

Extending Quek (2021)

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Abstract

Quek (2021) expands on the traditional understanding of costly signaling to argue there are four costs a state can send. I code them in all real-world crises that occurred between states since WWII. Relative to costless actions, I find that sunk costs are associated with worse outcomes in crises for states that sent them and tying-hands costs are associated with better outcomes. Reducible and installment costs are not statistically better than costless actions. My findings are in line with recent work highlighting both the efficacy of costless actions and the possible inferiority of sunk cost actions. This raises a puzzle: why would a state use sunk costs instead of costless actions or other cost types that appear more effective?

Introduction

One of the concerns in the study of conflict is how states can credibly communicate that they are tough enough to deter predation and war without starting one themselves. The literature largely says that states must take sufficiently costly actions to convince others that they are tough, since only tough states can sustain the costs of these actions. Thus, weak states must make concessions to prevent conflict while tough states are often conceded to, especially when they can create costs for themselves to demonstrate that they are not worth fighting without having to fight to prove it.

The conventional wisdom is that there are two types of costly actions that tough states can take: sunk and tying-hands costs (Fearon 1997). Quek (2021) explicates the logic of

costly actions to uncover two other types: reducible and installment costs. Quek (2021) then shows the efficacy of each cost in a survey experiment on U.S. civilians. However, Quek (2021) cannot answer how the various costs state leaders incur in the real world affect the credibility of their actions.

My analysis attempts to fill this gap in a straightforward manner. Using the International Crisis Behavior (ICB) dataset (Brecher and Wilkenfeld 1997; Brecher et al. 2023), I coded the cost type of actions taken by states in every relevant crisis since the end of WWII. The relevant crises were interstate crises that were not immediately wars. I then evaluated how the cost type of a state’s action related to the crisis outcome for that state. I find that relative to a costless action, sunk costs are associated with worse outcomes for states while tying-hands costs are associated with better outcomes. Reducible and installment costs do not produce statistically distinguishable outcomes from costless actions.

In the next section I define the different costs and provide examples for each, both from the original authors and observed crises in the ICB dataset. Then, I describe the ICB data in more detail and introduce my coding rules. Results are presented afterwards. Finally, I conclude with a discussion of possible explanations for the observed patterns.

Definitions

There are 5 types of actions a state (say, sender) can take when communicating with another state (say, receiver). These actions are displayed in Table 1 and include: costless, sunk cost, reducible cost, tying-hands cost, and installment cost actions.

Costless Actions

Costless actions are indications of a sending state’s preferences without a cost that demonstrates how tough or resolved a state is about these preferences. Thus, a receiving state may be unsure how credible the sending state’s preferences are and might not take them seriously.

		Final cost depends on sender or receiver's future behavior?	
		Yes	No
Sender's action initially costly?	Yes	Reducible	Sunk
	No	Tying-hands	Installment Costless

Table 1: The 5 cost types a state's action can be associated with. This is a modified version of Table 1 from Quek (2021, 538), where the columns could be read (left to right) as “Contingent” and “Noncontingent” and the rows (top to bottom) as “Ex ante” and “Ex post.”

In Fearon's (1994, 579) words: “Costless signals, which often include private diplomatic communication and sometimes more public measures, will be so much ‘cheap talk,’ since a state with low resolve may have no disincentive to sending them.” Theoretically, as in the bargaining model of war (Fearon 1995, 396), costless actions do not affect states' calculations of fighting. However, it is important to note that there are conditions under which costless actions convey credible information (see footnote 33 in Fearon 1995, 396), and experimental evidence suggests that costless actions are impactful (Tingley and Walter 2011). I revisit this topic in the discussion section.

