfolio similarity. For each year in the sample, I calculate the S-score (Signorino and Ritter 1999) between the alliance membership portfolios of the US and m. Alliance ties are taken from the Correlates of War Formal Alliances data, v4.1 (Gibler 2009) and are weighted by each alliance partner's CINC score. The variable *Alignment* is the average annual S-score.

Democracy (*). One of the clearest stylized facts in the study of international conflict is that disputes and wars are disproportionately unlikely between democracies (Oneal and Russett 2001). Democracies also tend to exchange diplomats with each other at a greater rate than other pairs of countries (Kinne 2014). I measure regime type via the standard "polity2" index from the Polity IV project, v2016 (Marshall, Gurr and Jaggers 2017). The variable *Democracy* is m's average annual score on this index for years in which it is available.

3 Results

Before examining the results of the full structural model, I examine the raw data on the US's actions as a function of the current state. Table 2 contains the US's choice of dispute action (whether or not to seek a dispute) as a function of the current state of diplomatic relations and military hostility. As we would expect, the US is quite unlikely to initiate a dispute regardless of the current status of diplomatic relations. That said, the empirical frequency of initiations is about three times as great with countries with which the US lacks formal diplomatic ties (0.3% of country–months) than with its diplomatic partners (0.1% of country–months). The relative difference is similar, though the magnitudes are larger, for the US's propensity to back down from an ongoing dispute. The US chooses to de-escalate in about 17% of country–months in disputes with diplomatic partners,

compared to 6% for non-partners.

R_t	D_t	$d_t = 0$	$d_t = 1$
0	0	21638 (99.7%)	57 (0.3%)
1	0	141870 (99.9%)	99 (0.1%)
0	1	87 (6.0%)	1368 (94.0%)
1	1	163 (17.1%)	793 (82.9%)

Table 2. Cross-tabulation of dispute actions by current state, with row percentages in parentheses.

R_t	D_t	$r_t = 0$	$r_t = 1$
0	0	21527 (99.23%)	168 (0.77%)
0	1	1455 (100.00%)	0 (0.00%)
1	0	31 (0.02%)	141938 (99.98%)
1	1	8 (0.84%)	948 (99.16%)

Table 3. Cross-tabulation of diplomatic actions by current state, with row percentages in parentheses.

Similarly, Table 3 tabulates the US's diplomatic actions as a function of the current state of relations and military hostility. Changes in diplomatic status are extraordinarily rare, with the US seeking to maintain the status quo more than 99% of the time. As mentioned above, the US never forms new diplomatic ties with a country with which it has an ongoing militarized dispute. By contrast, it begins new relations in about 0.8% of country–months at peace with a non-partner. Most instances of the US cutting off diplomatic relations occur at peacetime, not during a dispute. However, since disputes are so much rarer than peacetime, the conditional frequency of cutting off relations is 0.8 percentage points greater during a dispute.

The raw frequencies are suggestive of a reciprocal relationship between diplomatic ties and peaceful relations. The US is less likely to initiate a dispute with its diplomatic partners than with non-partners, and more likely to back down from a dispute if one happens to begin. In the other direction, peace appears to be a necessary condition for the establishment of new diplomatic ties, and the relative incidence of cutting off relations is noticeably higher in times of dispute. Two questions arise from these descriptive results: Do the apparent effects hold up once we account for observable confounding factors? And if they do, which of the various plausible mechanisms is

responsible for them?

3.1 Main Results and Discussion

In addition to the full model described above, I estimate three other models with more restrictive specifications of the static utility function. (All four employ the same specification for state transitions.) The first only contains terms for the baseline payoffs to each state, excluding all covariate effects and short-run action-specific payoffs. The second and third each individually introduce the covariate influences on state payoffs and the utilities for various actions. The estimated coefficients for the static utility function parameters are reported in Table 5, and those for the transition function appear in Table 6. As the results are broadly similar in substance across the specifications, I focus on the full model in the subsequent discussion.

