

Doubling Down: The Danger of Disclosing Secret Action*

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November 9, 2020

Abstract

When an actor catches a state taking an objectionable secret action, it faces a dilemma. Exposing the action could force unresolved states to terminate the behavior to save face. But it could also provoke resolved states to double down on the activity now that others are aware of the infraction. We develop a model that captures this fundamental tradeoff. Three main results emerge. First, the state and its opponent may engage in a form of collusion—opponents do not expose resolved states despite their distaste for the behavior. Second, when faced with uncertainty, the opponent may mistakenly expose a resolved type and induce escalation, leading the opponent to have *ex post* regret. Finally, as the strength of secret action increases, states may engage in it less often. This counterintuitive result is a consequence of the opponent’s greater willingness to expose, which deters less resolved types.

*Forthcoming at *International Studies Quarterly*. We would like to thank Austin Carson, Andrew Little, Michael Poznansky, Rochelle Terman, and two anonymous reviewers for their comments.

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1 Introduction

Early in the Syrian Civil War, Iran provided funding and intelligence to the embattled Assad regime in Syria. Multiple international news agencies reported secret Iranian support for the Syrian government, including arms shipments seized by the Turkish government (Al Jazeera, 2012). The U.N. additionally published a report detailing Iranian arms shipments to Syria despite a weapons exports ban. Western intelligence soon discovered that Iranian involvement went further, to include the creation and backing of Shia militia groups (DIA, 2019).

The US State Department responded by condemning Iranian interference. However, this did not bring the policy changes Washington sought. Soon thereafter, 4000 Iranian soldiers deployed to Syria to assist government forces (Fisk, 2013). Again, US officials condemned the move, alleging that the Quds force “coordinated attacks” and “trained militias” against rebel forces (Filkins, 2013). Once more, the exposure of Iranian support failed. By 2014, the Iranian presence had increased to 7000 troops (Dagher and Fitch, 2015) and increased from there. In short, the continual reporting of Iran’s covert action in Syria seems to have only led to a more openly defiant Iranian position.

This outcome highlights a tradeoff in revealing objectionable secret actions. Guilty parties may respond in two ways. Would-be exposers hope that their opponents will simply terminate the behavior. But the decision could also backfire. It is possible that an opponent opted for secrecy in the first place because it did not want others to know it was engaged in the objectionable action. Once exposed, the motivation for secrecy is gone. As such, the opponent can openly continue and escalate the policy now that it no longer must cover its tracks.

Understanding these incentives is critical for a number of research areas. In an era when military technology and economic interdependence make regular warfare hard to pursue, these strategies have become a primary vector for interstate coercion. As the Iranian example illustrated, it is fundamental to traditional covert action. Secrecy and the risk of exposure is also central to cyber security, an area of increasing concern to policymakers. Outside of that, human rights abuses often occur in private, with outsiders having to investigate, name, and shame offending governments (Hafner-Burton, 2008). Many violations of environmental standards are similarly secret, forcing nongovernmental organizations (NGOs) to reveal the wrongdoing (Murdie and Urpelainen, 2015).

And many countries try to hide development of nuclear weapons (Debs and Monteiro, 2014; Spaniel, 2019), hoping to dodge punishment from failure to comply with international norms and Non-Proliferation Treaty commitments.

Recent research has examined escalation concerns in limited conflicts (Carson, 2016, 2018), the effects of exposure of covert action by information and communications technology (Joseph and Poznansky, 2018), and concerns that exposure might backfire (Terman, 2019; Snyder, 2019).¹ However, no study has investigated the problem central to the opening narrative on Iran’s aggression. Asymmetric information clouds how an actor will respond to exposure, and that uncertainty affects the aggressing state’s choice to take the secret action in the first place. We rectify this gap.

To do so, we develop a model of uncertainty and secret action. An aggressing state chooses whether to engage in a behavior that is not immediately recognized by outsiders.² If an interested party (the target state, an international institution, or a domestic political opponent) observes the action, it chooses whether to expose the behavior. Exposing generates a cost on the aggressor, which may then stop its behavior to mitigate that cost or escalate it.

The model identifies two core results. The first is a *doubling down* effect. As previewed above, unresolved aggressors are desperate to mitigate the costs of exposure. Opponents therefore expose actions they observe. However, with the information public and having nothing left to hide, resolved aggressors escalate following exposure. Recognizing that broadcasting the action causes the aggressor to double down, opponents remain silent. They may dislike what they see, but saying something only exacerbates the problem.

The second result is more nuanced. Existing theories suggest that secret action is more likely as it becomes stronger—e.g., when new weaponry or special training will improve battlefield outcomes. The Cold War provides a narrative of this idea. When the United States had the capacity to use well-trained and especially deadly special operation units in Laos and Cambodia during the Vietnam War (Smith, 2007),

¹On a separate dimension, Carnegie and Carson (2019) examine how exposure might reveal intelligence gathering methods.

²The model later defines secret action through the structure of the game. However, it captures: (1) clandestine actions, which no one is aware of when successful, (2) covert actions, which others can observe but cannot attribute the perpetrator, and (3) actions that are immediately obvious to some elites but not to the broader public.

policymakers would seemingly be more likely to exercise that option. Existing theories also suggest that secret action is more likely as it becomes harder to observe—e.g., where information and communication technology is sparse (Joseph and Poznansky, 2018). Another Cold War situation provides a narrative of this idea. The Johnson Administration worried that secretly financing the Congolese air force had a great risk of exposure, which would cause great embarrassment (Joseph and Poznansky, 2018, 324).

Our model corroborates those principles when secret action is overwhelmingly strong and impossible to observe. However, in more moderate cases, the pivotal type of the aggressing state chooses its strategy to make the opponent unsure whether to expose. Strengthening secret action makes the opponent more inclined to expose because there is now more to gain by ending the action. As such, the slightly unresolved types become more inclined to forgo secret action, causing an overall decline in its probability. Meanwhile, increasing the opponent’s chances of seeing the secret action means that the opponent need not expose the action as often. We show that the effects offset, with no change to the aggressor’s strategy.

Our work is closest to that of Carson (2016). However, we diverge on three fronts. First, in Carson’s framework, the target’s leadership colludes with the aggressor’s government. A hold up problem drives the mechanism—the leadership worries that its citizens will demand a response too extreme for the leadership’s tastes, causing the leadership to keep quiet about the action. In our setup, the target considers remaining silent out of fear that the aggressor will escalate. Second, we allow incomplete information to play a role, which generates rich deception behaviors not previously identified. Finally, we analyze how states anticipate risks of exposure and accordingly adjust their propensity to take secret action. An aggressor’s initiation of secret action and a rival’s decision to expose would seem to be theoretically linked. Our model confirms this.

Methodologically, we bring a formal approach to the area of secret action. This is rare in the field.³ Nevertheless, formal models have an advantage of enforcing accounting standards to ensure the validity of our argument. It is also useful because the inherent secrecy of the subject matter means that analysts rarely have complete data on the universe of cases. Potential for selection problems could also arise, and indeed

³The key exception (Spaniel and Poznansky, 2018) focuses on institutional design rather than the asymmetric information problem we consider.

our model confirms this.

More broadly, our work speaks to auditing processes. The observing state has the option to pull a “fire alarm” (McCubbins and Schwartz, 1984), hoping to change the behavior of the aggressing state. For leaders who engage in unobservable and objectionable activities at home, our model speaks to a whistleblower’s decision within domestic politics. Revelation of secret action also has applications beyond conflict within the realm of international relations. NGOs must weigh the risks associated with publicizing otherwise unknown actions like human rights violations. Naming and shaming, for example, could cause the guilty state to double down on oppression. Our model therefore addresses how such organizations confront the problem (Terman, 2019).

2 Motivation

We take a first-principles approach to developing our model, examining how a number of central incentives interact with one another in a strategic environment. In particular, our model has four key assumptions: (1) secret action has benefits and downsides, (2) other actors can expose secret actions and have incentive to do so, (3) exposure can incentivize escalation, and (4) potential exposing actors face uncertainty over the initiating state’s resolve. We motivate each of those assumptions below.

The benefits and downsides of secret action. In many cases, secret actions are weaker than public actions. Keeping the secret requires concealing the nature of the aggression (Joseph and Poznansky, 2018), which limits the technologies that a state can use. For example, CIA officers in Afghanistan used sterile AKMs—Russian assault rifles with their identifying serial numbers stripped off—rather than American weaponry. They also used Russian Mi-17 helicopters for transport to mask involvement (Neville, 2015, Ch 2), despite a preference for American hardware. Moreover, if for no other reason, secret action is weaker than public actions because states can supplement the public efforts with whatever they would otherwise do in secret. The same is not true in reverse.

If taking public action is stronger, why do states go secret at all? The benefit is lower costs. States face potential backlash from engaging in subversive behavior. Sometimes, these are external, coming from both direct opposition and the international community

at large. Israel has drawn international condemnation for its policy of assassinating PLO officers (Bergman, 2018). The nonproliferation regime tends to place economic sanctions on states failing to live up to non-nuclear norms (Soling, 2012). The same is true of human rights violations (Lebovic and Voeten, 2009). Other times, there may be domestic ramifications. The aforementioned sanctions regimes can motivate the disaffected groups to oust current leaders. If a state violates international agreements, domestic constituents can rally against the regime (Dai, 2005).

Taking public action guarantees that a state will suffer these backlash costs. Secret actions may be weaker, but they give the state a chance to avoid negative publicity.

Exposure of secret action. Of course, going secret does not guarantee avoiding exposure. Another party may observe it. Such actors include an opposing state's intelligence agency, whistleblowers within the state taking the secret action, or investigative journalists. For human rights abuses and violations of environmental standards, NGOs are prominent in this role (Hafner-Burton, 2008; Murdie and Urpelainen, 2015).

Witnesses have an important decision upon observing the problem: they can expose the action or keep the secret. Exposure may look attractive as a means to impose costs on the perpetrator and force a change in the behavior. For example, Iran has seen increased sanctions for its support of Houthi rebels in the Yemeni Civil War (Greenwood, 2018). Russia has also been the target of sanctions for its support of Ukrainian separatists (Thompson, 2017). President Obama received cold receptions from allies following the Snowden leaks (Edwards, 2015).

