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Revisiting US Economic Statecraft: Three Essays on Nuclear Reversal, Anti-American Political Violence, and Social Policies in Target States

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REVISITING US ECONOMIC STATECRAFT: THREE ESSAYS ON
NUCLEAR REVERSAL, ANTI-AMERICAN POLITICAL VIOLENCE,
AND SOCIAL POLICIES IN TARGET STATES

by

Wondeuk Cho

A Dissertation Submitted in
Partial Fulfillment of the
Requirements for the Degree of

Doctor of Philosophy
in Political Science

at

The University of Wisconsin–Milwaukee

May 2016

ABSTRACT

REVISITING US ECONOMIC STATECRAFT: THREE ESSAYS ON NUCLEAR REVERSAL, ANTI-AMERICAN POLITICAL VIOLENCE, AND SOCIAL POLICIES IN TARGET STATES

by

Wondeuk Cho

The University of Wisconsin–Milwaukee, 2016
Under the Supervision of Professor Steven B. Redd

This dissertation investigates whether and how U.S. economic statecraft influence policies and politics of targeted countries. Chapter 1 raises research questions about the role of U.S. economic statecraft in policies of targeted countries. The chapter summarizes my argument and empirical findings. Chapter 2 analyzes whether and to what extent U.S. economic statecraft extracts nuclear reversal commitments from target countries that have ever explored and pursued a nuclear weapons development. Using updated data on nuclear proliferation between 1970 and 2004, this study finds that U.S. economic sanctions with international organizations' involvement and U.S. foreign aid are likely to extract a suboptimal concession from a target country-reversing nuclear weapons development but keeping nuclear latent capacity. In Chapter 3, I examine how U.S. aid inadvertently produces political violence against Americans in a recipient country. I find that radical-opposition groups in an autocratic recipient state exercise violent attacks against Americans when U.S. assistance is used for authoritarian incumbents' political survival and political repression. But, autocracies have fewer incidence of anti-American violence when they are bounded to pseudo-democratic institutions. Chapter 4 investigates the role of U.S. sanction duration in affecting social policies of

authoritarian countries. I argue that U.S. sanctions reduce autocrats' resources to buy off political support from ruling elite groups and so force them to reallocate government spending in such a way that favor the ruling coalition groups. So, autocratic leaders facing longer U.S. sanctions are likely to cut their spending on public goods and services. The empirical finding shows that authoritarian leaders under nominal democratic institutions, however, reduce their expenditure on public goods to much lesser degree than autocrats without such a institutions. I also find that autocrats under such institutions decrease government expenditure on social security/protection.

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To my parents, sister and wife, in honor of their patience and love

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Chapter 1

Introduction

Since World War II, the United States has enjoyed a remarkable level of international primacy with no significant challenge to such primacy from other states. According to hegemonic stability theory, the U.S., as the dominant state, has shaped and dominated the post-war international system in such a way that best serves its national interests. To make its dominance sustainable, the U.S. has employed its foreign policy instruments to extract compliance/concessions from other countries through diplomatic, economic, and military leverages. Economic leverage in particular has been widely and popularly used for several decades. Hence, scholarship on economic statecraft has produced a large volume of theoretical and empirical works, with much attention being paid to the effect of U.S. sanctions and aid on the policy outcomes of target countries. On one hand, research on economic sanctions examines how effectively they work and how they influence the political economy of target states. Research on economic aid, on the other hand, focuses on the effects of foreign aid on economic development, democratic transition, and leaders' political survival in target countries. However, much more work still needs to be done on the role of U.S. economic statecraft plays in affecting a variety of policies that the existing literature has rather overlooked.

This dissertation consists of three essays that appear to have little in common in terms of outcome variables. Nevertheless, all three essays all try to shed light on the influence of U.S. economic instruments on the politics and policies of target countries. Chapters 2 and 4 investigate the direct effects of U.S. economic statecraft on target governments' nuclear reversals and social welfare

policies. Chapter 3 deals with anti-American political violence that U.S. foreign aid provokes in aid-recipient countries.