Effect	Absolute difference		Relative difference	
Relations on dispute initiation	−0.002	[−0.009, −0.001]	−0.7	[−0.8, −0.3]
Relations on dispute termination	0.08	[0.01, 0.14]	1.0	[0.6, 2.0]
Dispute on severing relations	0.006	[0.003, 0.014]	21.8	[3.9, 55.7]

Table 4. Estimated marginal effects of diplomatic and conflict status on US actions.

Before examining the structural parameters, I summarize the estimates of the reciprocal effects of diplomatic relations and military hostility. For example, to estimate the effect of diplomatic relations on the probability that the US will initiate a dispute, I use the parameter estimates $\hat{\theta}$ to calculate for each other country m the difference in the probability of US initiation:

$$\underbrace{\left[P\left((0,1)\,|\,(1,0),x^m,\hat{\theta}\right)+P\left((1,1)\,|\,(1,0),x^m,\hat{\theta}\right)\right]}_{\text{pr. US initiates dispute when } R_t^m=1}-\underbrace{\left[P\left((0,1)\,|\,(0,0),x^m,\hat{\theta}\right)+P\left((1,1)\,|\,(0,0),x^m,\hat{\theta}\right)\right]}_{\text{pr. US initiates dispute when } R_t^m=0}.$$

The estimate of the marginal effect is the average of this difference across $m = 1, \ldots, M$. I calculate 95% confidence intervals for the marginal effect via a parametric bootstrap, following Hanmer and Kalkan (2013). Table 4 reports the marginal effects of greatest substantive interest: the effects of diplomatic relations on the US initiating or backing down from a dispute, and the effect of an

ongoing dispute on the US propensity to cut off existing diplomatic relations.

Unlike the raw frequencies reported above in Tables 2 and 3, the estimated marginal effects reported here come from a model that accounts for observable confounders and for the US's rational expectations about its own future behavior. Nevertheless, the story is broadly the same—formal diplomatic ties increase the chance that the US will act peacefully, and bilateral peace increases the stability of diplomatic ties. Each of the three effects is statistically discernible from zero at the 0.05 significance level. The effect magnitudes are not as great as in the raw estimates but remain substantively meaningful. For example, all else equal the US is twice as likely to terminate a dispute when it has relations with m than when it does not.

The next question that arises is *why* there is this reciprocal relationship between diplomatic ties and a lack of military hostility. The above estimates account for covariates, so their statistical and substantive significance rule out a mere spurious correlation, at least insofar as the observed variables capture the most important sources of confounding variation. But we need to examine the structural parameters of the model in order to distinguish short- from long-run mechanisms in the diplomacy–peace relationship.

Table 5 reports the point estimates and standard errors of the parameters of the US's static utility function. Recall that the parameters denoted with an α are associated with the US's utility from being in the given state of diplomatic relations or military hostility in a particular month. Since the current state is "sunk" by the time the US takes its action in a given period, these parameters represent long-run influences on US behavior. By contrast, the parameters denoted with a β affect the immediate payoff from the associated action and therefore represent short-run behavioral influences.

The primary driver of the reciprocal relationship between diplomatic ties and bilateral peace is the negative (and statistically significant) value of $\alpha_{\text{rel}\times\text{disp}}$, which represents an ongoing cost of maintaining diplomatic ties with m during a time of crisis. The US faces an unappealing choice when it initiates a dispute with a country in which it maintains an embassy: it must either pay the exceedingly high short-run cost of withdrawing its diplomatic staff (represented by $\beta_{\text{US-cutoff}} < 0$),