Sometimes this pressure is effective. For socially motivated states, backing down mitigates the damage and helps preserve prestige and status (Finnemore and Sikkink, 1998). Others may wish to stop international sanctions or relieve domestic pressures. The Church Committee, which investigated US covert action, admonished previous administrations and the intelligence community for their use of covert action (Isenberg, 1989). The Committee's recommendations resulted in the restricted use of covert action until the Reagan administration came into power (Isenberg, 1989). In the case of the USS *Pueblo* incident, where a US spy ship was captured by DPRK forces off the coast of North Korea, the US had to admit to the espionage, apologize, and assure DPRK leaders it would not happen again (Newton, 1992). Likewise, revelation of the Iran-Contra affair ended the operation.

Risk of escalation. Exposure is not a sure bet. Some states escalate following the exposure. Recall how much of the benefit from secret action comes from skirting international backlash. Once exposed, the offending state suffers some of that backlash cost even if it stops. Quitting may reduce international and domestic hostility, but the government cannot return to the good graces it had when the world was in the dark. Part of this is the international social reaction to a state that apologizes for its action. Another part of it is the perpetrator’s ability to exercise plausible deniability. For example, a state with institutions that make plausible deniability impossible are stuck shouldering the costs of exposure.

Regardless of the cause, inescapable costs perversely make escalating to public action *less* expensive than at the start. Indeed, we can see the perverse effect motivating states to escalate. Consider Operation *MENU* from the Vietnam War, which involved the secret bombing of North Vietnamese Army positions in Cambodia (Lewis, 1976). Once revealed in 1969, the Nixon administration expanded the bombing operation, which lasted for three years and encompassed a greater geographical area (Finney, 1973; Cormac and Aldrich, 2018). Meanwhile, Hafner-Burton (2008, 692–693 and 710) notes that name-and-shamed governments can further human rights abuses following public disclosure of their activities. As an example, Nigerian dictator Sani Abacha ramped up repression following complaints from the United States and Europe. Consequently, exposers must consider their opponents’ response when deciding to reveal a secret.

Uncertainty. Why would an actor expose secret action if it only makes the problem worse? We explore a strategic problem that would-be exposers face. Such actors may be uncertain about how a state internalizes the costs associated with negative publicity, sanctions, and domestic resistance relative to the value of the benefits of subversive actions of all types.

For example, McFarland and Mathews (2005) show that individuals are more likely to overlook human rights abuses that protect valuable national security interests. Conflict scholars describe this type of weighting as *resolve*, and researchers have provided strong microfoundations for it as a source of asymmetric information. After all, the relative weighting of costs versus benefits is an internal characteristic of a leader (Wolford, 2007). Unless we understand a leader’s internal thought process, we cannot know her corresponding resolve. In turn, an exposer may suspect the state is unresolved and will

back down once its secret action becomes public.⁴ But if the state is actually resolved, it seems that exposure could only exacerbate the problem.

Of course, understanding strategic dynamics under uncertainty is a challenging task. Building a model can help us obtain a better appreciation of the interaction, and so we develop one in the next section.

3 Complete Information Model

Despite the importance of uncertainty, the complete information case is interesting in its own right. It also helps build intuition for the incomplete information case. As such, we begin there, drawing on the remaining critical elements from the last section.

The game consists of two actors, A and B. We conceptualize A as a state weighing how to conduct some subversive policy. B is any actor that would prefer A take the least amount of subversive action and is in a position to potentially learn if A has conducted secret action. Rivals states of A, international organizations, people within A's government who disagree with the policy all fit within this scope.⁵

State A begins the game by choosing to take public subversive action, secret subversive action, or no action.⁶ Both the public and no action choices end the game. If A takes secret action, Nature reveals A's decision to B with probability $p \in [0, 1]$. Cases with greater information and communications technology would therefore correlate with greater p values (Joseph and Poznansky, 2018). Failure to reveal also ends the game. In contrast, following revelation, B decides whether to expose the action or not. Once more, not exposing ends the game. But if B does expose it, A has a final choice to escalate or quit.

Payoffs are as follows:

⁴Our focus on uncertainty differentiates our work from existing explanations, which rely on self-enrichment of the exposer (Terman, 2019; Sagar, 2001, 2013).

⁵Modeling one-sided responses ensures that any equilibrium behaviors we observe arise from that and not a more complicated reciprocal agreement. The asymmetric model is also more descriptively accurate in some cases, including government abuse of a powerless minority group or an NGO auditing those abuses.

⁶In practice, states can choose from a menu of secret actions. We think of the singular option as the secret action that maximizes the tradeoff between its strength and the risk of revelation. Within the context of the incomplete information game, this adds the caveat that all cost types of A find the same menu option optimal, otherwise the chosen action would signal information to B.

- If A begins with public action, it receives $V_P - k$, where V_P captures the subversive value of the action and the drawn k value captures the cost. As the previous section described, the k value implicitly incorporates A's resolve, or how much it cares about flaunting international norms. B suffers $-V_P$.
- If A does nothing, both parties receive 0 to reflect the status quo.
- If A takes secret action and B does not expose it, A receives $V_S \in (0, V_P)$. The value V_S captures how powerful secret action is. Cases where A can use advanced weaponry or exploit special training imply larger V_S values. The ordering with V_P ensures that public action is more powerful. B earns $-V_S$. Thus, the stronger the action A takes, the worse off B is, though A must also worry about the cost it pays for taking an action the public observes.⁷
- If B exposes the secret action and A escalates, both players receive the same payoff as if A began with public action.⁸ If B exposes and A quits in response, A earns $-\alpha k$ and B earns 0. Here, $\alpha \in (0, 1]$ captures how much A can save face by terminating its action. Higher values of α mean that course reversal has less impact. For example, states that cannot appeal to plausible deniability have greater α values.⁹

Insert Figure 1

Before continuing, it is worth highlighting the game's strategic tension. From a pure subversion perspective, A most prefers public action and least prefers no action. But it must also weigh its exposure cost. Going public incurs this cost directly. But secret action could still damage its reputation if B publicizes it. So it may view secret action as more attractive than public action, though going secret is still a gamble.

Meanwhile, B's strategic dilemma is more involved. Exposing the secret action provides no *direct* benefit to B. This is a helpful modeling assumption, as it ensures

⁷We could also include the monetary costs of public and secret actions. However, adding these creates notational clutter without fundamentally altering our theoretical results. We therefore exclude them.

⁸We could reduce the value of public action to account for the delayed implementation. Like before, though, this does not fundamentally alter our results. We therefore maintain equivalent payoffs.

⁹We could also allow A to maintain its now-exposed "secret" action, but the structure of the incentives makes this irrelevant. Adding operational cost increases to the public action would open up the maintain strategy as an equilibrium possibility. However, it does not change the core theoretical implications that follow from the threat to double down.

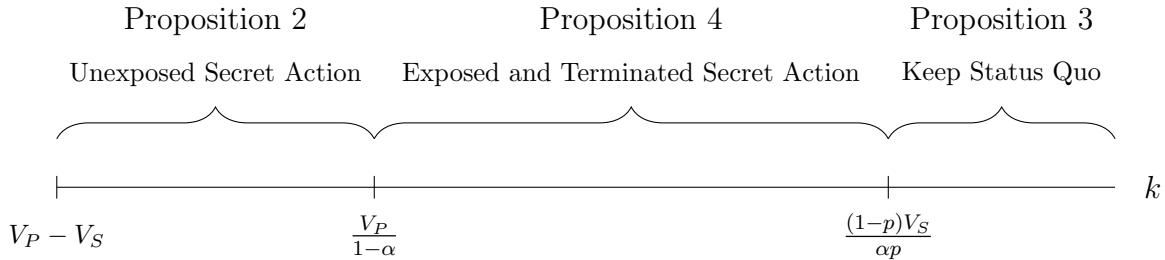


Figure 1: Parameter mapping for the complete information game.

that the mechanism we develop is distinct from Terman's (2019). However, exposing changes B's payoff depending on A's response. Once exposed, A may prefer escalation over quitting. After all, B's exposure guarantees that A pay part of its cost. Freed from part of that disincentive, A may escalate. In turn, B may wish to engage in a form of collusion, not publicize what it knows, and maintain A's course. On the other hand, A may wish to save face. In turn, B may wish to expose and thereby terminate A's action.

Of course, not all parameter spaces feature these dilemmas. In fact, the game is simple when costs are very low:

Proposition 1. *Suppose the punishment cost is sufficiently low (i.e., $k < V_P - V_S$). Then A engages in public action.*

If k is less than $V_P - V_S$, the cost of is less than the utility difference between taking public action and taking secret action. State A therefore has a dominant strategy to take public action, and no deeper strategic considerations impact the players.

Consequently, the search for deeper theoretical implications requires looking elsewhere. As Figure 1 illustrates, the game falls into one of three remaining cases based on the value of k . We describe now each in detail. Consider first the case where A is still not much concerned about the punishment, as it leads to a straightforward conclusion:

Proposition 2. *Suppose the punishment cost is relatively low (i.e., $k \in (V_P - V_S, \frac{V_P}{1-\alpha})$). Then A engages in secret action. If revealed, B does not expose because—off the equilibrium path—A would escalate.*

When the potential punishment cost is low, A wants to run the risk of revelation to obtain the subversive benefits. But here, the costs are so low that it would escalate

should B publicize the action. This concerns B. It prefers that A maintain the limited secret action to escalating to public action. As such, the threat of escalation deters B from publicizing, which in turn allows A to obtain its favorite outcome.

This parameter space formalizes a notion similar to Carson's (2016) state collusion. B observes that exposing the action would be counterproductive and only induce A to escalate. State A benefits from saving on its exposure cost. B benefits from A's stinginess through the more moderate subversion strategy A chooses. It is different from Carson's conception because the aggressor's reaction deters the opponent from revelation rather than the opponent's domestic audience.