Fearon's (1995, 396) idea of a costless action is “a foreign policy announcement.” The paradigmatic case would be Afghanistan's action towards Pakistan in 1955 during [crisis 150](#). Afghanistan responded to a territorial dispute with Pakistan “with a broadcast by Prime Minister Daoud voicing his government's protest and a formal note protesting the proposed merger.” The messages conveyed Afghanistan's preferences, but it left unclear how tough

or resolved the Afghan government was about these preferences. Would Afghanistan want to invade? Do they really prefer a fight? Costly actions like mobilizing troops or making a public commitment to the territory would have made these intentions more clear.

Another obvious example of a costless action is Iraq's behavior towards the U.S. in 2002 during [crisis 440](#). In light of growing U.S. hostility towards Iraq, "Iraq responded with verbal protests" in the U.N. and were asked by the U.N. to "provide a complete declaration of their weapons capabilities." The resulting declaration by Iraq "contained little new information since 1998," the definition of cheap-talk. Instead of taking costly actions to make either their preferences for war or peace more credible, the Iraqi government conveyed words with little to no information.

Sunk Cost Actions

Sunk costs are "actions that are costly for the state to take in the first place but do not affect the relative value of fighting versus acquiescing in a challenge" (Fearon 1997, p. 70). These actions convey a state's preferences but impose an initial and irretrievable cost on the sending state. The cost provides more information to the receiver state about how resolved the sending state is about these preferences. As a result, the sender state's preferences will seem more credible and are more likely to be taken seriously by the receiver. Similarly to costless actions, recent evidence indicates that sunk cost actions may not operate as conventionally expected. In particular, there may be a disconnect between senders and receivers in terms of how credible sunk costs are (Quek 2016). Again, this topic is revisited in the discussion section.

Fearon (1997, 82) says that states can "sink costs by taking actions such as mobilizing troops or stationing large numbers of them abroad that are financially costly ex ante." However, Quek (2021) contends that sunk costs are often conflated with reducible costs. Mobilization is one these cases, where the mobilization is actually a reducible cost since it can decrease the cost of future fighting (see next section). Quek's (2021, 540) idea of a sunk

cost is “burning money,” where a state essentially reveals its strength by expending resources but cannot use what they have revealed in the future.

Real world, paradigmatic cases include nuclear tests and indirect discharges of firepower like bombings. The nuclear tests, for example, conducted by India in 1998 during [crisis 425](#) were a sunk cost action towards Pakistan. The nuclear tests were costly to conduct but by definition destroyed the weapons tested (i.e., burnt money). The weapons could not be used in the future and would thus not affect either state’s future values of fighting.

Similarly, bombings of indirect targets can represent sunk cost actions. For example, China bombed islands off of Taiwan in 1954 during [crisis 146](#) to test the U.S.’s commitment to Taiwan. The bombing did not directly hurt the U.S. but demonstrated China’s strength and resolve about the issue. However, the bombs could obviously not be used again in the future and did not significantly change the situation such that China had reduced costs or an easier time fighting in the future. Thus, China burnt money by blowing it up, revealing its power but diminishing its ability to use that power in the future.

Reducible Cost Actions

Reducible costs are “costs that have been paid but can be offset in the future contingent on the signaler’s action” (Quek 2021, p. 540). Reducible cost actions convey the sender’s preferences but impose an initial and possibly retrievable cost on the sender. The initial cost associated with a reducible cost action provides information about how resolved or tough sender states are about their preferences. Meanwhile, the possibility that the cost can be at least partially retrieved gives the sender state additional incentive to follow through on their stated preferences, contributing to the credibility of the sender state’s preferences.

The main examples of reducible costs given by Quek (2021, 541) include buying weapons and mobilization. Weapons are initially costly to buy, but if the sender decides to fight in the future weapons will make fighting easier and thus reduce the severity of the initial cost. The same logic applies to mobilization, where “an early mobilization is less costly than a

late mobilization” (Quek 2021, 541). Having troops already near the border makes it less costly in the future to send them over the border and into an enemy’s territory when you need to. Thus, reducible cost actions are initially costly like sunk costs but can be reduced in expectation if future fighting occurs. Demonstrating toughness or resolve through the initial cost and being able to partially recover some of this initial cost if the sender fights provides credibility to sender’s preferences.