	Baseline	+Covariates	+Actions	Full Model
α_{rel}: Intercept	2.40*	0.22	−0.23*	−0.24*
	(0.01)	(0.15)	(0.01)	(0.09)
α_{rel}: Distance		−2.32*		−0.14*
		(0.07)		(0.04)
α_{rel}: Major Power		0.90*		0.02
		(0.04)		(0.02)
α_{rel}: Democracy		0.20*		0.01*
		(0.00)		(0.00)
α_{rel}: Alignment		−1.33*		−0.11*
		(0.04)		(0.02)
α_{rel}: US Relative Power		5.51*		0.17
		(0.20)		(0.12)
α_{disp}: Intercept	−2.90*	−3.06*	0.42*	0.20
	(0.13)	(1.16)	(0.20)	(0.38)
α_{disp}: Distance		−6.35*		−0.39*
		(0.44)		(0.08)
α_{disp}: Major Power		2.00*		0.11*
		(0.20)		(0.03)
α_{disp}: Democracy		−0.09*		0.01
		(0.02)		(0.01)
α_{disp}: Alignment		−3.43*		−0.15*
		(0.32)		(0.06)
α_{disp}: US Relative Power		5.26*		0.65
		(1.73)		(0.41)
$\alpha_{\text{rel}\times\text{disp}}$	−13.75*	−4.37*	−0.47*	−0.40*
	(0.17)	(0.15)	(0.17)	(0.20)
$\beta_{\text{US-cutoff}}$			−13.14*	−13.05*
			(0.20)	(0.20)
$\beta_{\text{disp}\times\text{US-cutoff}}$			−0.67	0.37
			(2.29)	(2.59)
$\beta_{\text{US-init}}$			−12.21*	−12.07*
			(2.76)	(4.74)
$\beta_{\text{rel}\times\text{US-init}}$			3.13	1.75
			(2.37)	(2.71)
$\beta_{\text{US-quit}}$			3.70	3.79
			(2.72)	(4.66)
$\beta_{\text{rel}\times\text{US-quit}}$			−3.45	−2.20
			(2.33)	(2.68)
Country–months	154,768	154,768	154,768	154,768
Log-likelihood	−63331	−57287	−4679	−4622

Table 5. Parameter estimates for the static utility equation in the full 1816–2007 analysis. $*$: $p < 0.05$.

or pay the ongoing costs associated with maintaining a diplomatic presence in a time of military hostility. Consequently, by establishing diplomatic ties with a country, the US reduces its own willingness to initiate a conflict with that country in the future. In other words, formal diplomatic relations serve as a hands-tying or commitment device for peace.

Meanwhile, the structural estimates provide little support for the idea that short-run incentives drive the observed relationship between diplomacy and peace. The influence of an ongoing dispute on the US's immediate payoff from cutting off diplomatic relations is represented by the parameter $\beta_{\text{disp}\times\text{US-cutoff}}$. For example, if the US could reap a political gain domestically or internationally through the symbolic act of cutting off relations with a military adversary, that would manifest itself in $\beta_{\text{disp}\times\text{US-cutoff}} > 0$. While this is indeed the sign of the point estimate in the full model, it is not robust across specifications, nor can we reject the null hypothesis that the parameter equals zero. The effect due to this kind of symbolic incentive is minimal at best.

The structural estimates cut even more starkly against the idea that a diplomatic presence increases the US's short-run payoff from acting peacefully. The effect of having an embassy on the US's immediate utility to initiating a dispute is represented by the parameter $\beta_{\text{rel}\times\text{US-init}}$. If diplomacy makes conflict less attractive in the short run, perhaps because professional diplomats help US leaders identify nonobvious peaceful solutions to problems that arise, then we would expect $\beta_{\text{rel}\times\text{US-init}} < 0$. But in the estimated model this parameter is statistically indistinguishable from zero, and the point estimate goes in the opposite direction. The effect of diplomatic tie on the short-run payoff for backing down from an ongoing dispute, $\beta_{\text{rel}\times\text{US-quit}}$, is also statistically insignificant and goes in the opposite of the direction we would expect if professional diplomats directly affected the US's incentives for peaceful behavior.

