Introduction

Assassination is one of the most widely-recognized acts of political violence, but one whose strategic calculus has not been rigorously investigated. The majority of literature on assassinations has concentrated on a few isolated cases of high-profile individuals. However, in recent years, a few efforts have been made to explore the topic of assassination empirically. All of these empirical discussions, however, have emphasized the relative rarity of assassination (in contrast to the frequency of incidents of armed conflict).

Nearly all nations have the apparatus to coordinate and execute an assassination attempt, and it is easy to imagine cases in which a head-of-state assassination could potentially avert conflict, thereby saving many lives, or end unfavorable domestic policies, yielding social or economic benefits at a fairly low cost to the perpetrator. However, an assassination is an unusual event and an assassination against a head-of-state even more so. Therefore, I ask the question, *why don't assassinations occur more frequently?* A formal model can suggest answers to this question, as well as form and answer several corollary and tangential questions. This paper constructs such a model, as both a normal-form strategic game and an extensive-form game with chance moves.

The next section discusses the existing empirical literature on assassination. Section three develops the model, followed by substantive effects of the variables within, and includes a discussion of an extended form of the model. Section six discusses the applications of the findings derived from the model, and section seven concludes.

Empirical Literature on Assassination

Assassinations are not unusual things. Jones and Olken claim that a national leader has suffered assassination in two of every three years since 1950 (2007). From Julius Caesar to modern day targeted killing of terrorists, assassinations have attracted much attention from the public. Even academia has invested some effort in discussing the high-profile assassinations of history. These discussions, however, have largely concentrated on individual events and not trends in behavior (Iqbal and Zorn 2008). This absence of empirical investigation has only begun to be filled very recently.

In their landmark study, Iqbal and Zorn construct an econometric model to investigate the relationship between assassinations of heads-of-state and factors such as institutionalized succession, institutionalized power, and repressiveness of the regime. They find that these three factors play a major role in indentifying the leaders who are the most likely targets for assassination attempts (2006). However, their variables suggest a bias for assassinations originating from within the country, instead of resulting from interstate aggressions.

Iqbal and Zorn followed this paper with another study on the subsequent fallout of a successful assassination. Their findings suggest that assassinations yield more instability when they are executed against leaders for whom there is no formal succession mechanism (2008). Dovetailing their prior study, this means leaders without institutional mechanisms to determine their successors are both most at risk for assassination, and most likely to be followed by political chaos.

The results of Iqbal and Zorn are followed-up in a study by Jones and Olken. By analyzing assassinations from 1875 to 2004, they determine that successful assassination of autocrats yields progress towards democracy, and increases in existing conflict intensity. However, unsuccessful attempts yield more authoritarianism, and diminishing conflict (2007). With this being the case, democracies should see some incentive to decapitate authoritarian regimes. However, it is important to note that this doesn’t necessarily generalize to nongovernmental institutions. A paper by Jordan seems to refute this, finding that leadership decapitation against terrorist networks actually tends to exacerbate terrorism and perpetuate the networks the targeted killing was supposed to catalyze the dissolution of (2009).

Wolford advances the notion that the fundamental unit of analysis in international relations should be the leader, and not the nation. He does this by discussing the disposition of newer leader towards more aggressive international policies. Likewise, incumbents in contentious elections are more inclined to pursue aggressive policies. Both do this in pursuit of reputations. The former are seeking legitimacy and relevance in subsequent international dealings. The latter seek to sustain their seats through another election. Both of these suggest that some aggressive actions may simply be structural costs of democratic institutions (2007). While Wolford doesn't explicitly discuss assassination as an exercise in political violence, his findings do not restrict acts of political violence to non-assassination acts.

The act of assassination itself is a difficult thing. Leaders have very large incentives (namely, their lives) to take measure to prevent assassinations from happening (Frey 2007). Such methods can be effective: wearing bullet-proof vests will protect a leader from many attacks by gun (Frey and Torgler 2008). However, authoritarian leaders have larger inclinations to expend lavishly on personal protection, and higher probability of being attacked. Thus, the probability of actually assassinating an individual given an attempt to do so must figure prominently in calculations of the expected value of attempting assassinations.