The first essay analyzes whether and to what extent U.S. economic statecraft influences nuclear reversal behaviors of target countries that have already initiated and pursued a nuclear weapons program. This theme belongs to a topic that has recently produced a large volume of empirical and quantitative literature on nuclear proliferation (Jo and Gartzke 2007; Montgomery and Sagan. 2009; Sagan 2011; Singh and Way 2004). Scholarship in this field of research mostly focuses on the *proliferation* of nuclear weapons and pursues such focus through two theoretical approaches—demand and supply. First, the demand-side approach to nuclear proliferation theorizes about a state’s demand for nuclear weapons, focusing on its security threats (Jo and Gartzke 2007), security guarantees (Bleek and Lorber 2014; Jo and Gartzke 2007; Monteiro and Debs 2014; Reiter 2014), the role of a nonproliferation regime (Brown and Kaplow 2014), and domestic politics and leaders (Fuhrmann and Horowitz 2015; Solingen 2009; Way and Weeks 2014). Second, the supply-side approach focuses on the development of nuclear technology, outside nuclear assistance (Fuhrmann 2009; Kroenig 2009), and economic capabilities (Jo and Gartzke 2007). However, it is puzzling that the quantitative studies in this area rarely deal with nuclear reversal behaviors of nuclear aspiring states with a few exceptions ¹. At the same time, it is clear that American economic statecraft plays a role, but the empirical works detailing that influence is scant.

To explain whether U.S. economic statecraft induces a nuclear aspirant’s compliance to non-proliferation, I discuss theories based primarily on the political externalities of U.S. economic sanctions and positive inducements to target states.

¹Scholars in the field of nuclear proliferation have recently initiated quantitative analysis of nuclear nonproliferation (Early 2012; Mattiacci and Jones 2016; Miller 2014) after I have been already exploring and conducting the quantitative study of nuclear reversal.

U.S. negative sanctions in general are ineffective in extracting a nuclear proliferator's compliance with nonproliferation because the state may expect use of force or conflict with the sanctioning state (i.e., the U.S.) and its coalition countries after being targeted by sanctions. So it is rational for the targeted proliferating state to accelerate the ongoing nuclear weapons program rather than to comply with demands to stop and rollback nuclear weapons development. In this situation, a targeted proliferator tries to search for alternative trading routes in order to minimize potential costs of U.S. economic sanctions. However, a proliferating state is more likely to pursue negotiations with the U.S. and give policy concession, to some degree, in exchange for the lifting of sanctions and other rewards, when facing international organization sanctions led by the U.S. U.S. sanctions through international institutions may get rid of a proliferating state's opportunity to avoid sanction costs by looking for alternative trading partners and/or investors. Given these conditions, a state had better reach an agreement with stopping nuclear weapons program but keeping nuclear latent capability. My main findings are that U.S. sanctions through international organizations and U.S. foreign aid are likely to extract a target state's sub-optimal policy concessions - keeping its nuclear latent capacity.

The second paper examines the determinants of political violence against Americans abroad, situating such violence in the context of U.S. aid policies. Despite a growing number of studies on anti-Americanism ([Chiozza 2010](#); [Katzenstein and Keohane 2007](#)), few studies pay attention, in a systematic or empirical way, to the violence dimension of anti-Americanism. The political violence literature has paid little attention to exploring the phenomena of political incidents against specific subjects, in particular U.S. citizens and properties. When it comes to anti-American violence, the literature offers an important rationale. Anti-government groups in a country tend to exercise violent behaviors against U.S. citizens and/or properties when the U.S. backs up for their repressive

dictators by providing them with free resources including U.S. foreign assistance. I hypothesize here that a recipient's constituencies can consider U.S. aid as bad money because it can facilitate the lengthening of its autocrat's tenure and record of repression. The role of U.S. aid varies depending on a recipient's political institutions. Especially, when a recipient state is an autocratic regime but is bounded to nominal-democratic institutions, it experiences fewer anti-U.S. violence. To test the argument, this study employs zero-inflated negative binomial regressions to cope with the excessive zeros in the dependent variable. The study covers 117 developing countries from 1970 to 2007. The findings show that the impacts of U.S. aid on anti-U.S. incidents vary depending on the presence of institutional constraints in autocracies.