Real world paradigms include France sending troops into Chad in 1983 to deter Libya from getting more involved in Chad’s domestic conflicts during [crisis 342](#). After Libya had begun to intervene in Chad, “several hundred French troops were dispatched to Chad’s capital” in an effort to make France’s preferences about Chad credible. Not only were the moving of these troops costly, but additional troops clearly had the ability to reduce the cost of fighting in the future if France decided to fight. Similarly, “in a sudden and surprise act, Iraq moved troops to its border with Syria” in 1976 during [crisis 269](#). This massing of troops at the border was costly to implement and made the expected costs of future conflict with Syria much easier for Iraq. Thus, the action was a reducible cost and carried credibility to Syria.

Tying-Hands Cost Actions

A tying-hands cost is an action “that increases the costs of backing down if the would-be challenger actually challenges but otherwise entails no costs if no challenge materializes” (Fearon 1997, p. 70). In this case, the sender state does not impose an initial cost on themselves in communicating their preferences but do commit themselves to paying a cost if the receiver state escalates their opposition to these preferences. Thus, the sender state’s preferences are more likely to be perceived as credible because they have done something to guarantee a cost for themselves should the receiver choose to escalate.

Fearon’s (1997, 82) main example of tying-hands costs are public actions that create expectations for future actions and costs for failed expectations. These are also called audience

costs, where some audience (e.g., domestic citizens) can exact costs on a state that reneges on its promises. Tying-hands cost actions provide credibility to sender preferences because the sender will have to pay some cost if it backs down during a crisis. When the sender makes a crisis public and escalates it with tying-hands costs, it sends a signal that it is willing to continue the crisis and possibly fight rather than pay audience costs for backing down. The state successfully conveys its preferences and increases the likelihood that they will be seen as credible. Thus, tying-hands cost actions are not costly initially but can be costly if the receiver escalates.

Paradigms in the real world typically include public claims over territory that- once proclaimed- create costs for a state if they were to give up their claims. For example, during [crisis 276](#) in 1976 “the Rhodesian government announced the creation of a new operational military zone- Operation Tangent- in the northwest and west covering the Botswana border area.” The creation of the military zone was a conspicuous claim over some of the border by Rhodesia (now Zimbabwe). The new zone thus committed Rhodesia to defending that area because backing down and reneging could be a costly blow to the credibility of Rhodesia’s threats and also make them pay audience costs.

A similar tying-hands cost action occurred in 1987 during [crisis 376](#). After perceiving that Turkey supported oil prospectors in waters near Greece, Greece “declared that oil prospecting in international waters was the responsibility- and right- of the geographically contiguous state and hinted that it might take over control” of the oil prospectors. This public declaration of ability to control this territory essentially committed Greece to defending their claim if Turkey escalated since it would be costly to renounce their claim. In both of these cases the initial action was costless: a declaration or claim. However, the actions were potentially costly in the future if the receiver escalated the crisis and made the sender either fight or pay audience costs for backing down.

Installment Cost Actions

Installment costs “are fixed costs that will be incurred in the future” (Quek 2021, p. 538). They are actions that are not initially costly but are costly in the future regardless of what the sender or receiver does. Thus, they are similar to sunk costs in that they demonstrate resolve or toughness by expending resources and they do not change either state’s calculations about fighting. The main difference is that the burning of money happens in the future and can occur multiple times with the costs being paid in installments.

Quek’s (2021, 538) primary example is the building of a new military base. The base will need to be defended and maintained in the future, incurring fixed costs over time that do not change based on the sender or receiver’s actions. The decision to create a new base may not be initially costly, but it does carry these costs in the future. Thus, the action could make the sender’s preferences more credible since the sender is committing to paying costs in the future and demonstrating their toughness or resolve.