The Model

In its simplest form, the model is structured as a normal-form strategic game. In this game, there are 2 heads of distinct states. Each head of state views the policies of the other unfavorably, and has exhausted traditional negotiation methods for changing the unfavorable policies. Thus, the leader is faced with the decision to attempt the assassination of the opposing leader. The resultant payoff matrix follows:

	Assassinate	Don't Assassinate
Assassinate	$-L, -L$	$c_1, -L$
Don't Assassinate	$-L, c_2$	0, 0

Where $-L$ is the personal cost to the leader of being assassinated, and c_i is the value of the concession. There are three pure-strategy Nash Equilibria: those two action profiles in which only one actor attempts assassination and the one in which they both do. Played over time, leaders should decide to assassinate each other immediately (before the other can make the decision to do so), yielding the probable outcome that both leaders are assassinated. However, we do not see this kind of brutal international politicking at the international level. We must therefore refine the model.

Throughout the development of this model, there are a few important substantive assumptions. Namely, if one leader orders the attempted assassination of another, the identity of the aggressor will be difficult to hide, and so players make calculations on the assumption that their identities as aggressors will be known internationally if they order an attempt. That said, though these decisions are made in continuous time, the decision is secret until the attempt is carried out, protecting leaders from unexpected reputational costs, meaning we have some analytical flexibility in deciding how to evaluate extensive forms of this game.

These assumptions aside, this simplest model fails to account for a wide variety of factors in the strategic calculus of the leaders. First, let a_i represent the probability that leader i will successfully execute an assassination should she chose to attempt one. (A reasonable approximation for this may be about 25%, the proportion of successful "serious" assassination attempts, as defined by Jones and Olken 2007). Second, let b_i represent the probability the assassination will yield a new leader more sympathetic to *i*'s interests. Third, let c_i represent the changes attained, given an assassination attempt is successful and another leader is installed (or, alternately, chaos breaks out, ending unfavorable institutional policies with the now defunct regime), and the utility function $u_i(c_i)$ represent the value of that change to the assassinating leader. Finally, the leader will pay a reputational cost $d > 1$, regardless of the success or failure of the attempted assassination. (We must include this value as a dependent variable of a utility function $u_i(d)$, in order to account for the potential that some leaders may *desire* the reputation which follows a leader who orders assassinations). With these factors in mind, we can generate expected value functions for the actions available.

$$E_i(\text{Assassinate}) = (a_i)(b_i)u_i(c_i) + u_i(-d) \quad (1)$$

$$E_i(\text{Don't Assassinate}) = 0 \quad (2)$$

Thus we find that assassination is the equilibrium behavior when $(a_i)(b_i)u_i(c_i) + u_i(-d) > 0$, or $(a_i)(b_i)u_i(c_i) > -u_i(-d)$.[1] In other words, leaders should attempt to assassinate each other when they believe the reputational cost is less than the expected political value of committing the act.

Changing the Calculus

There is a wide variety of endogenous factors which can affect the outcome of these decisions. Leaders can use their strengths to raise the probability of a successful assassination against an opposing leader. They can wear bullet-proof vests, ride in bullet-proof transportation, surround themselves with security entourages and avoid public appearances to lower the probability of a successful attack against them. They can implement institutions to assure that any successor will be at least as unfavorable to the opposition's ideal as he or she is, lowering the

[1] This is contingent upon the knife-edge assumption that given a leader is indifferent between assassination and not, the leader will elect not to do so.

probability of an opposing leader gaining anything by assassinating him or her. They can sign treaties explicitly agreeing not to commit assassinations, thereby raising the reputational cost of committing the act. And they can retaliate against assassination attempts against them, deterring aggressors.

The U.N. Multilateral convention on the prevention of crimes against internationally protected persons, including diplomatic agents (1977) set forth a simple legal declaration: No assassinations against foreign heads-of-state may occur while the leader is visiting another country. This warps the variables of the model in two ways: first, it lowers the overall probability of a successful assassination by prohibiting "home-court advantage," (or the heightened ability of a leader to engineer successful assassinations on domestic soil), and second, performs the first effect by raising the penalty incurred for an assassination attempt should the assassinating leader attempt to use said home-court advantage anyway.

A home-court advantage is not, however, the only means by which a leader may exert asymmetric power. Simply by possessing "smart" weaponry, for instance, leaders have a distinct advantage over other leaders of nations with more primitive military technology. With such technologies, targeted killings become automated and predictable. This distortion to the variables fits perfectly within the context of the simple model—it simply raises the probability that an assassination attempt will be successful.