Beyond that, we analyze the upstream consequences of exposure. The implications of this become more apparent for the remaining parameter spaces and the incomplete information case later. However, there is a more subtle effect within Proposition 2 parameter space. At first pass, B's ability to publicize A's decision would seem to deter A from taking secret action. Yet this is not always true. Note that exposure forces A to pay $1 - \alpha$ portion of its costs. That is, once B publicizes the action, A cannot recover that quantity. The effective discount A receives at this point makes A more inclined to escalate. In other words, exposure of A undermines B's ability to obtain the outcome it seeks.

To drive this point home further, consider A's utility for taking secret action, risking Nature informing B, being exposed, and having to escalate. It is possible that this quantity is less than if it just took no action at all. But A need not worry about this problem because it has a credible threat to escalate. In turn, B knows not to publicize, thereby turning A's apparently risky strategy into a safe bet.

Overall, Proposition 2 dealt with cases where A finds escalation acceptable because the cost of subversive action is manageable. In the remaining cases, A no longer has a credible threat to escalate following exposure. Thus, it can no longer expect B to collude. This has upstream consequences on A's decision to take secret action in the first place:

Proposition 3. *Suppose the punishment cost is sufficiently high (i.e., $k > \max\{\frac{V_P}{1-\alpha}, \frac{(1-p)V_S}{\alpha p}\}$). Then A maintains the status quo. Off the path, B would reveal secret action and A would quit.*

When the punishment cost is high, A wishes to avoid incurring it. Thus, A would

quit the secret action if caught to save face. Anticipating that, B exposes the action to force A to stand down. Realizing that will happen often enough, A avoids that mess by maintaining the status quo from the start.

Obtaining Proposition 3 requires k to exceed two values for the following reasons. First, if A has a credible threat to escalate following revelation, then B would not want to reveal it. State A could in turn choose secret action without fear, and this brings us to Proposition 2's case. But even if A would back down if revealed, it may still want to take a gamble. Indeed, if p is small, A obtains the benefits of secret action a vast majority of the time, and the downside risk of exposure becomes almost nonexistent. As a result, and as Figure 1 shows, this parameter space disappears as p goes to 0. In contrast, as p goes to 1, this constraint becomes unimportant. Nature always reveals, and so A no longer has any real gamble. It simply looks at whether its threat to escalate is credible and chooses whether to take secret action accordingly.

Along the same lines, this parameter space disappears as α goes to 0. Under that extreme, A can almost entirely save face by withdrawing the secret action once exposed. In turn, A has no disincentive to try. If it works, A is happy. If it does not, A can withdraw without consequence.

A careful reader will note that, if $\frac{V_P}{1-\alpha} < \frac{(1-p)V_S}{\alpha p}$, Propositions 2 and 3 do not cover a middle range of costs. Indeed, the constraints on Proposition 3 suggest that a more dynamic outcome may arise if the punishment cost is not so large. True to that, the following proposition shows that A may want to roll the dice:

Proposition 4. *Suppose the punishment cost falls in a middle region (i.e., $k \in \left(\frac{V_P}{1-\alpha}, \frac{(1-p)V_S}{\alpha p}\right)$). Then A takes secret action and B exposes it if it has the opportunity to do so. If exposed, A quits.*

Here, the middling punishment cost induces A to take a gamble. It prefers to maintain the status quo than to engage in public action. But the likelihood that B will observe A's secret action is low. As such, it tries to get away with subversion but will back down when pressed. In other words, expectations of collusion are not necessary for a state to engage in secret action.

4 Illustrations

Before turning to the richer model with incomplete information, it is worth pausing a moment to ground these ideas. Figure 1 plots the game’s outcomes as a function of the exposure cost k . Following Goemans and Spaniel (2016), we now substantively motivate where three cases fell within the parameter space and examine the decisions that the states made. This process helps illuminate the formal theory and serves as *prima facie* evidence for the mechanism.

Case of Low k : Britain and the North Yemen Civil War. Proposition 2 handles cases where exposure costs are low. Britain vis-à-vis the Middle East in the late 1960s fits that scope condition. Many in the UK government placed great value on maintaining British control of strategic colonial assets and administrations (Cormac, 2013). Hardliners within the Conservative MacMillan government focused their efforts on holding the Yemeni port city of Aden (Jones, 2004). Despite the foreign policy establishment’s strong support for action in the Arabian Peninsula, there were international and domestic reasons to exercise public restraint. Previous UK airstrikes against Egyptian and Yemeni Republican targets had sparked international outcry from the UN and the Arab League, along with condemnation from the British press (Jones, 2004). The Prime Minister also found it helpful to lie to the Parliament about covert activity in Yemen throughout the conflict (Jones, 2004). This plausibly maps to Proposition 2’s parameters, where there is some motivation to avoid exposure costs but not much.

Covert action became an attractive option because of potential accusations of imperialism, international backlash from overt action, and the failures of diplomacy in negotiating with Nasser (Cormac, 2013). Operation *RANCOUR* was the solution. The UK government secretly sent a support operation in response to Egypt’s deployment of 70,000 soldiers into the North Yemen Civil War. The operation would, in time, include weaponry provisions and mercenary support to royalist forces (UK Defense Secretary, 1964). British covert action continued throughout the conflict until 1968 (Cormac and Aldrich, 2018). Responding to Parliamentary questions in 1964, the Prime Minister answered “Our policy towards the Yemen is one of non-intervention in the affairs of that country. It is not therefore our policy to supply arms to the Royalists in the Yemen and the Yemen government have not requested these or other forms of aid” (Parlia-

ment, 1964). The UK government even briefly considered taking more aggressive secret actions against Egypt, namely the assassination of Egyptian intelligence officers, although this proposal was quickly discarded (Butler, 1964). Nevertheless, declassified documents note the UK foreign policy establishment's consideration of the deployment of troops as a means of maintaining control and additional forceful, overt interventions if alternative options were exposed (Macmillan, 1962).

Egyptian leaders, including Nasser, came to believe that there was a covert British arming of royalist forces and threatened appropriate retaliation against the British colonial presence in Aden (McNamara, 2017). A declassified Foreign Office cable notes a meeting between the UK Ambassador in Cairo and a top Nasser advisor, who suspected British support for royalist forces, to which the UK ambassador denied the allegation (Beeley, 1963). Nasser likely knew about UK covert action in Yemen given the statements of his advisor to the UK ambassador and the use of captured mercenary letters in Egyptian propaganda broadcasts (Orkaby, 2017). Even so, consistent with Proposition 2, Nasser did not reveal the extent of British covert activity to reduce escalation risks. Nasser was already militarily stretched thin and could not stomach an overt confrontation with the British. Contemporary British intelligence reports noted abandoned military bases in Egypt and worsening relations with Israel proved to be alarming to Egypt's national security (Orkaby, 2017).

Case of High k : Israel's plot to assassinate Saddam Hussein. Proposition 3 presents a challenge in empirically assessing it. When in effect, the exposure cost is so high that the aggressor engages in no action. Thus, we must look for something that did *not* happen. This requires tracing the government's thought process to ensure that the risk associated with secret action exceeded its expected benefit.

Despite the challenge, Israel's decision to *not* assassinate Saddam Hussein fits the theory. Israel had good motivation to attempt to sabotage Iraqi internal politics. Shortly after Israel declared independence, Iraq deployed thousands of soldiers to fight alongside Palestinians (Neff, 1991). Following that failure, Iraq provided financial assistance and safe haven to PLO terrorists (Neff, 1991). Israeli intelligence also became alarmed by Saddam's push for nuclear weapons to counter the Israeli threat (Baram, 2012). And his vicious crackdown on Iraqi Kurds—an Israeli beneficiary (Neff, 1991)—did not sit well in Israel (Bergman, 2018).

Nevertheless, Prime Minister Golda Meir had reason to exercise caution. At the time, both the United States and Soviet Union were attempting to woo Israel into their spheres (Bergman, 2018). Saddam also maintained a life long relationship with Russian intelligence agents (Novikov, 2003) and frequently cooperated with the CIA (Harris and Aid, 2013). If exposed, Meir feared substantial backlash from both sides, leaving Israel geopolitically alone. Consistent with Proposition 3, we would only expect Meir to take the action if the probability of exposure were low.

With that in mind, consider the nature of the proposed operation and Meir's ultimate decision. As Saddam Hussein was rising to power, an Israeli explosives expert rigged a Koran to kill Saddam and presented the plot to Meir (Bergman, 2018, 345). Israel would give the Koran to the Kurds, who would then deliver it to Saddam. Meir canceled the plan. The reason is telling and captures Proposition 3's central logic: she did not believe the Kurds could keep the secret. Between the high likelihood of exposure and the painful consequences, she believed that maintaining the status quo the best option (Bergman, 2018, 345).

Middling k : Reagan and Iran. Proposition 4 is the final parameter space, where costs fall in a middle range. The Reagan administration's response to perceived communist threats provides a helpful example. Objectionable subterfuge was a sensitive topic after the Church Committee's strong admonishment of CIA covert action in the decades prior (Isenberg, 1989). In line with this, Congress passed the Boland Amendment, prohibiting any US agency from supporting anti-Sandinista efforts. However, Reagan placed value on assisting the Contras in Nicaragua. Proposition 4 would predict a balancing act, with Reagan willing to try covert assistance but wanting to pull back if exposed.

This is what occurred. With full knowledge of Congress's position, the Reagan administration sought either financial or material support from Brunei, Panama, and Honduras. Originally, the US sold weapons to Iran in exchange for the release of PLO hostages. Eventually, 120 HAWK missiles were sold, along with 500 TOW missiles and the US-provided intelligence on Iraqi military positions (Inouye and Hamilton, 1987). A congressional investigation revealed that the US made \$16.1 million from arms sales to Iran and \$3.8 million went to support the Contras (Inouye and Hamilton, 1987). Despite objections from his Secretary of State and Secretary of Defense, Reagan continued to

push forward with weapons sales in exchange for the hostages (Weinberger, 1985).