Real world cases include Ukraine’s action towards Russia in 2018 during [crisis 491](#). Ukraine “officially announced an increase in their military presence on the Sea of Azov, including expanding the number of naval vessels and the construction of a new military base on the coast.” The announcement of the base was not initially costly but did guarantee future costs for maintenance and construction. Thus, it was an installment cost that intended to make Ukraine’s preferences for control over the region credible.

Mixed Cases

Before moving on to describe how I coded the rest of the ICB crises, it is necessary to address a critical concern now that I have introduced several examples above. The concern is of mixed cases, where a sender’s action incurs two or more types of costs. It is important to note that both Fearon and Quek are skeptical at best of observing pure cost types (see Quek 2021, 539). Further, Altman and Quek (2024) argue that sunk costs are rare in the real world because they expend resources (i.e., burn money) in unconstructive ways. Rather,

states should seek to tilt the probability of war in their favor through investment or downpay future costs of war (i.e., reducible costs).

I do not disagree that mixed cases occur or that sunk costs may be inferior. Indeed, this is one explanation for my findings that I return to in the discussion section. However, I argue that in expectation it is at least *useful* to associate sender actions with pure cost types for three reasons.

Firstly, after reading hundreds of real world crises where states are trying to get what they want (assumably) without starting a war, most observations support a pure cost type interpretation. The triggers or sender actions in the ICB dataset are isolated to one action that often can be easily associated with a particular cost type.

Secondly, a pure cost type interpretation is theoretically parsimonious. At a certain level of mixing, it is unclear what the explanatory power of cost types as a model is. If states are assumed to always use many cost types when they signal, 1) what can any one cost type explain and 2) what is the receiver thought to interpret from that signal? At worst, the cost types framework becomes useless and rational receivers may be thought to interpret a mixed case signal as a lack of strategy by the sender, hindering credibility (i.e., cheap talk).

Lastly, misidentifying mixed cases as pure cases is measurement error. But assuming that measurement error is not correlated with the outcome, misidentifying cases will only lead to attenuation bias and make it more difficult to find relationships between cost types and crisis outcomes.

For these reasons, it seems reasonable to at least try to code sender actions as pure type cost signals. It is also straightforward to extend this work to include the coding of mixed case actions in future work.

Data and the Coding Process: Creating the IV and DV

Coding Rules

The examples from real world crises above were first identified using the coding rules in Figure 1. These rules follow from the questions in Table 1, keeping as close to the dimensions that identify and define the costs as originally introduced in Quek (2021). The two dimensions are: the initial costliness of an action (ex ante versus ex post) and the extent to which the final cost depends on the actors' behavior (contingent or noncontingent). Thus, question 1. asks if a sender's action was initially costly to send or not. Following the definitions in the above section, if the answer is yes then the cost type must either be a sunk or reducible cost. It is impossible for the action to be a tying-hands or installment cost, since they are defined as being initially costless.

1. Was the crisis trigger or sender action costly to send?
 - (a) If yes, sunk or reducible cost action.
 - (b) If no, tying or installment cost action.
2. Does the crisis trigger or sender action have costs or benefits after the receiver acts?
 - (a) If yes, tying or reducible cost action.
 - (b) If no, sunk or installment cost action.
3. If the answer to question 1. and 2. was no, was the crisis trigger or sender action costly at all?
 - (a) If yes, installment cost action.
 - (b) If no, costless action.

Figure 1: Coding rules

Question 2. asks if a sender's action has costs or benefits after the receiver acts. That is, if the receiver were to act in a way that escalated the crisis, could the sender expect increased costs (either because the sender's action committed them to responding or they would pay a cost for backing down) or increased benefits (because the sender's action made

fighting or responding to escalation cheaper and easier). Question 2. is extremely simple yet powerful because it does not require the coder to consider how exactly the sender action induces expected future costs or benefits, which would require more lengthy consideration of each case and be error prone. It is also less objective and replicable to explicitly decide for each case if the sender's action committed them to respond a certain way or not. All that is necessary is to decide if the sender action could be expected to have costs or benefits in the future if the receiver were to react. This information, in combination with question 1., most often uniquely identifies a cost type.