Assassinations are far less likely in regimes with stable lines of succession (Iqbal and Zorn 2006). The United States, for example, has a long-established convention of giving the vice-presidency to an individual of similar ideological and political convictions to the president. Thus, attempting to assassinate the U.S. President will result in a low probability that supplanting said president will yield any favorable policy change. If, hypothetically, the Speaker for the

House was a member of the opposition party, who held a more favorable policy position (to an unscrupulous foreign leader), an opposing leader must expand the expected value calculation to include both the assassinations of the President and Vice President either simultaneously, or in quick succession:

$$E_i \text{ (Assassinate|preferred leader is second in line of succession)} = (a_i)^2(b_i)\, u_i(c_i) - u_i(d)^2 \qquad (3)$$

We can generalize this principle to longer chains of succession (if, for instance, some far-removed family member of a monarchy, *n* steps away from the crown, shares the opposing leader's policy stance):

$$E_i\text{(Assassinate|preferred leader is } n^{\text{th}} \text{ in line)} = (a_i)^n(b_i)\, u_i(c_i) - u_i(d)^n \qquad (4)$$

Thus, since $a_i < 1$ and $b_i < 1$, the probability of total success (i.e., eliminating all targets before the favored individual) becomes very small rapidly, whereas the reputational penalty may quickly become unwieldy. It is likely for this reason that democracies (or other governments with institutionalized chains of succession) tend to experience fewer assassinations than autocracies (Iqbal and Zorn 2006): a democracy will have a chain of leaders with ideological preferences similar to the first, making the probability of forcibly installing a favorable leader insignificantly low.

It is not inconceivable that a leader should have a utility function which places a positive value on a negative reputation (i.e. the "tough guy" reputation). Substantively, this suggests that a leader values the fear of other leaders in order to extort favorable policy changes more than the favorability of other leaders in order to engage in cordial bargaining (a la Wolford 2007). In other words, $u_i(-d) > 0$. Such a leader will elect to assassinate as often as he can, because $E_i(\text{Assassinate}|u_i(-d) > 0) > 0$ is true for all valid values of the other inputs. Therefore, for such a player, assassination strictly dominates the alternative action, and we should thus see cases of such leaders ordering assassinations at the tip of a hat.

Israel, for instance, is isolated geographically from its Western allies, and surrounded by hostile states. The Israeli government has little to gain by "playing nice" with its neighbors, and so could hypothetically begin a systematic campaign of eliminating unfavorable heads of surrounding states to demonstrate resolve and exact more flexible leaders of neighboring state whose leaders, in nothing more than brazen self-interest, adopt policies more preferable to the Israeli government.

If we are to consider the histories of leaders, we might revise the model to evaluate the situation as a possible extensive-form game in which one leader may elect not to assassinate until an attempt is carried out against him. His retaliation could lead the inciting leader to make additional attempts on his life. However, if we recall the assumption that leaders' decisions are secret, we can consider that over any given period of time, leaders have decided not to assassinate each other, decided to assassinate, or decided to assassinate in retaliation to a prior attempt. Therefore, we can continue to evaluate this as a repeated game of simultaneous moves (though the decisions themselves likely do not occur simultaneously) because the secrecy over time limits the leaders from knowing the other's action until some action is carried out. Analyzing the model in this way, we can calculate discounted averages for strategies, but we ultimately find that any such investigation yields a decision calculus identical to that of the original, single-move game[2].

While viewing this as a repeated game does not lend any new information to the model, the potential to model head-of-state assassination as an extensive-form game is not to be dismissed. The commission of an assassination attempt creates an incentive, independent of

[2] For an expanded discussion and proof of this claim, see Appendix [1]

policy, for leaders to attempt assassinations. Consider a case in which a leader, *i*, attempts (and fails) to assassinate a leader *j*. Disregarding the expected political value and reputational cost of committing an assassination attempt against *i*, *j* values her own life very highly. Because *i* threatens it, *j* has an incentive to commit an assassination attempt against *i*. If *i* is killed, *j* cannot be killed by *i*'s commission. Likewise, if *j* is killed, *i* cannot be killed by *j*'s commission. Thus, when we disregard the strategy of national interest, we fundamentally have a sequential duel, which can be modeled as an extensive game with perfect information and chance moves. It is here where we see a possible solution to explain the absence of real "leader-killing" leaders in the international community.

Consider the leader *i* possesses the apparatus to successfully assassinate another leader with some probability $p_i < 1$. If leader *i* at some point, for some reason, attempts to assassinate *j* and *j* survives, *j* will attempt to assassinate *i* in the interest of self-protection. This is a subgame perfect equilibrium, in which every subsequent move will result in another attempt to assassinate. However, if leader *i* never attempts to assassinate *j* (based on the expected value function in equation 1), and *j* never attempts to assassinate *i* (again, based on equation 1), then the two are in the subgame-perfect equilibrium in which neither is better off for attempting to assassinate each other. It is in this that tough-guys may be deterred, amounting to an unspoken, international gentleman's agreement: if no one takes the first shot, no one needs to die.