The pattern of the coefficients in the state payoff equations illustrates why spurious correlation (at least on observables) does not explain away the evident diplomacy–peace relationship. The case for spuriousness would be that the kind of state that the US prefers to maintain diplomatic ties with is the same kind of state that the US prefers to avoid conflict with. However, the coefficient estimates provide little support for this claim. There are three statistically significant influences

	Baseline	+Covariates	+Actions	Full Model
$\gamma_{m\text{-cutoff}}$: Intercept	-10.47^*	-11.03^*	-11.53^*	-10.76^*
	(3.28)	(3.30)	(3.29)	(3.29)
$\gamma_{m\text{-cutoff}}$: Democracy	-0.24^*	-0.21	-0.20	-0.22
	(0.12)	(0.12)	(0.12)	(0.11)
$\gamma_{m\text{-cutoff}}$: US Relative Power	1.24	2.06	3.10	1.95
	(4.66)	(4.69)	(4.67)	(4.67)
$\gamma_{m\text{-init}}$: Intercept	-1.02^*	-0.42	-0.60	-0.93
	(0.17)	(0.91)	(0.86)	(0.87)
$\gamma_{m\text{-init}}$: Democracy	-0.45^*	-0.15^*	-0.14^*	-0.12^*
	(0.01)	(0.02)	(0.02)	(0.02)
$\gamma_{m\text{-init}}$: US Relative Power	-7.63^*	-9.94^*	-9.71^*	-9.20^*
	(0.25)	(1.38)	(1.30)	(1.32)
$\gamma_{m\text{-quit}}$: Intercept	2.35^*	-0.33	-6.66^*	-6.75^*
	(0.32)	(0.67)	(1.49)	(1.84)
$\gamma_{m\text{-quit}}$: Democracy	0.11^*	0.11^*	0.10^*	0.11^*
	(0.01)	(0.01)	(0.03)	(0.03)
$\gamma_{m\text{-quit}}$: US Relative Power	-0.30	2.29^*	4.62^*	4.88
	(0.45)	(0.99)	(2.22)	(2.73)
Country–months	154,768	154,768	154,768	154,768
Log-likelihood	-63331	-57287	-4679	-4622

Table 6. Parameter estimates for the transition function in the full 1816–2007 analysis. $*$: $p < 0.05$.

on the US's long-run payoff from diplomatic relations with a country: distance, democracy, and interest alignment. All three of these variables have the same sign in the equation for the US's long-run payoff from military hostility with *m*, whereas we would expect opposite signs if the relationship were spurious.

It is intuitive that distance negatively affects the US's payoffs from both diplomatic ties and military hostility. Particularly in the period before it becomes a major power, the US simply has more entanglements or mutual concern with closer countries than with distant ones. It is more puzzling that interest alignment is also a negative predictor of both payoffs. This may be an artifact of the temporal aggregation, as the interest alignment variable has varying signs and is never statistically significant in the temporal sub-analyses reported below.

The US's uncertainty over *m*'s actions is what allows the structural model to distinguish between short- and long-run influences on US behavior. If the US actions at time *t* fully determined

the state of diplomatic relations and military hostility at time $t + 1$, it would be impossible to separately identify these components. To understand when the US is most uncertain about m's actions, we can look to the estimates of the transition function parameters, reported in Table 6, which define the distribution over m's behavior.

The US's diplomatic partners very rarely expel US diplomats, so neither of the factors modeled (US Relative Power and Democracy) are statistically significant at conventional levels in $\gamma_{m\text{-cutoff}}$. The main indication from the point estimates is that democracies are relatively unlikely to halt existing diplomatic ties with the US. In line with the democratic peace literature (Oneal and Russett 2001), regime type more strongly predicts m's conflict behavior toward the US. As expected, democratic countries are significantly less likely to initiate, and quicker to back down from, militarized disputes with the US. Moreover, and intuitively, weaker states are significantly less likely to initiate disputes with the US. The point estimate also suggests that weaker states more readily back down from existing disputes with the US, though the estimate here is not statistically significant at the usual level. In combination, these results imply that the US is most uncertain about its diplomatic and military relations with states that have autocratic regimes and are militarily strong.

