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IR 210

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Annotated Bibliography: Nuclear Proliferation

Introduction to Nuclear Proliferation:

1. Gartzke, Erik, and Matthew Kroenig. "A Strategic Approach to Nuclear Proliferation." *The Journal of Conflict Resolution*, vol. 53, no. 2, 2009, pp. 151–160.

The possession of nuclear weapons have a wide range of effects on the nuclear state. While some believe that nuclear proliferation will make diplomacy more aggressive, it is also believed that a state with nuclear power can turn deter war. In fact, having nuclear weapons in a state's possession often means conflicts tend to be shorter, less intense, and in the nuclear state's favor. Furthermore, only states that have had nuclear weapons for a short period of time are more capable of dispute than states with long term nuclear programs. In addition, some states capable of developing nuclear weapons, such as Germany, chooses not to. On the other hand, states like Egypt, has shown interest in nuclear power but are unable to acquire the supplies to develop nuclear weapons. As a result, one must take into account that the supply of adequate materials for nuclear weapons is more important than demand. Besides developing nuclear weapons as individual states, another route is international assistance. By allowing an already established nuclear state to provide aid, a state is not hindered by technical and diplomatic obstacles. Nuclear weapons are not simply limited to aggression. It has a broad range of uses from influencing diplomatic relations and conflicts.

Matthew Kroenig and Erik Gartzke's research present detailed insight on different views on the value of nuclear proliferation. They criticize other research for ignoring supply and demand of nuclear weapons as one of the causes of nuclear proliferation. Having access to materials capable of developing nuclear weapons plays a major role in the spread of nuclear power. Whether or not a state will reach for international assistance depends on the scarcity of its materials, finances, and professionals. Kroenig and Gartzke stresses the ability of nuclear weapons to limit war and aggression, counter to nuclear-pessimists. If war is necessary, possession of nuclear weapons can alter the conflict in favor of the nuclear state and or decrease the intensity and duration of violence. While Kroenig and Gartzke's research on nuclear proliferation is unfinished. In fact, both researchers stress the need for further investigation into the global phenomenon of nuclear proliferation.

2. Kroenig, Matthew. “Importing the Bomb: Sensitive Nuclear Assistance and Nuclear Proliferation.” *The Journal of Conflict Resolution*, vol. 53, no. 2, 2009, pp. 161–180.

Nuclear Proliferation is the acquirement of nuclear weapons by states other than “Nuclear Weapon States”. Many states are interested in nuclear weapons because it deters aggression from their neighbors and or other countries. Due to the difficulty of obtaining and maintaining nuclear power, states rely on either sensitive nuclear technology or their own resources. If a state tries to acquire nuclear powers itself, there must have raw materials, nuclear infrastructures to develop the weapons, scientists and specialists, and money. Since the requirement for nuclear power is difficult to achieve, many states prefer sensitive nuclear assistance, which means states with nuclear power assist a state trying to gain nuclear weapons. Big power states are willing to assist other states for multiple scenarios. One such case is if they have a common enemy. The desire to acquire nuclear power and the willingness of certain states to assist others in achieving this military goal, nuclear proliferation is an international phenomenon.

Matthew Kroenig’s research on nuclear proliferation includes studies of the economic circumstances of a state and relations among states that determine the necessity of nuclear powers, and in particular, sensitive nuclear assistance. Kroenig goes in depth on the alliance aspect of nuclear proliferation. He effectively describes the pros of nuclear assistance and why many countries prefer aid from nuclear countries instead of developing nuclear weapons themselves. In addition, he includes the point of views of both the state in the mission of gaining nuclear power and the state willing to give nuclear information and assistance. The willingness to give and accept between a nuclear state and a country looking for collaboration creates a transnational relationship. Kroenig criticizes other research on nuclear proliferation for ignoring the importance of collaboration between states and focusing solely on individual states. Kroenig’s paper is detailed and well-researched on the diplomatic aspect of nuclear proliferation.

3. Horowitz, Michael. “The Spread of Nuclear Weapons and International Conflict: Does Experience Matter?” *The Journal of Conflict Resolution*, vol. 53, no. 2, 2009, pp. 234–257.