In 1986, NSC staffer Oliver North proposed that the “residuals” of the Iranian arms deal be used to fund the Nicaraguan rebels. North directed the funds from the arms sales to the Contras and to other covert action, according to a Congressional report (Inouye and Hamilton, 1987). Weapons sales continued until the secret operation was exposed in 1986. The story broke when a senior official in Iran’s Islamic Revolutionary Guard leaked it to a Lebanese magazine (Cave, 1994). There is evidence that an NSC staff member arranged the leak, having grown disenchanted with the operation (Hersh, 2019). A few days after publication, the Iranian government confirmed the story. The Reagan administration originally denied US arms sales to Iran before admitting to some sales. A declassified memorandum for record notes “the President said we did not do any trading with the enemy for our hostages” (Weinberger, 1985). The lack of information from the Administration regarding the scandal was largely due to a need to protect hostages and to protect lives in Iran and Nicaragua, according to the Secretary of Defense (Weinberger, 1986). Yet, fears of fallout after exposure persisted in the administration as Iran could stand to benefit from exposing the secret action. Even the Secretary of Defense noted that Iran’s exposure of the story could compromise the administration (Weinberger, 1986).

The exposure of the US arms sales to an adversary created a political scandal. Congressional hearings, indictments, and significant public admonishment created an environment that fostered the termination of the secret program. The political costs of exposure were likely multiplied by the fact that the secret action was illegal via the Boland Amendment and the Executive did not inform Congress as required about the foreign arms sales. Reagan noted the illegality of his administration’s secret action but remained resolved in administering the secret arms sales (Weinberger, 1985). Yet, upon the exposure of the secret action Reagan terminated the arms sales agreement as the costs of exposure was too high for the administration to bear.

5 Uncertainty over Resolve

Taking stock of the complete information cases, the lowest cost types want B to know they will escalate if exposed and convince B to accept a moderate amount of subversion. The other types are weaker, buckling upon exposure or not even trying. It would seem

that they could benefit from mimicking a more resolved type's behavior. We now explore that logic by adding incomplete information to the model. Broadly, we will see that this intuition is true—sometimes.

To modify the game, Nature begins by drawing A's cost of exposure k from the interval $[\underline{k}, \bar{k}]$. As is standard in models of conflict, we conceptualize the uncertainty as over A's resolve. We assume that the cumulative distribution function, called $F(k)$, is continuously differentiable everywhere and strictly increasing on the interval.¹⁰ We do not place further structure on the function. By keeping it general in this manner, we ensure that the results are not a quirk of a particular functional form but rather are a product of any distribution that meets the requirements. State A observes the cost draw, but B does not.

The propositions below divide the parameter space by $F\left(\frac{V_P}{1-\alpha}\right)$. Because $F(k)$ is the cumulative distribution function defined on the interval $[\underline{k}, \bar{k}]$, $F\left(\frac{V_P}{1-\alpha}\right)$ gives the portion of types that would escalate the secret action if exposed. As suggested a moment ago, this probability determines the higher cost types' ability to deceive. When large, upon observing secret action, B's initial inclination would seem to default to caution. In contrast, lower values would seem to inspire skepticism. We indeed see these reactions in the parameter spaces below.

We make two assumptions about \underline{k} . First, to avoid redundancies, suppose that $\underline{k} > V_P - V_S$. This means that no type has a dominant strategy to take the public action. Relaxing this assumption does not alter our fundamental claims. Instead, we would see all such types choose public action, and the remaining types behave in the manner described below.

Second, suppose that $\underline{k} < \frac{V_P}{1-\alpha}$, which implies that $F\left(\frac{V_P}{1-\alpha}\right) > 0$. Making this assumption allows us to focus on the more difficult and interesting case. If no such type existed, then A would always back down when exposed. The corresponding outcomes follow directly from Propositions 3 and 4. Middle types would take secret action, and high cost types would not. Knowing that exposure ends the secret action, B publicizes it. In contrast, as the previous paragraph outlined, having types with $\underline{k} < \frac{V_P}{1-\alpha}$ means that B fears that its exposure could backfire. This gives less resolved types an opportunity to take advantage, which we see in the first parameter space:

Proposition 5. *Suppose low cost types are sufficiently likely (i.e., $F\left(\frac{V_P}{1-\alpha}\right) > \frac{V_S}{V_P}$).*

¹⁰Thus, $f(k) > 0$ for all $k \in [\underline{k}, \bar{k}]$, where $f(k)$ is the probability density function.

Then all types pool on secret action. B does not expose.

Because low cost types are common and B expects them to take secret action, it does not dare publicize any secret action revealed to it. The low cost types therefore choose secret action. But anticipating B 's tepid reaction, higher cost types also take secret action. Although they would back down if challenged, they do not worry about such a contingency. In fact, some types take secret action even though they never would have in the complete information setting. Indeed, any type with k values within Proposition 3's parameters quit if B knows its high cost. But B does not know that information, and thus these types can deceive their way to a better outcome.

B 's willingness to take chances constrains high cost types. As Proposition 5 indicates, the portion of credible types cannot exceed the ratio $\frac{V_S}{V_P}$. Substantively, this cutpoint is how much worse public action is for B compared to secret action. When secret action causes almost as much damage as public action, V_S approaches V_P . In turn, B loses much of the downside risk of exposure. At the same time, B has a lot to gain. The non-credible types quit. Because secret action is close to public action in terms of strength, B 's payoff increases by a wide margin. Consequently, high cost types can only engage in such behavior when they are rare.

This parameter space is the most straightforward. Pooling works, and high cost types do not fear any exposure. As such, Proposition 5 serves as a robustness check for the empirical implications that Proposition 2 generated. Even if we cannot know with certainty that A 's resolve is low, the *expectation* thereof predicts that A would take secret action and B would not expose. Cases like Operation *RANCOUR* follow from this.

In contrast, venturing away from Proposition 5's parameter space forces higher cost types to reassess their plan and leads to richer strategies. We now switch to situations where the most credible types are rare:

Proposition 6. Suppose low cost types are sufficiently unlikely (i.e., $F\left(\frac{V_P}{1-\alpha}\right) < F\left(\frac{(1-p)V_S}{\alpha p}\right)\left(\frac{V_S}{V_P}\right)$). Then all types with sufficiently low costs (i.e., $k < \frac{(1-p)V_S}{\alpha p}$) take secret action, and the rest maintain the status quo. B exposes. The remaining highest cost types back down (i.e., those with $k \in \left(\frac{V_P}{1-\alpha}, \frac{(1-p)V_S}{\alpha p}\right)$), while the remaining lowest types escalate (i.e., those with $k < \frac{V_P}{1-\alpha}$).

Here, middling types like those from Proposition 4 are pervasive. B knows they will

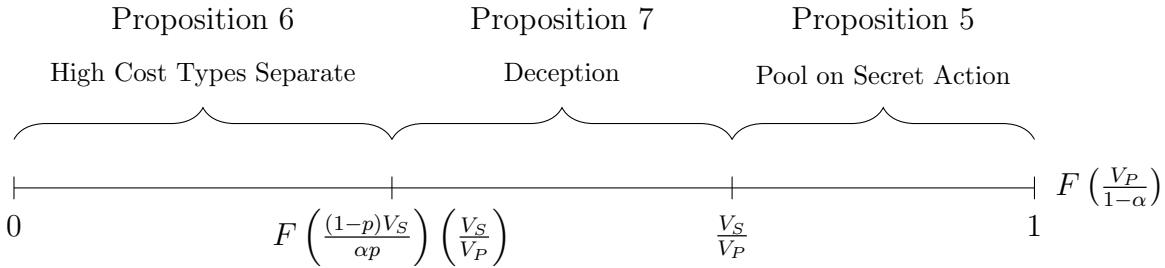


Figure 2: Parameter mapping for the incomplete information game.

test the waters. It therefore exposes the action, anticipating that those middling types will then fold. But B also knows that this strategy could backfire. Some portion of the time, A actually has low costs and escalates the subversion. Meanwhile, extremely high cost types know that B will challenge A, so they sit out altogether.

Proposition 6 provides an empirical prediction that the complete information model does not. By the standard collusion logic, it is hard to explain why an actor would expose secret action if it only induces a worse response from the opponent. This model explains such an outcome as a result of uncertainty. B may suspect that exposing the action is the right decision, but the middling types do not make that a sure bet. Rather, B exposes because it is the best move in expectation.

Note that we can only obtain this equilibrium outcome when Proposition 4's condition is filled. That is, some types must exist that wish to both take secret action and escalate if exposed, and some other types must exist that wish to take secret action but back down if exposed. The second group does not exist if, anticipating that B will expose anything it learns, taking secret action in the first place implies a type's preference to escalate later.

When the middle types exist, they act like low cost types here by pooling with them on secret action. Nevertheless, their strategy is not particularly devious. They too would take secret action in a complete information setting, and thus Proposition 4 captures many of the incentives that Proposition 6 explores. It would be more surprising if even higher cost types opted for secret action despite B's temptation to expose. We observe this in the final case, where the most credible types are neither too common nor too uncommon.

Before reaching that discussion, it will first help to further explore B's incentives.

Suppose for the moment that all types with a cost less than some k value choose to take secret action. Then B's utility for exposing equals:

$$-\left(\frac{F\left(\frac{V_P}{1-\alpha}\right)}{F(k)}\right)V_P + \left(1 - \frac{F\left(\frac{V_P}{1-\alpha}\right)}{F(k)}\right)0$$

Recalling that B earns $-V_S$ by maintaining silence, B is indifferent between exposing and not if:

$$\begin{aligned} -\left(\frac{F\left(\frac{V_P}{1-\alpha}\right)}{F(k)}\right)V_P + \left(1 - \frac{F\left(\frac{V_P}{1-\alpha}\right)}{F(k)}\right)0 &= -V_S \\ \frac{F\left(\frac{V_P}{1-\alpha}\right)}{F(k)} &= \frac{V_S}{V_P} \end{aligned} \tag{1}$$

Let k^* be the unique solution to Line 1.¹¹ We are now ready for the final parameter space:

Proposition 7. *Suppose the likelihood of low cost types falls in a middle region (i.e., $F\left(\frac{V_P}{1-\alpha}\right) \in \left(F\left(\frac{(1-p)V_S}{\alpha p}\right)\left(\frac{V_S}{V_P}\right), \frac{V_S}{V_P}\right)$). Then all types with sufficiently low costs (i.e., $k < k^*$) take secret action, and the rest maintain the status quo. B sometimes exposes secret action and sometimes does not (i.e., it exposes with probability $\sigma^* \equiv \frac{V_S}{p(V_S + \alpha k^*)}$). The remaining highest types back down (i.e., those with $k \in \left(\frac{V_P}{1-\alpha}, k^*\right)$) when exposed. The remaining lowest types (i.e., those with $k < \frac{V_P}{1-\alpha}$) escalate.*

Now the parameters impose deeper strategic problems for both players. For A, low cost types are frequent enough that B would not want to expose if the middle types from Figure 1 took secret action. But they are not so frequent that B would stay reticent if the highest cost types took action. And those high cost types would indeed want to, as they prefer doing so when B would not expose. Yet B would want to expose if they all took secret action.