3.2 Robustness over Time

As noted above, the covariates are assumed to be time-invariant in the statistical model. For time-varying variables, I take the average by country across the sample period in order to meet this condition. Otherwise, to allow them to vary in the model, I would have to incorporate them into the state space and transition function, resulting in an explosion of parameters and model complexity. Using the full sample period of 1816–2007 helps reduce the variance of the estimator, but may raise concerns about bias due to the averaging of coefficients across such a long period. In this section, I rerun the model in four temporal subsamples in order to gauge the robustness of the main results. As expected, it is more difficult to draw precise inferences with less data. The robustness checks are consistent with the main finding of the analysis thus far—that the diplomacy–peace relationship is driven primarily by a commitment effect—but do not definitively rule out alternatives.

	1816–1897	1898–1945	1946–1991	1946–2007
α_{rel}: Intercept		0.13	0.02	−0.07
		(0.18)	(0.15)	(0.14)
α_{rel}: Distance	−0.33*	−0.28*	−0.07	−0.04
	(0.10)	(0.07)	(0.06)	(0.06)
α_{rel}: Major Power	−0.01	−0.06	0.05	0.07
	(0.05)	(0.05)	(0.06)	(0.06)
α_{rel}: Democracy	0.00	0.00	0.01*	0.01*
	(0.00)	(0.00)	(0.00)	(0.00)
α_{rel}: Alignment	−0.06	−0.04	0.02	−0.03
	(0.08)	(0.11)	(0.05)	(0.05)
α_{rel}: US Relative Power	−0.20	−0.26	−0.17	−0.08
	(0.11)	(0.26)	(0.20)	(0.19)
α_{disp}: Intercept		7.23	1.60	2.96*
		(5.44)	(1.34)	(1.02)
α_{disp}: Distance	−2.21*	−0.58*	−0.04	0.05
	(0.48)	(0.15)	(0.11)	(0.09)
α_{disp}: Major Power	0.07	−0.03	0.29*	0.20*
	(0.46)	(0.09)	(0.14)	(0.10)
α_{disp}: Democracy	0.07	−0.11*	−0.01	0.01
	(0.07)	(0.05)	(0.02)	(0.02)
α_{disp}: Alignment	−0.26	−0.32	0.04	0.05
	(1.00)	(0.26)	(0.10)	(0.11)
α_{disp}: US Relative Power	−1.15	0.23	−1.31	−2.69*
	(4.39)	(1.88)	(0.90)	(0.81)
$\alpha_{\text{rel}\times\text{disp}}$	1.91	−0.11	−0.33	−0.36
	(2.91)	(0.31)	(0.34)	(0.20)
$\beta_{\text{US-cutoff}}$	−14.88*	−12.16*	−12.18*	−12.48*
	(0.66)	(0.40)	(0.29)	(0.26)
$\beta_{\text{disp}\times\text{US-cutoff}}$		3.79	0.51	0.43
		(3.99)	(5.15)	(2.63)
$\beta_{\text{US-init}}$	−11.59	−94.11	−18.46	−21.39*
	(10.16)	(69.39)	(11.62)	(7.27)
$\beta_{\text{rel}\times\text{US-init}}$		−1.71	1.30	0.85
		(3.65)	(5.26)	(2.60)
$\beta_{\text{US-quit}}$	4.33	82.58	10.83	13.91
	(9.46)	(67.47)	(11.49)	(7.17)
$\beta_{\text{rel}\times\text{US-quit}}$		1.42	−2.63	−2.51
		(3.51)	(5.24)	(2.57)
Country–months	30,004	30,060	63,737	94,704
Log-likelihood	−734	−895	−2103	−2767

Table 7. Parameter estimates for the static utility function in temporal subsamples. $*$: $p < 0.05$.

I consider four substantively meaningful subsets of the full sample period. The first is 1816–1897, the period before the Spanish-American War and the US's ascension to major power status.[17] The next is the period of the US as a major power in a multipolar world, 1898–1945, between the Spanish-American War and the conclusion of World War II. Third is the Cold War period, 1946–1991. Last is the entire available postwar period, 1946–2007.[18] Table 7 reports the parameter estimates for the US's static utility function in each of these periods.