International relations is brittle when it comes to states that have acquired nuclear weapons for only a short period of time. Studies have shown that inexperienced states with nuclear weapons are more likely to resort to aggression than long standing nuclear states. However, causes of this type of behavior for inexperienced states is unclear. The exact reason for why experienced states are less belligerent is also unclear. One possible reason is that the longer the state has possessed nuclear weapons, the more time they have had to re-evaluate the necessity of using nuclear

weapons on their enemies. It takes time for a state to move from a pessimistic and fearful point of view on potential conflicts threatening its survival and thus needing nuclear weapons to eliminate risks. More experienced states view the possession of nuclear power as an assurance of security and peace instead. The tendency to use nuclear weapons to eliminate threat is different between an uncertain and inexperienced state and a long-established nuclear power country.

The research and analysis done by Michael Horowitz states that inexperienced nuclear states tend to be more aggressive than experienced states. Horowitz's two sets of independent variables consists of whether or not both sides are nuclear countries and the duration both sides have possessed nuclear weapons. Horowitz's research concluded that there is no direct correlation between time and level of aggression. However, Horowitz's belief that level of experience with nuclear weapons play a vital role in a state's behavior. As a result, further research is needed to confirm the cause of a state's behavior concerning nuclear weapons. Horowitz believe that a state's behavior is determined by either level of inexperience or uncertainty. While Horowitz conducts a detailed research on a state's usage of nuclear weapons depending on their level of experience, further inquiry is needed to fully determine the reason for a state's actions.

Why Nuclear Proliferation Exists

4. Knopf, Jeffrey W. "Nuclear Disarmament and Nonproliferation: Examining the Linkage Argument." *International Security*, vol. 37, no. 3, 2012, pp. 92–132.

Efforts to prevent the proliferation of nuclear weapons actually contribute to the global phenomenon of nuclear proliferation. The Nuclear Nonproliferation Treaty (NPT) is managed by established nuclear states which may motivate other states to secretly rebel against the NPT by seeking nuclear proliferation. Though not all of these states will actively seek to gain nuclear power, some will feel less inclined to obey the NPT, which increases the possibility of nuclear proliferation. NPT is biased against non-nuclear states. For example, the treaty states that nuclear states are not allowed to aid non-nuclear states in achieving nuclear power. While there is a link between NPT and nonproliferation, there is also a link between nuclear disarmament and proliferation. As a result, there is no universal hypothesis.

Jeffrey W. Knopf's research on the connection between nonproliferation and nuclear disarmament is feasible when he analyzes the psychology behind state's actions. In order to be more conclusive, more empirical data is needed to confirm Knopf's hypothesis. While this research is detailed, Knopf cannot be certain. His evidence hints that nuclear disarmament treaties such as the NPT has played a role in limiting the spread of nuclear weapons. However, he also found counterarguments. Some states may feel excluded or biased against since the NPT is operated by superpower states. As a result, it gives these states, in particular, non-nuclear states a motivation to try to acquire nuclear power, making nuclear proliferation possible. Since

his research evidence supports both his hypothesis and the counterargument, Knopf's research needs further finesse.

5. Fuhrmann, Matthew. "Spreading Temptation: Proliferation and Peaceful Nuclear Cooperation Agreements." *International Security*, vol. 34, no. 1, 2009, pp. 7–41.

Civilian aid does not promote proliferation of nuclear technology, weapons, and information for peace purposes. Some argue that states seek nuclear power not because of peace motivation but because of a need for defense. However, nuclear technology and knowledge is vital to maintain peace and achieve other motives. In this article, the idea that long term civilian assistance increases the likelihood of a state to successfully develop a nuclear program is tested. The conclusion is that nuclear proliferation will occur with or without civilian aid. Rather than trying to eliminate nuclear weapons completely, peace efforts are focusing on decreasing risk. Studies have shown that nuclear cooperation have increased proliferation rate. In addition, the spread of nuclear technology can be underground. For example, Abdul Qadeer's Khan Network was a black market of nuclear technology and materials. Recently, many countries have pledged themselves to cooperate in nuclear proliferation out of an economic motive rather than a security one. France, for example, wants assurance in the oil resources of the Middle East. Hence, France pledges itself to aid United Arab Emirates and Saudi Arabia in nuclear proliferation. The transnational nuclear market is not just operated by security and risk dilemma. It is also made possible by economic reasons.