B is also in a conundrum. If it never exposes, high cost types will exploit it. But if it always reveals, those high cost types never enter the fray, and the option backfires on B too often.

The solution to each problem fixes the other. B must mix between exposing and not exposing. Doing so deters the highest types from taking secret action. After all,

¹¹We prove the existence and uniqueness of the solution in the appendix.

imagine k is so large that backing down produces an extremely negative payoff. Then even the slightest probability that B will expose it is enough to convince that type to not take the action in the first place. But the fact that B does not always expose here means that some of the higher cost types are willing to test their luck. These types fall in Proposition 3's range, where a pure exposure strategy would have otherwise deterred them. Because a greater portion of types that would back down now take secret action, B faces enough uncertainty that it is willing to mix between its strategies.

The more adventurous strategy from the higher cost types produces a new implication. Under Propositions 4 and 6, the medium cost types back down when exposed in the game's equilibrium outcome. In both cases, A experiences *ex post* regret, but those types prefer running that risk even if they know B would expose. The higher cost types also experience *ex post* regret here. But unlike before, if they knew B would expose, they would not have wanted to take the gamble in the first place. Rather, the uncertainty B induces by pursuing the mixed strategy convinces the higher cost types into attempting the secret action.

The central lesson from Proposition 7 is that actors may expose distasteful policies only for that decision to backfire. The shift from covert to overt military aid by the CIA in Afghanistan illustrates how Soviet exposure of US covert action resulted in a less preferable policy outcome. Soviet Premier Leonid Brezhnev, seeking to prevent Afghanistan's re-orientation with the West, ordered the assassination of the Afghan president by elite Soviet forces and the deployment of thousands of Soviet soldiers into Afghanistan (Rubin, 2002). With the 1979 Soviet invasion of Afghanistan, President Jimmy Carter authorized a secret CIA program, Operation *Cyclone*, which provided support for Afghan *mujahideen* rebels (Brzezinski, 1979). President Carter's national security advisor wrote to him explaining that the US now had the opportunity to give the Soviets their own "Vietnam War" (Gibbs, 2000). The operation was approved only two weeks after the initial invasion (Kuperman, 1999). Originally, the US only allocated \$30 million to the program, while Soviet's were spending \$5 billion annually in counter-insurgency efforts. Eventually, US funding would swell to \$650 million annually in assistance to Afghan rebels (Rubin, 2002).

One reason why the operation was initially covert was because of a hostile domestic climate in the US regarding executive overreach. The 1970s saw significant criticism of intelligence agencies, namely manifested in the Church Committee's report (Isenberg,

1989). However, covert action saw a resurgence under President Reagan. The Reagan administration expanded the program to include weapons and training, facilitated by Pakistan's ISI, in an effort to pressure the Soviets into withdrawal (Pach, 2006). The Soviets detected American covert action in Afghanistan in 1980 and sought to expose it through the American press. One *New York Times* article from January 1980 was titled "Kremlin Steps Up Anti-U.S. Campaign, Charges CIA Is Training Afghan Rebels" (Fisher, 1980) as the Soviets sought to increase the pressure on Washington. In a secret memorandum, Soviet intelligence assessed that the US was supplying arms to Afghan rebels through third-party states, such as Egypt and Saudi Arabia, to Pakistani intelligence to be smuggled across the border (Ustinov, 1980). The CIA went to great lengths maintain plausible deniability by sourcing Soviet AK-47 rifles from Egypt and China, in doing so, tried to cover US tracks (Galster, 2001).

As the conflict continued the Reagan administration authorized the use of US-made Stingers, an anti-aircraft weapon that was uniquely identifiable as American and had a controlled proliferation (Carson, 2016; Pear, 1988). Security experts within the Reagan administration pushed for authorization of the Stinger program as part of a larger shift in US strategy in Afghanistan from harassment to full Soviet withdrawal (Coll, 1992). Since it was produced in 1983, the Stinger was considered cutting edge anti-air technology that would significantly hamper Soviet helicopter-borne counter-insurgency forces (Carson, 2016). The presence of Stingers on the battlefield meant that there was now undeniable evidence that the US was complicit in supporting the mujahideen, which came with possible significant ramifications. As Kuperman (1999) notes: "For the Central Intelligence Agency and especially its cautious Deputy Director John McMahon, directly traceable US involvement raised the danger of public exposure and political scandal that could damage the agency, as had earlier CIA covert operations uncovered by the Pike and Church congressional committees in the 1970s."

The CIA's station chief in Pakistan was significantly opposed to the Stinger program so as to keep their covert assistance program inconspicuous (Rubin, 2002). Yet the Reagan administration eventually approved the Stingers and, as analysts have noted, broke "the embargo on Made-in-America arms" with regards to Afghan rebels (Rubin, 2002). A Soviet intelligence report notes that that US likely delivered at least 600 Stingers to the Afghan rebels and over 250 US advisers were in Afghanistan training 100 rebels on Stinger use (GRU, 1988). Subsequent analysis found the stingers were

effective with one Pentagon report noting “more tactical and air support changes in the last quarter of 1986 and the first quarter of 1987 than in the previous 7 years of the conflict.” (United States Army, 1989)

Despite the massive Soviet Army securing major cities and highways through out the country, the war raged in the rebel-held country side (Taylor, 2014). Over the course of the conflict 18,000 Afghan government troops, 14,500 Soviet troops, 90,000 Afghan rebels, and over 1 million civilians would be killed as a result of the fighting (Taylor, 2014). After 9 years of fighting and a stalled domestic economy, Soviet forces withdrew from Afghanistan (Taylor, 2014).

While the decision to implement the stinger program in Afghanistan might appear to reflect preference differences between the Reagan and Carter administration, it is telling that the implementation did not occur until late in the conflict after US covert support was largely exposed. Rather than a change in preferences between administrations resulting in the use of weaponry implicating American involvement, it was the preferences over time for one administration which coincided with increased exposure of Operation Cyclone.¹²

The decision to escalate to overt action was likely due to domestic calls for more aid to rebels. In fact, it appears that the exposure of Operation Cyclone resulted in little blow back against the Reagan administration and Congressional support continued as funding to the CIA program increased until 1991 (Cogan, 1993). The chairman of defense appropriations, Charlie Wilson, was instrumental in pressuring the Pentagon in supporting the Afghan rebels with Stingers. In sum, the Soviet exposure did little to reduce American covert action in Afghanistan and instead increased American covert assistance to the Afghan rebels.

6 Empirical Implications

The previous section constructed a formal model of secret action and demonstrated that its implications capture empirical phenomenon. Our next task is to leverage the model to investigate how altering the environment changes the actors’ equilibrium behaviors.

¹²The Carter administration did not have stingers as an option, but their use to the Reagan administration reflects a clear decision to use weaponry that could be identified as American rather than other hardware that would not implicate American involvement.

In the process, we can examine whether existing theoretical claims withstand formal scrutiny for the types of cases covered under the model.

Indeed, we recover two unexpected findings. To begin, consider how adding value to secret action influences A’s decision:

Proposition 8. *Within Proposition 7’s parameter space, the probability that A takes secret action strictly decreases in its strength (i.e., as V_S increases). Moreover, the overall probability that A implements secret action strictly decreases in its strength.*

This is surprising. Increasing V_S strengthens secret action. Intuitively, A ought to pursue it more often. Many existing theories of secret action make this precise prediction. Significant increases in the ability to carry out secret action are supposed to encourage more use of secret action. For example, the creation of the CIA led to dramatic increases in the amount of covert action the US took during the early years of the Cold War (Rudgers, 2000; Johnson, 1989). Multiple former CIA operatives testified before the Church Committee regarding an agency with an over-reliance on covert action when limited, selective covert action was the intention of the law (Rudgers, 2000). By this narrative, the shift from military-led covert action to an agency more capable of carrying out stronger covert action increased its use.

Yet the opposite happens in equilibrium. Why? Within Proposition 7’s parameter space, the types of A sort themselves not by their own preferences but by B’s. This is because A’s strategy must induce B’s indifference between exposing and not exposing. Otherwise, some types would certainly regret either taking secret action or not taking secret action.

The appendix proves the claim by analyzing how V_S alters k^* . However, the unexpected result has a reasonable intuition. Within Proposition 7’s parameter space, the types of A make B indifferent between exposing and not exposing. Increasing V_S makes B more inclined to expose A to force the higher cost types to quit and not enjoy the additional subversive power of secret action. Thus, to maintain B’s indifference, exposing A must backfire more often conditional on having reached B’s decision. Having fewer of the higher cost types—who would back down if exposed—engage in secret action accomplishes this. In effect, B’s newfound desire to test the waters deters the marginal, least resolved types. The probability that A takes secret action declines.