An immediate conclusion is that there are meaningful differences over time in the set of variables that affect the US's payoff from diplomatic ties or military hostility with a particular partner. Distance, which was negative and statistically significant in both equations in the full analysis, here only remains so in the pre–World War II period. As the US became a global power and later a global hegemon, the effect of distance on its decision-making shrank. The mirror image of distance is democracy, which does not significantly enter the US's diplomatic calculations before 1945 but is positive and statistically significant thereafter.

The critical term in the full analysis above, the cost to maintaining a diplomatic presence during a crisis represented by the interaction term $\alpha_{\text{rel}\times\text{disp}}$, here remains negative in all but the earliest period. However, it is not statistically significant at the conventional level, and is only significant at the weaker 0.10 level in the most recent time period. With the reduction in sample size, it is natural that standard errors would increase, so the lack of statistical significance is not surprising. Ultimately, the subsample results for the commitment mechanism are consistent with those of the full analysis, but not definitive.

That said, even with the reduction in bias due to temporal averaging, the evidence that the diplomacy–peace relationship is driven by spurious correlation (again, on observables) remains scant. In no time period do the coefficient estimates indicate that the predictors of US incentive for diplomatic relations have the opposite effect on the US incentive for military hostility, or vice

[17] Identification problems with the full specification arise in this time period because the US only initiates disputes with diplomatic partners and never backs down from an ongoing dispute with a non-partner. As seen in Table 7, I exclude terms that are unidentified or so weakly identified that their estimation poses numerical problems.

[18] There is not enough variation in US diplomatic ties in the post–Cold War period, 1992–2007, to estimate this on its own.

versa.

4 Conclusion

I have employed a dynamic formal and statistical model, following the methods pioneered by Rust (1987, 1988), to analyze US diplomatic relations and conflict management. Unlike reduced form models, the structural approach allows me to disentangle long-run from short-run influences in the reciprocal relationship between diplomatic ties and peace. The estimation results indicate that a reciprocal relationship indeed exists; diplomatic ties increase the US incentive to behave peacefully, and ongoing conflict makes the US more likely to cut off diplomatic relations. A close examination of the structural parameters suggests that this relationship is best explained by diplomatic ties serving as a long-run commitment device: it is costly for the US to maintain diplomatic ties during a time of crisis, so the US will be relatively hesitant to initiate a dispute with a country once it has established a diplomatic presence there.

There remains much to be done in future work. The most obvious limitation of the present study is that it solely considers American diplomatic and conflict relationships. Substantively, fine-grained data on other countries' diplomatic networks would help identify whether the commitment effect found here is specific to the American case or is a more general feature of formal diplomatic institutions. Methodologically, richer data on non-US actions would allow for the model to be estimated as a game rather than as a decision problem, opening up a richer set of strategic incentives to uncover.

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A Supplemental Appendix

A.1 Coding of Diplomatic Status

The raw data (available on request) codes transitions in the highest level of American diplomatic representation in each other country. The set of levels from least to greatest is as follows:

1. None
2. Interests section
3. Liaison office
4. Consulate (or nonresident consul general)
5. Legation (or nonresident envoy)
6. Embassy (or nonresident ambassador)

These are coded according to the *Guide to the United States' History of Recognition, Diplomatic, and Consular Relations, by Country, since 1776*. When this guide contains ambiguities in dates or status, I also consult the guide on *Principal Offices and Chiefs of Mission* for supplemental information.

An electronic version history of the source records is available at https://github.com/HistoryAtState/rdcr. The codings here are based on the records as of 16 May 2016 (commit hash beginning with `d70219`).

Some relevant coding rules and judgment calls are as follows:

- In the analysis in this paper, only the two greatest statuses (embassy and legation) are coded as diplomatic relations, $R_t^m = 1$. All lower statuses are coded as $R_t^m = 0$.
- Whenever the records note the specific date of an embassy, legation, or consulate general opening, that is used as the transition date. If a specific date is not provided, I use the date of presentation of credentials by the first chief of mission.
- "Missions" (e.g., to France and Prussia in the 1700s) are coded as legations.
- "Office of the U.S. Representative" (e.g., Marshall Islands) and "Diplomatic Agent" (e.g., Morocco) are coded as liaison offices.
- Nonresident charges d'affaires (e.g., Dominican Republic) and ministers (e.g., Estonia) are coded as nonresident envoys.
- For governments in exile during World War II, an "embassy near the government" is treated as an embassy.