The third essay examines how U.S. economic sanctions impact in two ways social welfare spending in authoritarian countries. One way is that they may reduce the resources autocrats use to buy off support from ruling elite groups and so force them to reallocate government expenditures in such a way that favor their supporting groups. Consequently, autocrats who face U.S. sanctions over a long period are likely to cut their spending on public goods and services, especially education and health care spending. The second way is that the impacts may vary depending on political variables such as autocrats' pseudo-democratic institutions. I hypothesize that U.S. sanction duration is positively associated with the changes in social spending when dictators and their ruling elites are bounded together by quasi-democratic institutions such as legislature and political parties emulating their democratic counterparts. To test this argument, I conduct a series of panel error-correction models to estimate the effects of U.S. sanction duration on changes in government expenditures on social security/protection, education and health care. I also implement the multiple imputation to deal with a considerable amount of missing values in the data in order to avoid a biased estimation. In addition, the study conducts a matching estimation to improve the causal

inference of the model. The empirical findings confirm the significant impacts of U.S. economic sanction on variation in social expenditure.

The empirical findings show that autocrats under nominal democratic institutions reduce their expenditures on education or public health to much lesser degree than do autocrats with no institutions, even when U.S. sanctions last longer. When they face longer lasting U.S. sanctions, however, autocrats with seemingly-democratic institutions decrease government spending on social security/protection.

The final chapter discusses the findings of three essays and explores ideas for future research.

Chapter 2

Kicking the Nuclear Ladder: The Effects of U.S. Economic Statecraft on Nuclear Reversal

Abstract. This essay examines whether U.S. economic statecraft is effective in dissuading nuclear aspirants from going nuclear. Conventional wisdom holds that nuclear nonproliferation is not strongly affected by economic sanctions. This article posits, however, that U.S. economic statecraft has exhibited a greater effectiveness than previously explained in the literature. This study finds that when U.S. policy objective is to extract the perfect compliance with nonproliferation from a nuclear aspiring state, U.S. negative sanctions have no significant impact on the state's nuclear reversal. However, U.S. economic statecraft is moderately successful in extracting *suboptimal* policy concessions of nonproliferation—"nuclear power without nuclear weapons proliferation." The empirical evidence uses a statistical analysis of 18 countries from 1970 to 2004. Analysis shows that U.S. sanctions through international institutions and U.S. positive inducements (e.g., foreign assistance) are effective at least in driving nuclear aspirants into remaining in a nuclear latency status.

2.1 Introduction

On July 14, 2015, Iran and the P5+1 nations (i.e., the United States, the United Kingdom, France, China, and Russia, plus Germany) reached a momentous agreement that limited Iran's nuclear development in exchange for the lifting of economic sanctions. Media commentators and policy analysts consider this landmark Iranian nuclear deal as a victory for international sanctions (Cassidy 2015; Rosofsky 2015). According to the deal called the "Joint Comprehensive Plan of Action (JCPOA)," Tehran is requested to significantly reduce its capacity to develop nuclear bombs for more than a decade by eliminating 98 percent of its enriched uranium stockpile. Why did Iran decide to limit its nuclear weapons development? Did U.S. economic statecraft force/induce Iran and/or other (previous) nuclear proliferators¹ to make decisions to reverse their nuclear weapons development?

The existing research on nuclear proliferation primarily concentrates on why states go nuclear. Since Sagan (1996) began his theoretical and empirical work on nuclear proliferation, many international relations scholars have conducted quantitative examinations to determine the causes of nuclear proliferation (e.g., Bleek and Lorber 2014; Brown and Kaplow 2014; Fuhrmann 2009; Fuhrmann and Horowitz 2015; Jo and Gartzke 2007; Kroenig 2009; Monteiro and Debs 2014; Reiter 2014; Singh and Way 2004; Way and Weeks 2014). Proliferation studies emphasize a state's motivation or intention to pursue nuclear development specifically by looking into domestic politics (Hymans 2011; Way and Weeks 2014), the nuclear umbrella or security guarantees (Bleek and Lorber 2014; Monteiro and Debs 2014; Reiter 2014), a state's openness to the international market (Solingen 2009), a state's ratification of the nonproliferation treaty (Potter 2010), and political

¹In this paper, a nuclear proliferator is a state that ever initiated/explored and/or pursued nuclear weapons development. A nuclear proliferator is used interchangeably with a nuclear aspirant.