One may wonder whether the initial probability of secret action declines but the

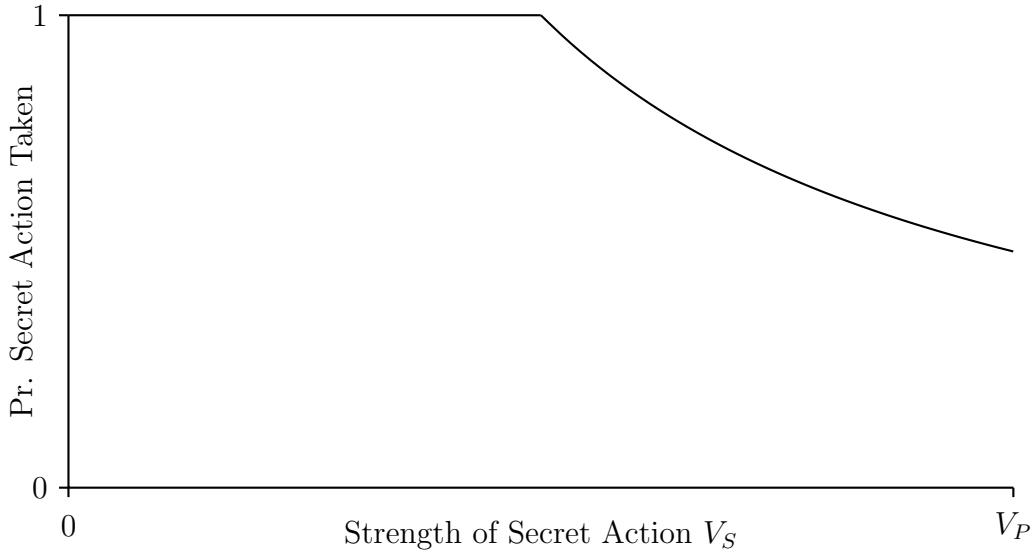


Figure 3: The probability A takes secret action as a function of the strength of that action. Counterintuitively, it weakly decreases for parameters shown.

probability of secret action implemented increases. Despite the first half of Proposition 8, this is not immediately obvious. There are two ways A finishes firm with the secret action choice. To obtain either, A must enact the secret action. After that, Nature can keep the secret action hidden. Alternatively, Nature can reveal the secret action but B keeps silent. The first process decreases in V_S as a consequence of the first half of Proposition 8. The second process also decreases. As claimed a moment ago, larger values of V_S scare B and compel it to reveal the action more often. Thus, A becomes less likely to use secret action overall as it becomes more powerful.

Before moving on, we have a few technical points about Proposition 8. First, the comparative static examines what occurs in the region where $F\left(\frac{V_P}{1-\alpha}\right)$ falls between $F\left(\frac{(1-p)V_S}{\alpha p}\right)\left(\frac{V_S}{V_P}\right)$ and $\frac{V_S}{V_P}$. Within Proposition 5's parameter space, local changes to V_S do not affect the probability of secret action. Large increases eventually shift the game to Proposition 7's case, however. Figure 3 plots this relationship and the transition between parameter spaces.¹³

Second, large increases to V_S can push the game into Proposition 6's parameters. There, types with k values less than $\frac{(1-p)V_S}{\alpha p}$ opt for secret action. This now causes the

¹³We draw this using $p = .5$, $\alpha = .5$, and $V_P = 1$, with k distributed uniform on the interval $[1, 3]$.

intuitive increase in the portion of types choosing to do so.¹⁴

Finally, this comparative static increases the value of holding secret action while holding everything else constant. However, in the substantive motivation, we discussed how better secret action can also improve public action. The appendix therefore replicates Proposition 8 under that assumption. Answering this question is more complicated than the main case and requires use of the implicit function theorem. Nevertheless, we derive a technical condition that guarantees the same implication. A sufficient condition for it is that the density of the type that is indifferent between escalating and quitting is low. This insures that the described intuition dominates the desire of more types to escalate.

Our second unexpected result concerns the probability B observes the action:

Proposition 9. *Within Proposition 7's parameter space, the probability that A takes secret action is unchanging in the probability Nature reveals the action. Moreover, the overall probability of A ultimately implementing secret action is also unchanging.*

One would suspect that increasing A's chance of exposure would deter it from taking secret action. Indeed, existing theories of covert action also make this prediction. Joseph and Poznansky (2018) show that exposure from information and communication technologies likely decreases traditional covert action. Likewise, security policymakers consider the risk of exposure when considering approving a covert action plan (Mark, 2015, 251). Keefer (2001) also notes that policymaking institutions, like the Joint Staff, write reports on the risk of exposure for a potential covert action that is to be considered in the decision to carry out covert action. In the case of democratic leaders, Downes and Lilley (2010) highlight the that the decision to engage in covert intervention likely rests on the chance of success and a likelihood of a failure remaining secret.

Nevertheless, we see that the frequency of secret action remains static. The reason is that A's types choose their strategy intending to induce indifference from B. But B's move occurs after Nature's decision to reveal the secret action. As a result, the probability of revelation does not determine whether B prefers exposing. In turn, A's types do not change their strategy as p changes. This explains why the probability of

¹⁴Nevertheless, because $F\left(\frac{(1-p)V_S}{\alpha p}\right)\left(\frac{V_S}{V_P}\right)$ and $\frac{V_S}{V_P}$ are both continuous and Proposition 8 requires the parameters to fall strictly within those bounds, we can always analyze how the equilibrium probabilities change for some change in V_S .

initial secret action remains fixed.¹⁵

Nevertheless, Proposition 9 goes further and says that the overall probability that A stays with the strategy is also identical. Given that mixed strategies intend to induce indifference and that the potential for exposure hurts A, one might expect that the end probability would be different. However, within Proposition 7’s parameter space, B’s strategy supplements the exposure risk. If the signal is weaker, B compensates by exposing more often; if the signal is stronger, B adds some slack by exposing less often. Inducing indifference requires that the changes offset one another. As such, the probability A stays with unexposed secret action is constant in p .

Like Proposition 8, these claims apply within Proposition 7’s local region. Within Proposition 6’s region, B exposes as a pure strategy. Thus, higher revelation rates deter more types from gambling on not getting caught. However, sufficient increases to p transition the game into Proposition 7, where the secret action rates stay flat thereafter.

7 Conclusion

This paper explored exposure of secret action. With complete information, the opponent should expose if the state would quit and keep quiet if the state would escalate. States that would escalate therefore choose to take secret action with impunity. Less resolved states may try their luck, hope that their secret actions remain secret, and then quit if exposed. The least resolved states choose not to engage in secret action at all, deterred by the credible threat of exposure.

However, the exposer’s dilemma becomes more complicated when faced with uncertainty over the state’s resolve. Publicizing secret action becomes a gamble. If the exposer suspects that the state is likely to double down, it withholds its knowledge. Less resolved states enjoy free rein here, conducting secret action they would otherwise not get away with. On the opposite end of the spectrum, if the exposer suspects that the state is likely to quit, only the resistant types even try. Some bow out after exposure, but others escalate. The most interesting situation falls in between those cases, where some portion of unresolved types take secret action. Without a clear response,

¹⁵It also implies that if changing V_S necessarily increases the odds of revelation (perhaps because better secret action is inherently easier to observe), Proposition 8’s relationship still holds.

the exposer only sometimes publicizes the information.

This deception gives rise to a couple of unexpected comparative statics. Intuition suggests that a state would more often engage in stronger secret action and when others are less likely to observe it. However, such logic fails to properly account for the second-order incentives that come along with the opponent's decision whether to expose. The types that choose to take secret action do so in an effort to force the opponent into not having a clear response. Stronger secret action makes the opponent more inclined to try to end the action. Thus, more unresolved types must quit at the outset. Meanwhile, the opponent's exposure strategy counterbalances any increase in the probability of revelation, so secret action remains constant.

Zooming out, our model of uncertainty urges caution in interpreting observational evidence regarding the value of exposing and shaming perpetrators of secret action. Evidence of success from such exposure would suggest that policymakers should use the tactic more often. Lucas (1976) warns against making such recommendations based on historical data without an underlying theoretical explanation, and indeed our model highlights a problem. Strategic actors, to the best of their ability with the information they have available, expose questionable secret action when they believe that the results will be effective. We do not observe failures as often precisely because the actor endogenously chooses not to expose when it believes that the state will double down. In turn, more aggressive exposure without consideration for the strategic selection into secret action will backfire.

References

Al Jazeera. 2012. "Iran sending arms to Syria despite ban." *Al Jazeera* .
URL: <https://www.aljazeera.com/news/2012/05/17/iran-sending-arms-to-syria-despite-ban/>

Baram, Amatzia. 2012. "Saddam Hussein's Dreams of an End to the Zionist Nightmare." *Haaretz* .

Beeley, Harold. 1963. Harold Beeley, ambassador, Cairo to Foreign Office, 6 January 1963. In *National Archives: Yemen and Aden 1962-5*, ed. Mark Curtis. Vol. PREM 11/3878 Declassified p. 4.

Bergman, Ronen. 2018. *Rise and Kill First: The Secret History of Israel's Targeted Assassinations*. New York: Random House.

Brzezinski, Zbigniew. 1979. Reflection on Soviet Intervention in Afghanistan. In *National Security Archive Electronic Briefing Book No. 396*, ed. Malcolm Byrne Svetlana Savranskaya. Vol. 12 National Security Archive.

Butler, Rab. 1964. Rab Butler, Foreign Secretary to Prime Minister, 20 April 1964. In *National Archives: Yemen and Aden 1962-5*, ed. Mark Curtis. Vol. DEFE 13/569 Declassified p. 8.

Carnegie, Allison and Austin Carson. 2019. "The disclosure dilemma: Nuclear intelligence and international organizations." *American Journal of Political Science* 63(2):269–285.

Carson, Austin. 2016. "Facing off and saving face: Covert intervention and escalation management in the Korean War." *International Organization* 70(1):103–131.

Carson, Austin. 2018. *Secret Wars: Covert Conflict in International Politics*. Princeton University Press.

Cave, George. 1994. "Why Secret 1986 US-Iran Arms for Hostages Negotiations Failed." *Washington Report on Middle East Affairs* 8:89.

Cogan, Charles G. 1993. "Partners in Time: The CIA and Afghanistan since 1979." *World Policy Journal* 10(2):73–82.

Coll, Steven. 1992. “Anatomy of a Victory: CIA’s Covert Afghan War; 2 Billion Program Reversed Tide for Rebels.” *The Washington Post* .

Cormac, Rory. 2013. “Coordinating Covert Action: The Case of the Yemen Civil War and the South Arabian Insurgency.” *Journal of Strategic Studies* 36(5):692–717.

Cormac, Rory and Richard J. Aldrich. 2018. “Grey is the new black: covert action and implausible deniability.” *International Affairs* 94(3):477–494.