A.2 State System Membership and Country Names

Table 8 records the mapping between the Correlates of War State System Membership data (Correlates of War Project 2017) and the State Department Office of the Historian records (United States Department of State 2018) for countries that have different names in the two sources. Countries with which the US never has relations are missing in the State Department data, indicated by a dot (.) in the table. Taiwan is indicated with an asterisk (*) as it is a special case. Under the

One-China Policy, the US does not officially recognize Taiwan as a separate sovereign entity from mainland China. Consequently, historical US diplomatic relations with Taiwan are recorded in the document for China.

Code	Name	Start	End	Dept. State name
31	Bahamas	1973-07-10	2011-12-31	The Bahamas
56	St. Lucia	1979-02-22	2011-12-31	Saint Lucia
57	St. Vincent and the Grenadines	1979-10-27	2011-12-31	Saint Vincent and the Grenadines
58	Antigua & Barbuda	1981-11-01	2011-12-31	Antigua and Barbuda
60	St. Kitts and Nevis	1983-09-19	2011-12-31	Saint Kitts and Nevis
200	United Kingdom	1816-01-01	2011-12-31	The United Kingdom
210	Netherlands	1816-01-01	1940-07-14	The Netherlands
210	Netherlands	1945-06-26	2011-12-31	The Netherlands
265	German Democratic Republic	1954-03-25	1990-10-02	East Germany
269	Saxony	1816-01-01	1867-04-17	.
271	Wuerttemburg	1816-01-01	1871-01-18	Wurttemberg
273	Hesse Electoral	1816-01-01	1866-07-26	.
275	Hesse Grand Ducal	1816-01-01	1867-04-17	Hesse
280	Mecklenburg Schwerin	1843-01-01	1867-04-17	Mecklenburg-Schwerin
300	Austria-Hungary	1816-01-01	1918-11-12	Austrian Empire
316	Czech Republic	1993-01-01	2011-12-31	The Czech Republic
332	Modena	1842-01-01	1860-03-15	.
335	Parma	1851-01-01	1860-03-15	The Duchy of Parma
337	Tuscany	1816-01-01	1860-03-15	The Grand Duchy of Tuscany
345	Yugoslavia	1878-07-13	1941-04-20	Kingdom of Serbia/Yugoslavia
345	Yugoslavia	1944-10-20	2011-12-31	Kingdom of Serbia/Yugoslavia
346	Bosnia and Herzegovina	1992-04-07	2011-12-31	Bosnia-Herzegovina
420	Gambia	1965-02-18	2011-12-31	The Gambia
437	Ivory Coast	1960-08-07	2011-12-31	Cote D'Ivoire
484	Congo	1960-08-15	2011-12-31	Republic of the Congo
511	Zanzibar	1963-12-19	1964-04-26	.
678	Yemen Arab Republic	1926-09-02	1990-05-21	Yemen
696	United Arab Emirates	1971-12-02	2011-12-31	The United Arab Emirates
713	Taiwan	1949-12-08	2011-12-31	*
731	North Korea	1948-09-09	2011-12-31	.
732	South Korea	1949-06-29	2011-12-31	Republic of Korea
760	Bhutan	1971-09-21	2011-12-31	.
775	Myanmar	1948-01-04	2011-12-31	Burma
816	Vietnam	1954-07-21	1975-04-30	.
817	Republic of Vietnam	1954-06-04	1975-04-30	Vietnam
860	East Timor	2002-09-27	2011-12-31	Timor-Leste
940	Solomon Islands	1978-07-07	2011-12-31	The Solomon Islands
987	Federated States of Micronesia	1991-09-17	2011-12-31	Micronesia

Table 8. Mapping from Correlates of War state system entries into State Department records for cases in which the country names differ.