Matthew Fuhrmann's research on nuclear peace agreements connects nuclear proliferation with defense motivations but also economics ones. While some question the role nuclear weapons and technology have on maintaining peace, Fuhrmann is adamant that nuclear proliferation also works to establish peace cooperation. In his research Fuhrmann found that nuclear aid increases the likelihood of a state successfully acquiring nuclear weapons dramatically. While all evidence points towards nuclear cooperation as a key factor in nuclear proliferation, additional research on the motivation of supplier countries is needed to determine the other causes of nuclear proliferation beyond the guise of maintaining peace. Fuhrmann's use of interaction terms in his research to test the extent peace cooperation affect nuclear proliferation in threatened countries prevents him from reaching a clear conclusion. As a result, more work is needed to test this hypothesis.

6. Fuhrmann, Matthew, and Michael C. Horowitz. "When Leaders Matter: Rebel Experience and Nuclear Proliferation." *The Journal of Politics*, vol. 77, no. 1, 2015, pp. 72–87.

Leaders play a vital role in nuclear proliferation. While the best interest of the state adds weight to the nuclear proliferation debate, the personal beliefs and experiences of leaders can also affect a state's need for nuclear weapons. In particular, former rebels strive to attain national security. Leaders with a rebel background fear loss of power. Therefore, they aspire to acquire nuclear weapons. This research has shown that the type of government does not play a significant role in a state's pursuit of power. It is mostly controlled by the leader's priorities. While this research finds a clear correlation between a former rebel leader and the likelihood of a state to pursue nuclear weapons, the reasons are unclear.

The correlation between former rebel leaders and a state's pursuit of nuclear weapons is obvious but without a reason. According to this research, individuality plays a key role in a state's wellbeing, despite the state being made up of different people who reunite to form a unit. Michael C. Horowitz and Matthew Fuhrmann measured the relationship between nuclear pursuits and rebel experienced by continuing existing data that followed nuclear programs. Horowitz and Fuhrmann's research is not concrete because every leader is different. Therefore, the direct relationship between leaders and nuclear programs cannot be determined. It can only be implied.

7. Sechser, Todd S., and Matthew Fuhrmann. "Crisis Bargaining and Nuclear Blackmail." *International Organization*, vol. 67, no. 1, 2013, pp. 173–195.

The threat nuclear weapons pose to a nuclear state's enemy is unimpressive. While nuclear weapons can have deadly and catastrophic effects when utilized, most states are not swayed when faced with nuclear coercion. Since nuclear weapons have not been used since 1945, when it was first introduced into warfare, the awareness nuclear states have regarding nuclear weapons and its usage renders the intimidation factor ineffective. This article explores the ability of nuclear weapons to coerce a nuclear state's enemy. The result of this research proves that most states are not intimidated by nuclear threat. This may be due to the fear of automatic deterioration of international relations and chaos. Furthermore, nuclear weapons and technology poses as a distant figure in history. While it is very much present in a nuclear state's military system, no state besides the United States have put it into action. Nuclear proliferation has many dangerous aspects, however, the ability to coerce and intimidate is not a characteristic of nuclear weapons.

Nuclear weapons are not suitable for improving the success of compellent threats. Matthew Fuhrmann and Todd S. Sechser's research on the intimidation effects of nuclear weapons contribute to the pre-existing debate by stating that nuclear weapons are not weapons of coercion. Fuhrmann and Sechser's research is very conclusive and critical of previous empirical research. What the two researchers did differently than others is that they took into account and

separated state victories into two different categories: fear and force. Furthermore, contrary to previous research which isolates the effects of nuclear power, Fuhrmann and Sechser studies scenarios in which a nuclear state has an advantage over a non-nuclear state. This causes the non-nuclear to have a more fearful perception of nuclear weapons than a nuclear state. While Fuhrmann and Sechser's findings are likely, there are some holes in their research. One case is that Fuhrmann and Sechser did not study the coercion effects of nuclear weapons during war. War is when emotions are heightened. As a result, nuclear weapons may have a different intimidation level during interwar period. Overall, Sechser and Fuhrmann's research on nuclear coercion and blackmail is executed very well, refined, and detailed.