Results

This model provides some insight into the strategic and personal concerns of heads-of-state. When the likelihood of (successfully) carrying out an assassination is high (e.g. in a Democracy in which politicians are relatively secure), institutionalized succession usually stymies the likelihood of said assassination resulting in a favorable policy change. When the institutionalized succession is not present (e.g. in a dictatorship), the probability of success is diminished by the leader's own (rightful) paranoia. And when there is no other reason not to commit an assassination, the promise of personal retribution to follow gives leaders very strong incentives not to.

We can envision scenarios in which the equilibrium we enjoy (i.e. heads-of-state tend not to assassinate each other), break down. Consider a "crazy" leader problem, where a head-of-state acts with public disregard for his or her personal safety, and attacks at will. If the policies of said leader do not result in more severe crises or armed conflict, the international convention against assassination will hopefully prevail, albeit in possible exception of a concerted effort to supplant the crazy leader with whatever force is necessary. A single (or even multiple) defector(s) will not break the equilibrium.

Conclusion

The robustness of the international distaste for head-of-state-ordered head-of-state assassination will likely persist for some time to come. Through formal modeling, we can envision ways in which both the equilibrium we experience can be interrupted, and how it is, in fact, self-correcting. Anomalous assassinations may occur from time to time, but no matter the payoffs, heads-of-states will tend to shy away from such campaigns of violence, and leave disagreement resolution to more traditional means of mediation.

This analysis does not hold for assassinations perpetrated by individuals or groups unmotivated by a hostile head-of-state. Future analysis could break down the occurrence of domestically- and internationally-motivated assassinations to establish stronger understanding of the regimes and actors who commit assassinations, and further investigate the effects of assassinations, if they can be used, for example, as an alternative to larger-scale warfare.

Appendix

[1] Consider a Discounted Average calculation for the game in which a player breaks from the equilibrium of continuously electing not to assassinate an opposition leader. The discounted average payoff for neither player ever choosing "assassinate" is 0 for each player. However, assume a player estimates that she can attain a payoff, $x > 0$, by *attempting* to assassinate (whether the attempt is successful or not is irrelevant, because the player values a negative reputation enough to choose (assassinate) repeatedly). The discounted average for breaking this equilibrium is represented by the function:

$$\text{DA} = (1 - \delta)\,(x + x\delta + x\delta^2 + x\delta^3 + x\delta^4 + \ldots) = x\,(1 - \delta) \sum_{i=0}^{\infty} \delta^i$$

$$\text{Consider } V = (x + x\delta + x\delta^2 + x\delta^3 + x\delta^4 + \ldots)$$

$$\delta V = (\qquad x\delta + x\delta^2 + x\delta^3 + x\delta^4 + \ldots)$$

$$V - \delta V = x$$

$$V = \frac{x}{1-\delta}$$

$$\text{DA} = (1 - \delta)\left(\frac{x}{1-\delta}\right) = x$$

Because x is simply the payoff to be attained by committing the assassination, we find ourselves comparing x and 0, the same expected payoffs for a single move of the game. Thus no value of δ will change the calculus in any meaningful way, and the repeated game is the same as the one-step game.

References

Frey, Bruno S. 2007. “Overprotected Politicians.” Working paper, Research Center for Economics, Management, and Arts, Basel, Switzerland.

Frey, Bruno S, and Benno Torgler. 2008. “Politicians: Be Killed or Survive.” Working paper, Research Center for Economics, Management, and Arts, Basel, Switzerland.

Iqbal, Zaryab, and Christopher Zorn. 2006. “Sic Semper Tyrannis? Power, Repression, and Assassination Since the Second World War.” Journal of Politics 68(August):489-502.

Iqbal, Zaryab, and Christopher Zorn. 2008. “The Political Consequences of Assassination.” Journal of Conflict Resolution 52:3(June):385-400.

Jones, Benjamin F., and Benjamin A. Olken. 2007. “Hit or Miss? The Effect of Assassinations on Institutions and War.” Working paper: Kellogg School of Management, Northwestern University

Jordan, Jenna. 2009. “When Heads Roll: Assessing the Effectiveness of Leadership Decapitation.” Security Studies, 18:719–755.

Wolford, Scott. “The Turnover Trap: New Leaders, Reputation, and International Conflict.” American Journal of Political Science, 51.4:772–788.