Dagher, Sam and S Fitch. 2015. “Iran expands role in Syria in conjunction with Russias airstrikes.” *Wall Street Journal* .

Dai, Xinyuan. 2005. “Why comply? The domestic constituency mechanism.” *International Organization* 59(2):363–398.

Debs, Alexandre and Nuno P Monteiro. 2014. “Known unknowns: Power shifts, uncertainty, and war.” *International Organization* 68(1):1–31.

DIA. 2019. Iran Military Power: Ensuring Regime Survival and Securing Regional Dominance. Technical report Defense Intelligence Agency Stop IDCC, Washington, DC 20402-0001: .

Downes, Alexander B. and Mary Lauren Lilley. 2010. “Overt Peace, Covert War?: Covert Intervention and the Democratic Peace.” *Security Studies* 19(2):266–306.

Edwards, Julia. 2015. “Obama acknowledges damage from NSA eavesdropping on Merkel.” *Reuters* .

Filkins, Dexter. 2013. “The Shadow Commander: Qassem Suleimani is the Iranian operative who has been reshaping the Middle East. Now hes directing Assads war in Syria.” *The New Yorker* .

Finnemore, Martha and Kathryn Sikkink. 1998. “International norm dynamics and political change.” *International Organization* 52(4):887–917.

Finney, John. 1973. “More Secret Air Attacks In Cambodia Disclosed.” *The New York Times* p. 1.

Fisher, Dan. 1980. "Kremlin Steps Up Anti-U.S. Campaign, Charges CIA Is Training Afghan Rebels." *Los Angeles Times* p. B8.

Fisk, Robert. 2013. "Iran to send 4,000 troops to aid President Assad forces in Syria." *The Independent* 16.

Galster, Steve. 2001. "AFGHANISTAN: THE MAKING OF U.S. POLICY, 1973-1990." *National Security Archive* 2.

Gibbs, David N. 2000. "Afghanistan: The Soviet invasion in retrospect." *International Politics* 37(2):233–245.

Goemans, Hein and William Spaniel. 2016. "Multimethod research: A case for formal theory." *Security Studies* 25(1):25–33.

Greenwood, Max. 2018. "US sanctions five Iranians over missile support to Houthis." *The Hill* .

GRU. 1988. "Memorandum about US Aid to the Counterrevolutionaries.". A.A. Lyakhovskiy, Plamya Afgana (Moscow: Iskon, 1999), pp.410-411. Translated by Gary Goldberg.

Hafner-Burton, Emilie M. 2008. "Sticks and stones: Naming and shaming the human rights enforcement problem." *International Organization* 62(4):689–716.

Harris, Shane and Matthew Aid. 2013. "Exclusive: CIA Files Prove America Helped Saddam as He Gassed Iran." *Foreign Policy* .

Hersh, Seymour. 2019. "The Vice Presidents Men." *London Review of Books* 41:9–12.

Inouye, Daniel and Lee Hamilton. 1987. Report of the Congressional Committees Investigating the Iran-Contra Affair. Congressional 100-216 US Congress Washington, DC: .

Isenberg, David. 1989. "The Pitfalls of US Covert Operations." Cato Policy Analysis No. 118.

Johnson, Loch K. 1989. "Covert Action and Accountability: Decision-Making for America's Secret Foreign Policy." *International Studies Quarterly* 33(1):81–109.

Jones, Clive. 2004. “‘Among Ministers, Mavericks and Mandarins’: Britain, Covert Action and the Yemen Civil War, 1962–64.” *Middle Eastern Studies* 40(1):99–126.
URL: <http://www.jstor.org/stable/4289889>

Joseph, Michael F and Michael Poznansky. 2018. “Media technology, covert action, and the politics of exposure.” *Journal of Peace Research* 55(3):320–335.

Keefer, Edward C. 2001. “Foreign Relations of the United States, 1964–1968.” *Volume XXVI. Indonesia; Malaysia-Singapore; Philippines* .

Kuperman, Alan J. 1999. “The Stinger Missile and U.S. Intervention in Afghanistan.” *Political Science Quarterly* 114(2):219–263.

Lebovic, James H and Erik Voeten. 2009. “The cost of shame: International organizations and foreign aid in the punishing of human rights violators.” *Journal of Peace Research* 46(1):79–97.

Lewis, Anthony. 1976. “Menu for Disaster.” *The New York Times* p. 21.

Lucas, Jr., Robert E. 1976. Econometric policy evaluation: A critique. In *The Phillips curve and labor markets*, ed. Karl Brunner and Allan H Meltzer. North Holland: Elsevier.

Macmillan, Harold. 1962. Prime Minister personal minute, 6 October 1962. In *National Archives: Yemen and Aden 1962-5*, ed. Mark Curtis. Vol. PREM 11/3877 Declassified p. 1.

Mark, Lowenthal. 2015. *Intelligence: From Secrets to Policy*. SAGE Publishers.

McCubbins, Mathew D. and Thomas Schwartz. 1984. “Congressional Oversight Overlooked: Police Patrols versus Fire Alarms.” *American Journal of Political Science* 28(1):165–179.

McFarland, Sam and Melissa Mathews. 2005. “Do Americans care about human rights?” *Journal of Human Rights* 4(3):305–319.

McNamara, Robert. 2017. “The Nasser factor: Anglo-Egyptian relations and Yemen/Aden crisis 1962–65.” *Middle Eastern Studies* 53(1):51–68.

Murdie, Amanda and Johannes Urpelainen. 2015. "Why pick on us? Environmental INGOs and state shaming as a strategic substitute." *Political Studies* 63(2):353–372.

Neff, Donald. 1991. "The U.S., Iraq, Israel, and Iran: Backdrop to War." *Journal of Palestine Studies* 20(4):23–41.

URL: <http://www.jstor.org/stable/2537433>

Neville, Leigh. 2015. *Special Forces in the War on Terror (General Military)*. Oxford, UK: Osprey Publishing.

Newton, Robert. 1992. CRYPTOLOGIC/CRYPTOGRAPHIC DAMAGE ASSESSMENT: USS PUEBLO. Historical National Security Agency Fort Meade, MD: .

Novikov, Evgeni. 2003. "SAVING SADDAM.THE SEQUEL?" *Russia and Eurasia Review Volume* 2.

Orkaby, Asher. 2017. "The North Yemen civil war and the failure of the Federation of South Arabia." *Middle Eastern Studies* 53(1):69–83.

Pach, Chester. 2006. "The Reagan Doctrine: Principle, Pragmatism, and Policy." *Presidential Studies Quarterly* 36(1):75–88.

Parliament, UK. 1964. Contains Hansard parliamentary answers, 14 May 1964, Vol.685, No.110, Col.605. In *National Archives: Yemen and Aden 1962-5*, ed. Mark Curtis. Vol. DEFE 7/1304 Declassified p. 11.

Pear, Robert. 1988. "Arming Afghan Guerrillas: A Huge Effort Led by U.S." *The New York Times* .

Rubin, Michael. 2002. "Who is responsible for the Taliban?" *Middle East Review of International Affairs* 6(1):1–16.

Rudgers, David F. 2000. "The Origins of Covert Action." *Journal of Contemporary History* 35(2):249–262.

Sagar, Rahul. 2001. *Whistleblowers: Broken lives and organizational power*. Ithaca: Cornell University Press.

Sagar, Rahul. 2013. *Secrets and leaks: The dilemma of state secrecy*. Princeton: Princeton University Press.

Smith, Michael. 2007. *Killer Elite: The Inside Story of America's Most Secret Special Operations Team*. New York: Macmillan.

Snyder, Jack. 2019. “Backlash against human rights shaming: emotions in groups.” *International Theory* pp. 1–24.

Solingen, Etel. 2012. *Sanctions, statecraft, and nuclear proliferation*. Cambridge: Cambridge University Press.

Spaniel, William. 2019. *Bargaining over the bomb: the successes and failures of nuclear negotiations*. Cambridge: Cambridge University Press.

Spaniel, William and Michael Poznansky. 2018. “Credible commitment in covert affairs.” *American Journal of Political Science* 62(3):668–681.

Taylor, Alan. 2014. “The Soviet War in Afghanistan, 1979 - 1989.” *The Atlantic* .

Terman, Rochelle. 2019. “Rewarding resistance: Theorizing defiance to international shaming.” Manuscript, University of Chicago.

Thompson, Nick. 2017. “Ukraine: Everything you need to know about how we got here.” *CNN.com* .

UK Defense Secretary. 1964. Memorandum by Defence Secretary, Maintaining our position in South Arabia, 13 July 1964. In *National Archives: Yemen and Aden 1962-5*, ed. Mark Curtis. Vol. DEFE 13/570 Declassified p. 11.

United States Army. 1989. Impact of the Stinger Missile on Soviet and Resistance Tactics in Afghanistan. Technical report United States Army.

Ustinov, Dimitri F. 1980. “Report by Soviet Defense Minister Ustinov to CPSU CC on ‘Foreign Interference’ in Afghanistan.” .

Weinberger, Caspar. 1985. Diary, Caspar W. Weinberger, December 7, 1985. In *National Security Archive Electronic Briefing Book 210*, ed. Malcolm Byrne; Peter Kornbluh; Thomas Blanton. Washington, DC: National Security Archive.

Weinberger, Caspar. 1986. Caspar W. Weinberger Memorandum for the Record, “Meeting ... with the President ... in the Oval Office,” November 10, 1986. In *National Security Archive Electronic Briefing Book 210*, ed. Malcolm Byrne; Peter Kornbluh; Thomas Blanton. Washington, DC: National Security Archive.

Wolford, Scott. 2007. “The turnover trap: New leaders, reputation, and international conflict.” *American Journal of Political Science* 51(4):772–788.

8 Appendix

We now prove the formal claims from the main text.