Factors that Prevent Nuclear Proliferation

8. Lieber, Keir A., and Daryl G. Press. "Why States Won't Give Nuclear Weapons to Terrorists." *International Security*, vol. 38, no. 1, 2013, pp. 80–104.

The power dynamic of the world is changed when terrorist countries acquire nuclear weapons. For the United States, terrorism is formidable threat. Fear plays a vital role that prevents supplier countries from aiding terrorists. Potential supplier states are torn between maintaining their distance from terrorists or to establish their control. It is easy to find a connection or cooperation between a nuclear state and a terrorist organization. Since the September 11 attack, when the Twin Towers in New York City is bombed by the Al-Qaeda, fear of future terrorism attacks is evident in the United States foreign policies.

Daryl G. Press and Keir A. Lieber conducted an elaborate and detailed research on nuclear terrorism. Bringing into light the risk terrorism poses to other states, particularly the United States, Press and Lieber stresses the importance of preventing terrorists from acquiring nuclear weapons for the security and peace of the world. Using data that analyzes the likelihood that a catastrophic attack against the homeland of a state is launched by terrorists, Press and Lieber delves into the risks that sponsor states will face if it chooses to supply terrorists with nuclear information and technology. Press and Lieber's research is articulate and detailed, bringing the risks of nuclear proliferation into light.

9. Coe, Andrew J., and Jane Vaynman. "Collusion and the Nuclear Nonproliferation Regime." *The Journal of Politics*, vol. 77, no. 4, 2015, pp. 983–997.

Non-proliferation is determined by the state's perception of proliferation. NPT is a treaty on non-proliferation of nuclear technology and weapons. It is signed by over 190 states. Superpower states can enforce the limitations on the spread of nuclear weapons. However, the degree of reinforcement depends on the super state's view on the importance of non-proliferation. While

many states are capable of developing nuclear programs, many choose not to pursue nuclear power because superpowers tend to collude with each other to enforce non-proliferation as a means to maintain their influence and power. As a result, the voluntary actions of these states make collusion easier for the larger states.

In this research, Jane Vaynman and Andrew J. Coe test the hypothesis that superpower collusion plays a role in influencing other states to participate in non-proliferation. Vaynman and Coe finds that rather than being intimidated into non-proliferation, states simply chooses to sign the NPT because they want to. However, even though intimidation by superpower states are not applied to other nuclear states, collusion still occurs. The smaller states voluntarily comply to the treaty out of belief that other states will not try to pursue nuclear weapons or that they will be prevented to do so. Vaynman and Coe's research on non-proliferation is clear and include the grand scheme of the nuclear picture that showcases the superpower and other state's beliefs and reasons for their actions. This research forms a steady foundation for which future research on non-proliferation can be built on.

10. Tannenwald, Nina. "The Nuclear Taboo: The United States and the Normative Basis of Nuclear Non-Use." *International Organization*, vol. 53, no. 3, 1999, pp. 433–468.

The atomic bomb was only used in World War II against Japan by the United States. Since then, nuclear weapons have never been used again. There is a moral taboo of nuclear weapons due to its devastating impact on civilian life. Since World War II through the Cold War, the usage of nuclear weapons has become a taboo. Countries that try to attain nuclear weapons themselves face the judgement of other countries. The self help theory of states do not extend to nuclear weapons. While the usage of nuclear weapons are frowned upon, nuclear power countries are unwilling to give the technology and weapons up. The deterrence theory is the idea that if a state gives up its nuclear power, it will make attacking the state less appealing to its opponents. Instead, states are resorting to developing more advanced nuclear weapons to deter its enemies. While states are boasting cutting edge nuclear technology, the taboo surrounding nuclear weapons act as a constraint on agency regarding defensive and offensive military tactics.