leaders' prior experiences (Fuhrmann and Horowitz 2015). Recent scholarship, though, takes into account the supply-side approach to nuclear proliferation. A nuclear aspiring state is more likely to seek nuclear weapons development when it has outside groups that would supply nuclear weapons materials or nuclear technology (e.g., Brown and Kaplow 2014; Fuhrmann 2009; Kroenig 2009). Despite the increase in quantitative studies on determinants of nuclear proliferation, much less attention has been paid to reversal behaviors of nuclear proliferators. In particular, the effect of U.S. economic statecraft on a state's nuclear rollback have not, with a few exceptions (e.g., Early 2012; Miller 2014), been examined systemically or thoroughly.²

Since the 1970s, the United States has taken great efforts to prevent the proliferation of nuclear weapons, seeking close cooperation from other countries in the international community.³ The United States has implemented several foreign policy instruments to strengthen nonproliferation efforts, using for instance economic statecraft-including positive inducements and negative sanctions. Here, this paper pays attention to evaluating the role of U.S. economic statecraft in counterproliferation. I will ask whether U.S. positive inducements and/or negative sanctions have worked at persuading or forcing a state to reverse its nuclear weapons program that it had already initiated and/or pursued. The answer to this puzzle produces a systematic and quantitative examination of the impacts of U.S. economic statecraft on nuclear reversal-an area little investigated by

²Early (2012) found that U.S. economic sanctions increased the probability that a target state begin nuclear weapons programs. Miller (2014) maintained, however, that U.S. economic sanctions had a deterrent effect on nuclear pursuit while they have been ineffective in dissuading a nuclear proliferator from withdrawing ongoing nuclear weapons development. Both scholars posit that US negative sanctions are ineffective in preventing nuclear aspirants from rolling back their ongoing nuclear weapons development.

³The United States led the establishing of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 1970 and arranged safeguards to control the use of nuclear materials such as uranium. Scholars emphasized the role of U.S. in international nonproliferation efforts. Nye (1981) argued, for instance, that the U.S. has helped to promote the establishment of nonproliferation regime (i.e., the NPT). Doyle (1997) also mentioned that U.S. nonproliferation policy became strong, supporting for the NPT and its nonproliferation norms that emphasized arms reduction and nuclear export controls. In addition, Kroenig (2016) also acknowledges that it is possible to consider US policy efforts with nonproliferation after the establishment of the NPT in 1968.

the quantitative studies of nuclear proliferation.

Relying on updated data of nuclear proliferation from 1970 to 2004, this paper tests quantitatively whether U.S. economic statecraft has either forced or induced nuclear proliferators to rollback their nuclear weapons development. The study assumes that U.S. economic statecraft brings political consequences to target regimes. U.S. economic statecraft is likely to generate political externalities, which may threaten leaders' political survival in target countries. Political leaders in a sanctioned country are constrained by their domestic political audiences or members of a winning coalition when they are targeted by U.S. economic statecraft. Leaders' political careers may be in danger when their policy performance (e.g., economic hardship generated by foreign sanctions) is poor. This paper contends that U.S. economic statecraft affects, in a target state, the domestic constituency's assessment of its leaders' policy competence. Political and/economic distributional consequences of both positive incentives and negative sanctions may impact a sanctioned state's decisions regarding its nuclear weapons development. This study finds that U.S. economic statecraft results in a greater probability of nuclear latency status, a suboptimal outcome of nuclear reversals for a sanctioning state such as the United States. Both U.S. economic aid and negative sanctions do little in the way of leading to a nuclear aspirant's perfect compliance with nonproliferation-stable non-nuclear status. But when nuclear development paths are disaggregated into three outcomes-i.e., stable non-nuclear status, nuclear latency status, and nuclear pursuit/acquisition-, U.S. economic statecraft has a substantial impact on a target's decision to keep the latent capability. More U.S. foreign aid and negative sanctions through international organizations make a nuclear aspiring state move down from nuclear pursuit to nuclear latency status, though not to perfect nonproliferation. The main contribution of this paper to the existing literature is in revealing the suboptimal impacts of U.S. economic statecraft on nuclear nonprolif-

eration, bringing nuclear latency status into the paths of nuclear development. Specifically, I argue that while nuclear aspiring states tend to be reluctant to suspend the ongoing nuclear development, U.S. sanctions through international organizations induce them to reach a less undesirable nuclear deal with the U.S.-‘nuclear power without nuclear bombs.’