Question 3. is useful if the answer to question 1. and 2. were both no. If a sender's action was not initially costly and is not expected to have additional costs once the receiver reacts, then it is either an installment cost or costless action. The coder then simply has to decide if there was any cost involved in the sender action at all, in which case it has been identified as an installment cost.

The Data and Creating the IV (Cost Types)

The ICB dataset contains 1100 observations. Each observation is a crisis trigger or sender action that is a subset of a larger crisis, potentially involving multiple actors and actions. I filtered the dataset to crises after WWII that were between states and not immediately wars. This left 366 observations or sender actions which I manually coded. `coding.txt` lists each crisis I coded, including a quote stating the sender's action, the answers to the questions in Figure 1, and the resulting cost type. I will give a brief example of the coding process here.

One of the most recent crises that required coding occurred in 2019 between the U.S. and Iran (see [crisis 495](#)). There are two actors in this crisis, meaning that there could be up to two senders and two receivers: the U.S. could send an action while Iran receives it and responds, and Iran can send an action while the U.S. receives it and responds. When coding a crisis, I read the crisis summary to find the action taken by each sender. In this case, my pre-filtering of the data indicated that there was only one sender, the U.S. That is

because Iran's response to the U.S., which also constituted its sending action, was a direct military attack and excluded from the sample. For this paper on the ability of signaling to prevent war, it is not relevant to consider open acts of war (as designated by a direct military attack). However, Iran's action is captured in the outcome of the crisis, which is for coding the dependent variable (see next section).

The first paragraph of the crisis summary is as follows:

“A crisis for Iran began on 18 June 2019, after the U.S. announced that it would order one thousand additional troops to the region. The deployment announcement was a response to alleged Iranian attacks on ships in the Straits of Hormuz. Several days later, on 20 June, Iran shot down a U.S. military drone, a GLOBAL HAWK, which the U.S. claimed was operating in international waters. This action both triggered a crisis for the U.S. and constituted Iran's major response to the increased U.S. troop presence. On 22 June, Trump unveiled a new suite of sanctions against Iran as the U.S.'s major response to the crisis.”

The triggering or sending action from the U.S. was moving 1000 troops to the region. I would then consider question 1.: is this action initially costly? In this case, the answer is clearly yes. This identifies the cost type as either a sunk or reducible cost. Considering question 2., does the sender action have costs or benefits after the receiver acts? The answer in this case is also clearly yes, since after Iran acts (i.e., in the future) the additional troops have the future benefit of making potential fighting for the U.S. easier. Thus, the coding rules have quickly established that this is a reducible cost action by the U.S. The cost types for every crisis are summarized in Figure 2.