The research done on nuclear taboo by Nina Tannenwald is mostly theory rather than statistical data and analysis. The belief that nuclear taboo contributes to the lack of physical nuclear action is without question. However, the correlation between nuclear taboo and nuclear deterrence is still undetermined. Tannenwald's conclusions come from analysis of history, such as brinkmanship but no nuclear weapons during the Cold War. She did not have any independent or dependent variables to measure the correlation between taboo and nuclear usage. Correspondingly, nuclear weapons are only used twice in history, thus there is no data to attain with nuclear usage. On the other hand, Tannenwald notices that established nuclear countries are

unwilling to give up its nuclear technology and many countries seek assistance to obtain nuclear power. The path to achieving normative answers are uncertain because taboo vary individually and is riddled with judgement and personal thought.

Appendix:

1. Gartzke and Kroenig examine why states acquire nuclear weapons, why they engage in nuclear cooperation, and explore the relationship between nuclear weapons possession and a variety of security and diplomatic outcomes. This list does not cover the full range of possible nuclear proliferation issues that could be subjected to scholarly scrutiny, but they offer several advantages for our research. First, these outcomes are substantively important. Second, they can be measured, allowing them to quantitatively analyze nuclear proliferation across cases and over time. Third, this list covers a broader range of outcomes than are considered in the existing literature.

2. Why do nuclear weapons spread? Using new data on sensitive nuclear transfers, this article analyzes the determinants of nuclear proliferation. The author first describes a simple logic of the technical and strategic advantages that potential nuclear proliferators can gain by importing nuclear materials and technology from more advanced nuclear states. The author then shows that sensitive nuclear transfers are an important determinant of nuclear proliferation. In broader terms, the author find strong support for a supply-side approach to nuclear proliferation. States that are better able to produce nuclear weapons, due to either international assistance or domestic capacity, are more likely to do so.

3. This article evaluates whether the length of time states have nuclear weapons influences their behavior and the behavior of opponents in militarized disputes. Using multiple statistical models and illustrative cases, the article shows that, while acquiring nuclear weapons makes states significantly more likely to reciprocate militarized challenges and have their challenges reciprocated, over time, the effect reverses. In contrast to a static understanding of nuclear weapons, this variation in outcomes over time highlights the difficulties presented by nuclear proliferation

4. Does the extent or lack of progress toward nuclear disarmament affect the health of the nuclear nonproliferation regime? Commentators have long asserted both positive and negative responses to this question as if the answer were self-evident. Given that opposite positions have been advanced with equal conviction, a more systematic analysis is required. This analysis begins by attempting to identify all of the potential arguments that

can be made both for and against the hypothesis of a disarmament-nonproliferation linkage. The arguments are grouped in terms of five broader sets of explanatory factors: security, institutions, norms, domestic politics, and psychology. This approach clarifies the various causal microfoundations that could underpin different arguments in the debate as well as the types of empirical tests that would be most relevant for evaluating the "linkage hypothesis." Comparative assessment of the arguments on both sides suggests that signs of commitment to nuclear disarmament by the nuclear weapon states will tend to enhance support for nonproliferation. Because of the multitude of other factors that affect state decision making, however, progress on disarmament will not by itself address all of the challenges to making the nonproliferation regime effective.

5. This article argues that peaceful nuclear cooperation - the transfer of nuclear technology, materials, or know-how from one state to another for peaceful purposes - helps explain why some countries pursue and acquire nuclear weapons while others do not. In particular, countries receiving peaceful nuclear assistance are more likely to initiate nuclear weapon programs and successfully develop the bomb - especially when they are also faced with security threats. To test this argument, this article uses a new dataset of more than 2,000 bilateral civilian nuclear cooperation agreements (NCAs) signed between 1950 and 2000. A series of quantitative and qualitative tests provide strong empirical support. This article challenges the conventional wisdom by showing that supplier countries raise the risks of further nuclear proliferation when they assist others in developing civil nuclear programs. Further, the relationship between civilian nuclear cooperation and proliferation is surprisingly broad. Even ostensibly "innocuous" assistance such as training nuclear scientists or providing research or power reactors increases the likelihood that states will pursue nuclear weapons and ultimately acquire them. With a renaissance in nuclear power on the horizon, major suppliers like the United States should reconsider their willingness to assist other countries in developing peaceful nuclear programs.