This chapter assesses how earlier research conceptualizes nuclear weapons proliferation and identifies the driving forces that induce states to go nuclear. It then examines some conceptual and theoretical issues and builds a theoretical argument about the role U.S. economic statecraft plays in leading to nuclear reversal of proliferators.⁴ The chapter then proposes testable hypotheses and lays out a research design. Finally, the results of logistic and multinomial logistic regressions are presented and a discussion/conclusion put forward.

2.2 Existing Research on Nuclear (Non-)Proliferation

Existing literature on nuclear proliferation primarily focuses on causes of the nuclear weapons proliferation. Scholars find causal factors of nuclear proliferation through qualitative works and test the statistical correlations using the large- N quantitative research. Here I discuss the concept of nuclear proliferation and briefly mention the current studies on nuclear proliferation because it helps define nuclear reversal and understand plausible explanations for nuclear reversal.

2.2.1 The Concept of Nuclear Proliferation

Nuclear proliferation can be defined as “the spread of nuclear weapons” (Sagan and Waltz 2003). Despite this simple definition, the existing and inadequate concept of nuclear proliferation

⁴In this paper, nuclear reversals are used interchangeably with nuclear withdrawal and rollback.

may prevent scholars from carrying out rigorous studies (Ogilvie-White 1996). At the same time, few quantitative studies have conceptually defined or measured a relatively-overlooked feature of nuclear proliferation-nuclear rollback as the opposite direction of the spread of nuclear weapons. Some critics suggest that the current research on nuclear proliferation tends to focus too much on developing bombs by relatively disregarding the aspect of nuclear restraints or reversal (Levite 2002; Solingen 1994). At the beginning of his article, Levite (2002) described the following:

A serious gap exists in scholarly understanding of nuclear proliferation. The gap derives from inadequate attention to the phenomena of nuclear reversal and nuclear restraint as well as insufficient awareness of the biases and limitations inherent in the empirical data employed to study proliferation.(59)

How do the empirical studies conceptualize nuclear proliferation? What proliferation means is closely related to whether it is a static dichotomy or a dynamic continuum. Some focus on one dimension of proliferation related to the extent of proliferation: stages or phases of nuclear proliferation. For example, Singh and Way (2004, 861) explicitly emphasized proliferation as “continuum instead of a dichotomy,” defining “degrees of nuclearness,” which consist of nuclear acquisition, the pursuit of nuclear weapons programs, the exploration of the nuclear weapons option, and no interest in nuclear arms. By the same token, Jo and Gartzke (2007, 167-168) disaggregated nuclear proliferation into “the presence of a nuclear weapons production program” and “nuclear weapons possession.” Most quantitative approaches to nuclear proliferation choose either type of nuclear proliferation paths as the outcome of research interests. However, few quantitative studies have evaluated the causes of nuclear reversal as another dimension of nuclear weapons policy. In order to obtain a complete understanding of nuclear proliferation, scholarship on nuclear proliferation should be interested in conditions under which nuclear proliferators stop and/or reverse their ongoing nuclear weapons programs.

2.2.2 Explanations of Nuclear Weapons Proliferation

Why do countries go nuclear? To answer the question, many scholars suggest a variety of explanations. Sagan (1996) first presented the systematic analysis of nuclear proliferation by offering the three models of security, domestic politics, and norms. First, the security model posits that nuclear weapons development is associated with the maximization of national security against security threats. Second, the domestic politics model stresses the political interests of actors within the state in regard to nuclear pursuit. Lastly, the norms model refers to norms and shared beliefs about whether nuclear pursuit is “legitimate” and “appropriate.” Since Sagan (1996) suggested his three theoretical models of nuclear proliferation were suggested, many international relations scholars have conducted systematic and quantitative examinations of causes of proliferation to find causal factors that drive nuclear weapons proliferation.

This chapter presents a review of the existing literature on nuclear proliferation as it pertains demand and supply frameworks (Sagan 2011). The demand-side explanation refers to the motivation or intention to acquire nuclear weapons while the supply-side one is associated with the available resources for nuclear weapons development. The demand-side factors include, for instance, security threats, the security guarantee/ defensive alliance from a nuclear-armed state, and domestic political constraints. The supply-side factors include economic conditions, nuclear technology, and foreign nuclear cooperation/assistance.