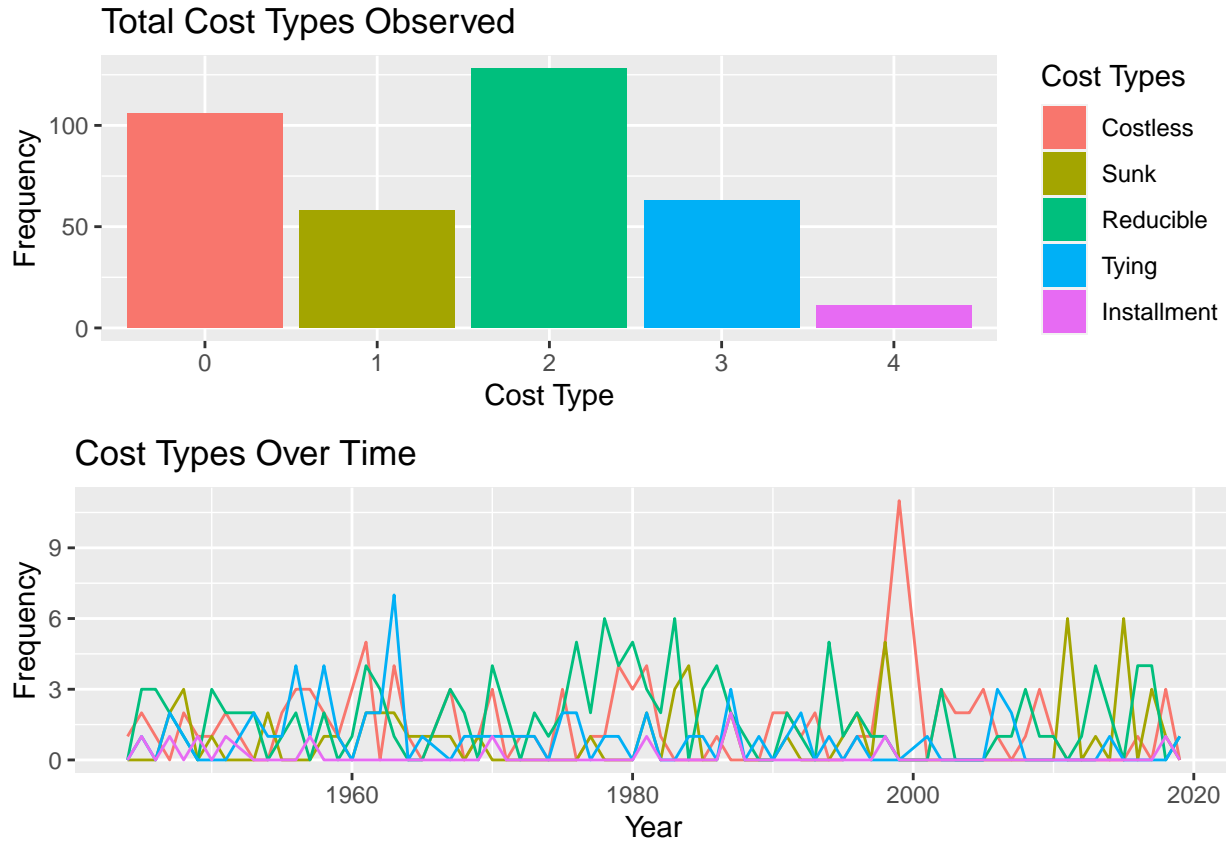


Figure 2: The cost types of each relevant crisis from the ICB dataset.

Creating the DV (Crisis Outcomes)

The outcome for each crisis is given in the ICB dataset in terms of how favorable it was to the receiver. The crisis outcome was either a victory for the receiver, a compromise between the receiver and sender, a stalemate for them, or defeat for the receiver. I coded crisis outcomes as successful for the sender if the outcome for the receiver was a stalemate or defeat. If the receiver's outcome was a victory or compromise, the outcome for the sender was coded as a defeat. (Using the original, four-item categories of receiver outcomes does not change the main results in the next section [see the Appendix]). The success of each sender action is summarized in Figure 3.



Figure 3: Crisis outcomes for each relevant crisis from the ICB dataset.

Results

In addition to the ICB dataset and the resulting IV and DV described above, I collected yearly observational data on the following Correlates of War (COW) variables: the military capabilities of the sender (J. D. Singer, Bremer, and Stuckey 1972; J. D. Singer 1987), the (logged) volume of exports for each sender (Barbieri and Keshk 2016; Barbieri, Keshk, and Pollins 2009), the number of international organizations the sender was a member of (Pevehouse et al. 2020; Wallace and Singer 1970), the number of defense treaties the sender was involved in (Gibler 2009; Singer J. David and Small 1966; Small and Singer 1969), and the number of other states the sender is contiguous with (Correlates of War Project 2022; Stinnett et al. 2002; Gochman 1991). I then regressed the success of the sender’s action on

the cost type of the action using logit, including the variables listed above as controls. I also include country and year fixed effects and cluster the standard errors by crisis. The results are presented in Table 2.