6. This article contributes to a growing literature on leaders in international politics by explaining why and how the background experiences of leaders influence nuclear proliferation. Given nuclear weapons' crucial role in world politics, examining the importance of leaders for nuclear proliferation represents a key development in research on leaders. We argue that leaders with a particular experience—participation in a rebellion against the state—are more likely than their nonrebel counterparts to pursue nuclear weapons. Former rebels are aware of the contingency of their rule and more likely to value weapons that could bolster national independence. Drawing on a new dataset on leader participation in rebel activities, we analyze 1,342 leaders in office from 1945 to 2000. The results strongly support our theory, even when accounting for leader

selection. Our findings underscore the value in using leaders—not just states—as a unit of analysis in international relations research

7. Do nuclear weapons offer coercive advantages in international crisis bargaining? Almost seventy years into the nuclear age, we still lack a complete answer to this question. While scholars have devoted significant attention to questions about nuclear deterrence, we know comparatively little about whether nuclear weapons can help compel states to change their behavior. This study argues that, despite their extraordinary power, nuclear weapons are uniquely poor instruments of compel- lence. Compellent threats are more likely to be effective under two conditions: first, if a challenger can credibly threaten to seize the item in dispute; and second, if enact- ing the threat would entail few costs to the challenger. Nuclear weapons, however, meet neither of these conditions. They are neither useful tools of conquest nor low- cost tools of punishment. Using a new dataset of more than 200 militarized compel- lent threats from 1918 to 2001, we find strong support for our theory: compellent threats from nuclear states are no more likely to succeed, even after accounting for possible selection effects in the data. While nuclear weapons may carry coercive weight as instruments of deterrence, it appears that these effects do not extend

8. Many experts consider nuclear terrorism the single greatest threat to U.S. security. The fear that a state might transfer nuclear materials to terrorists was a core justification for the invasion of Iraq in 2003 and, more recently, for a strike against Iran's nuclear program. The logical basis for this concern is sound: if a state could orchestrate an anonymous nuclear terror attack, it could destroy an enemy yet avoid retaliation. But how likely is it that the perpetrators of nuclear terrorism could remain anonymous? Data culled from a decade of terrorist incidents reveal that attribution is very likely after high-casualty terror attacks. Attribution rates are even higher for attacks on the U.S. homeland or the territory of a major U.S. ally—97 percent for incidents in which ten or more people were killed. Moreover, tracing a terrorist group that used a nuclear weapon to its state sponsor would not be difficult, because few countries sponsor terror; few terror groups have multiple sponsors; and only one country that sponsors terrorism, Pakistan, has nuclear weapons or enough material to manufacture them. If leaders understand these facts, they will be as reluctant to give weapons to terrorists as they are to use them directly; both actions would invite devastating retaliation.

9. We present a theory of the origins and enforcement of the nuclear nonproliferation regime based on a game-theoretic model of proliferation. The theory synthesizes the popular, but incomplete, views of the regime as a grand bargain or a cartel. Widespread nonproliferation is only possible if the superpowers collude to coerce some states into

compliance, as in the cartel, but this enforcement is only affordable if most states voluntarily comply under a grand bargain. This collusion arises from the superpowers' early experience of proliferation and its disruptive effects on intra-alliance politics. We document collusion in the negotiation and enforcement of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and find support for the theory's predictions in a data set of superpower reactions to states' failure to join or comply with the NPT. Our theory implies that the regime has substantially reduced proliferation, in contrast to previous studies' findings.

10. We have recently witnessed the fiftieth anniversary of the bombing of Hiroshima and Nagasaki, the only use of nuclear weapons in warfare. The non-use of nuclear weapons since then remains the single most important phenomenon of the nuclear age. Yet we still lack a full understanding of how this tradition arose and is maintained and of its prospects for the future. The widely cited explanation is deterrence, but this account is either wrong or incomplete. Although an element of sheer luck no doubt has played a part in this fortuitous outcome, this article argues that a normative element must be taken into account in explaining why nuclear weapons have not been used since 1945. A normative prohibition on nuclear use has developed in the global system, which, although not (yet) a fully robust norm, has stigmatized nuclear weapons as unacceptable weapons of mass destruction. Without this normative stigma, there might have been more "use." This article examines this phenomenon in the context of the nuclear experience of the United States.