8.1 Proof of Proposition 5

Consider B's decision. If it exposes A, types with k values less than $\frac{V_P}{1-\alpha}$ escalate. Types with k values greater than that back down. The probability of the former case is the CDF of A's distribution evaluated at $\frac{V_P}{1-\alpha}$, or simply $F\left(\frac{V_P}{1-\alpha}\right)$. B then receives $-V_P$. The probability of the latter case is the complement. B then receives 0. Therefore, its expected utility for exposure equals:

$$-F\left(\frac{V_P}{1-\alpha}\right)V_P + \left(1 - F\left(\frac{V_P}{1-\alpha}\right)\right)0 = -F\left(\frac{V_P}{1-\alpha}\right)V_P$$

Meanwhile, B's utility for not exposing equals $-V_S$. As such, B does not expose if:

$$\begin{aligned} -V_S &> -F\left(\frac{V_P}{1-\alpha}\right)V_P \\ F\left(\frac{V_P}{1-\alpha}\right) &> \frac{V_S}{V_P} \end{aligned}$$

This is the cutpoint in Proposition 5.

We only have A's strategies left to check for profitable deviations. By sticking to the strategy, A always secures V_S . This could be because Nature does not reveal the action or Nature does but B chooses not to expose it. Either way, V_S is the best possible payoff A can receive for the game, so cannot profitably deviate.

8.2 Proof of Proposition 6

Conditional on exposure, A's actions are a trivial application of backward induction. With that in mind, consider B's decision. If it exposes, types for which $k < \frac{V_P}{1-\alpha}$ escalate, and B receives $-V_P$. The remainder back down, and B receives 0. Given that only types with k values less than $\frac{(1-p)V_S}{\alpha p}$ take secret action in the first place, the posterior probability B is facing one of the types that will escalate is $\frac{F\left(\frac{V_P}{1-\alpha}\right)}{F\left(\frac{(1-p)V_S}{\alpha p}\right)}$. In turn, B prefers exposing to not if:

$$\begin{aligned}
& - \left(\frac{F\left(\frac{V_P}{1-\alpha}\right)}{F\left(\frac{(1-p)V_S}{\alpha p}\right)} \right) V_P + \left(1 - \frac{F\left(\frac{V_P}{1-\alpha}\right)}{F\left(\frac{(1-p)V_S}{\alpha p}\right)} \right) 0 > -V_S \\
& F\left(\frac{V_P}{1-\alpha}\right) < F\left(\frac{(1-p)V_S}{\alpha p}\right) \left(\frac{V_S}{V_P}\right)
\end{aligned}$$

This is the cutpoint in Proposition 6. Note that this parameter space implies that $\frac{V_P}{1-\alpha} < \frac{(1-p)V_S}{\alpha p}$ because $\frac{V_S}{V_P}$ is 0-to-1 constrained.

We only have A's strategies left to check for profitable deviations. But this is straightforward. Conditional on B always exposing, a type prefers to take secret action even if it were to back down after exposure if:

$$\begin{aligned}
p(-\alpha k) + (1-p)V_S & > 0 \\
k & < \frac{(1-p)V_S}{\alpha p}
\end{aligned}$$

Analogously, the remaining types would want to take no action.¹⁶ This completes the proof.

8.3 Proof of Proposition 7

We begin by deriving B's indifference condition. If B does not expose, it earns $-V_S$. If it does expose, all types with k values less than $\frac{V_P}{1-\alpha}$ must escalate, and all types with k values greater than that must back down.¹⁷ To derive a cutpoint strategy, suppose that all types with a value less than some k chose to engage in secret action in the first place. Then B is indifferent if:

$$\begin{aligned}
& - \left(\frac{F\left(\frac{V_P}{1-\alpha}\right)}{F(k)} \right) V_P + \left(1 - \frac{F\left(\frac{V_P}{1-\alpha}\right)}{F(k)} \right) 0 = -V_S \\
& \frac{F\left(\frac{V_P}{1-\alpha}\right)}{F(k)} = \frac{V_S}{V_P}
\end{aligned}$$

A unique solution exists. This is for the following reasons. To begin, note that

¹⁶Of course, types with $k < \frac{V_P}{1-\alpha}$ would want to escalate after exposure. But this only reinforces their desire to try secret action.

¹⁷What the $k = \frac{V_P}{1-\alpha}$ type chooses is immaterial because it has zero measure.

the right hand side is between 0 and 1. Now consider the left hand side. Recall that the numerator is strictly positive, or $F\left(\frac{V_P}{1-\alpha}\right) > 0$. Thus, the right hand side goes to infinity as k approaches \underline{k} from the right. Meanwhile, as k goes to \bar{k} , the left hand side goes to $F\left(\frac{V_P}{1-\alpha}\right)$. This is strictly less than the right hand side, otherwise we would be in Proposition 5's parameter range. Because the left hand side strictly decreases and is continuous in k , a unique value of k satisfies the line with equality. We call that value k^* . Note that $k^* > \frac{V_P}{1-\alpha}$, meaning that the k^* type prefers to back down following exposure. Moreover, k^* must also be greater than $\frac{(1-p)V_S}{\alpha p}$, otherwise we would fall into Proposition 6's parameter space.

Now consider what must be necessary for all types less than k^* to take secret action and all types less than k^* to not. Because the types' utilities are continuous in k , the type k^* must be indifferent between the two choices. The only way this can be true is if B mixes. Playing a pure strategy of not exposing means that A obtains V_S , which is strictly preferable to not taking secret action and earning 0. Meanwhile, playing a pure strategy of exposing means that the k^* type has a strict preference to maintain the status quo over taking secret action because $k^* > \frac{(1-p)V_S}{\alpha p}$. In turn, letting σ represent B's probability of exposing, the k^* type is indifferent if:

$$p(\sigma(-\alpha k^*) + (1 - \sigma)V_S) + (1 - p)V_S = 0$$

$$\sigma^* \equiv \frac{V_S}{p(V_S + \alpha k^*)}$$

These are the values in Proposition 7. The remaining strategies are straightforward applications of backward induction.

8.4 Proof of Proposition 8

We can prove the first half of Proposition 8 by examining Line 1. As V_S increases, the right hand side increases. Maintaining equality requires the right hand side to increase to compensate. The value k^* is the only degree of freedom. $F(k)$ strictly increases in k on the interval of the support of the distribution. Because this is in the denominator of the left hand side, the left hand side strictly decreases in k . As such, k^* must decrease when V_S increases.

For the second half of the proposition, note that the equilibrium probability of A

implementing (and sticking with) covert action equals:

$$F(k^*)(1 - p) + F(k^*)p(1 - \sigma^*) = (1 - p\sigma^*)F(k^*)$$

Recall that $\sigma^* = \frac{V_S}{p(V_S + \alpha k^*)}$. We can therefore further manipulate this probability to:

$$\left(\frac{\alpha k^*}{\alpha k^* + V_S} \right) F(k^*) \quad (2)$$

Because k^* decreases in V_S , $F(k^*)$ decreases as well. Thus, if $\frac{\alpha k^*}{\alpha k^* + V_S}$ also decreases in V_S , then the probability decreases overall. It will help to write k^* as a function of V_S for the corresponding derivative, giving us $\frac{\alpha k^*(V_S)}{\alpha k^*(V_S) + V_S}$. Showing that the derivative of this is negative gives us:

$$\frac{\alpha k''(V_S)(\alpha k^*(V_S) + V_S) - \alpha k^*(V_S)(\alpha k''(V_S) + 1)}{(\alpha k^*(V_S) + V_S)^2} < 0$$

$$k''(V_S) > V_S k''(V_S)$$

The left hand side is obviously positive—the cutpoint k^* is always a positive value regardless of V_S . Meanwhile, the first half of this proof established that k^* decreases in V_S . This is the same thing as saying $k''(V_S) < 0$. But this means that the right hand side is negative. Overall, then, a positive value is greater than a negative value, thereby completing the proof.

8.5 Robustness Check for Proposition 8

We now derive the technical condition for Proposition 8 to hold if increasing the value of covert action also increases the value of public action. To do this, let $\epsilon > 0$ represent the change, such that the value for public action equals $V_P + \epsilon$ and the value of covert action equals $V_S + \epsilon$. Rather than take the derivative on V_S , we now want to know how changing ϵ alters the outcome to capture the effect of changing both covert and public action simultaneously.

Changing the notation for the extension and rearranging Line 1 yields:

$$\frac{F\left(\frac{V_P + \epsilon}{1 - \alpha}\right)}{F(k)} - \frac{V_S + \epsilon}{V_P + \epsilon} = 0 \quad (3)$$

We want to know when increasing ϵ decreases the corresponding k that maintains the equality.¹⁸ Such a condition implies that the probability of covert action decreases. To do this, we can use the implicit function theorem on Line 3. The implicit function theorem tells us that the derivative of k^* with respect to ϵ is the negative of the derivative of Line 3 with respect to ϵ divided by the derivative of Line 3 with respect to k . That is, we require:

$$-\frac{\frac{\partial}{\partial \epsilon} \left(\frac{F\left(\frac{V_P+\epsilon}{1-\alpha}\right)}{F(k)} - \frac{V_S+\epsilon}{V_P+\epsilon} \right)}{\frac{\partial}{\partial k} \left(\frac{F\left(\frac{V_P+\epsilon}{1-\alpha}\right)}{F(k)} - \frac{V_S+\epsilon}{V_P+\epsilon} \right)} < 0$$

Manipulating this yields:

$$\begin{aligned} & -\frac{f\left(\frac{V_P+\epsilon}{1-\alpha}\right)}{F(k)(1-\alpha)} - \frac{V_P-V_S}{(V_P+\epsilon)^2} < 0 \\ & f\left(\frac{V_P+\epsilon}{1-\alpha}\right) < \frac{F(k)(1-\alpha)(V_P-V_S)}{(V_P+\epsilon)^2} \end{aligned}$$

The right side is strictly positive. Thus, a sufficiently small density for the type indifferent between escalating and quitting generates the result.

8.6 Proof of Proposition 9

The proof here is straightforward. The probability of A taking covert action is $F(k^*)$, and the probability of A ultimately implementing it is Line 2. Because p does not appear explicitly in either of these figures, for either probability to change in p , it must be that k^* is implicitly a function of p . However, Line 1 shows that this is not the case, thereby completing the proof.

¹⁸From here, we require that a solution exists to Line 3 (given by assumption) and that the derivative of Line 3 with respect to k is non-zero (it is negative).