The main findings are as follows. Relative to a costless action, there is a robust statistical association between sunk costs and defeats in a crisis. In the model without covariates, there is also an association between tying-hands costs and success in a crisis. In both models, reducible and installment costs are not statistically distinguishable from costless actions in their effects on crisis success. These results largely hold when using the original four-item categories of receiver outcomes, as shown in ordinal regressions displayed in Table 3 in the Appendix. Those models do not include country or year fixed effects but do cluster standard errors by crisis.

Table 2: Logit Regression of Success on Cost Types

	<i>Dependent variable:</i>	
	Success	
	(1)	(2)
Sunk Cost	-2.624** (0.952)	-3.536* (1.381)
Reducible Cost	-1.147 (0.737)	-1.487 (1.098)
Tying-Hands Cost	1.784* (0.851)	2.239 (1.687)
Installment Cost	1.475 (1.694)	-1.805 (1.996)
Capabilities		7.099 (12.968)
Logged Exports		0.635 (0.464)
IGO's		-0.040 (0.094)
Alliances		-0.239 (0.380)
Intercept	-21.981 (22.499)	-2.602 (6.346)
Observations	366	256
Log Likelihood	-94.788	-55.553
Akaike Inf. Crit.	503.575	371.106
<i>Note:</i>		+p<0.1 *p<0.05 **p<0.01 ***p<0.001

Discussion

There are two possible explanations for my findings, one interesting and one uninteresting. The uninteresting explanation is that my coding is simply wrong, possibly from differential measurement error as mentioned in the subsection on mixed cases. The interesting explanation- and the one I argue best explains the results and is commensurate with the literature- is two-fold: 1) sunk costs are inferior signaling mechanisms and 2) costless actions and surprisingly effective. Both already enjoy evidence in the literature.

Sunk costs are inferior because they are the only cost type where a cost is paid immediately and is not useful in the future. If the cost is high enough (as it should be to theoretically communicate credibility), it may weaken the sender without actually benefiting it if fighting were to occur. Thus, a strong sunk cost means that the sender state *was* tough but may be less so now that they have paid the cost. This is very different from other costs, where only a promise of future costs is necessary (i.e., with tying-hands or installment costs) or the cost directly benefits the sender in future fighting (i.e., reducible costs). In these other cost types, the sender is still just as tough after sending the signal as they were before. This could account for the finding in Quek (2016), where receivers seem to interpret sunk costs differently from senders and thus sunk costs do appear very effective.

Costless actions are also more effective than theoretically expected. While the mechanism underlying their effectiveness is less clear, there is a precedent in the literature for their success. For example, Tingley and Walter (2011) find that costless actions are effective at deterrence in experiments. The effectiveness of costless actions makes it difficult for other cost types to be statistically more effective in the real world, such as reducible and installment costs. The occasional finding that tying-hands costs are more effective than costless actions may imply that they are actually very effective since the effectiveness of costless actions may be nonnegligible.

Thus, my analysis raises a puzzle. If sunk costs are truly inferior- even to costless actions- why would a state ever use a sunk cost action? It seems that sunk costs must either be rare

(as in Altman and Quek 2024) or there is a counterintuitive explanation for sunk costs being observed in real-world crises that must be explained in future research.

Appendix

Table 3: Ordinal Regression of Receiver Outcomes on Cost Types

	<i>Dependent variable:</i>	
	Receiver Outcomes	
	(1)	(2)
Sunk Cost	-0.345 (0.396)	-1.029* (0.476)
Reducible Cost	0.306 (0.342)	-0.315 (0.339)
Tying-Hands Cost	0.649+ (0.379)	0.188 (0.321)
Installment Cost	0.497 (0.631)	-0.181 (1.028)
Capabilities		1.212 (3.196)
Logged Exports		0.126 (0.097)
IGO's		0.002 (0.009)
Alliances		0.002 (0.055)
Observations	366	256
<i>Note:</i>		+p<0.1 *p<0.05 **p<0.01 ***p<0.001

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