The Demand-Side Explanation

This section lays out how the demand-side conditions influence states’ nuclear behaviors. In particular, how do security threats and domestic political concerns influence states’ decisions re-

garding going nuclear?

First, states attempt to develop or obtain nuclear weapons for national security purposes. A large proportion of existing proliferation literature relies on the security model (Bowen and Kidd 2004; Ogilvie-White 1996; Paul 2000; Sagan 1996). States seek nuclear bombs when they face a significant conventional or nuclear threat to their security, which cannot be met by existing conventional forces (Sagan 1996). Such a security-based explanation for nuclear arms has been strongly supported by the realist/neorealist tradition in international relations. For realists/neorealists, the nuclear weapons possession is regarded as the rational behavior to protect national interests-state survival-against potential threats in the international system (Jo and Gartzke 2007; Ogilvie-White 1996; Singh and Way 2004). Any state that seeks to maintain its national security must come up with a counterbalance to any rival state that develops nuclear weapons; the counterbalance involves gaining access to a nuclear deterrent. In this respect, the acquisition of nuclear weapons plays a role in deterring the adversaries. Within the international system, the serious concerns about national survival lead states to maximize power and to try to become the most powerful nation in the regional or world (Mearsheimer 2003). In this context, states seek nuclear weapons to maximize national security and deter foreign attacks.

Second, forming a defense pact with a nuclear weapons state or with the dominant state reduces a state's motivation to acquire nuclear arms (Bleek and Lorber 2014; Jo and Gartzke 2007; Singh and Way 2004). This is not only because a state does not have an incentive to possess nuclear weapons due to nuclear umbrella but also because the powerful nuclear weapons state discourages a state from developing a nuclear weapons program. For example, Singh and Way (2004, 863) argued that "a credible security guarantee from a powerful state can dull the desire for nuclear weapons." Jo and Gartzke (2007, 170) claimed that "states with security commitments from pa-

trons with nuclear weapons may be less likely to proliferate.” In contrast, Reiter (2014) found empirical evidence that neither alliances nor foreign-deployed troops reduces an alliance-partner’s motive to develop nuclear weapons. However, the variable of foreign-deployed nuclear weapons is the strong predictor of decreasing the proliferation intention. A nuclear umbrella can provide a non-nuclear alliance partner with the extended nuclear deterrence. In a similar logic, Gerzhoy (2015) developed the logic of alliance coercion and argued, based on it, that a nuclear aspiring ally is compelled to withdraw its nuclear weapons program due to its nuclear patron’s threats of military abandonment. However, even if in history alliance restraints on a state’s nuclear weapons program is substantial, it is just effective on a state within defensive alliances and during the Cold War.⁵ After the end of Cold War, most nuclear arms seekers were states without alliance and so-called rogue states-Iran and North Korea, for instance. Alliance factor may have a limited influence on nuclear proliferation in regard to country characteristics and changes in international structure.

Third, domestic-political explanations assume that the decision to go nuclear depends upon the strategic games over policy makings among domestic political actors (Jo and Gartzke 2007; Paul 2000; Sagan 1996; Singh and Way 2004). Domestic political factors do not necessarily affect a state’s nuclear ambition in one direction. Domestic politics may encourage or discourage a state’s nuclear arms development (Sagan 1996, 63). For instance, according to Gray (1999), nuclear weapons programs are essentially based on their domestic process. Sathasivam (2003) argued that, in the case of Pakistan, the domestic power interest group forced the Pakistani government to build and test nuclear arms in response to India’s acquisition of nuclear weapons. In the case of Japan, the domestic constitution, legislation, and non-nuclear principles restrain Japan from building nuclear

⁵Since 1945, a list of countries that tried but gave up nuclear weapons development includes many countries allied with the United States - Argentina, Brazil, Canada, West Germany, Italy, Japan, Netherlands, South Korea, Sweden and Taiwan (Levite 2002, 300).

weapons (Hughes 2007). In particular, three non-nuclear principles include "not manufacturing, possessing, or importing nuclear weapons" (Hughes 2007, 85).

The Supply-Side Explanation

The supply-side model is associated with the resources necessary to obtain nuclear weapons. It includes such factors economic/industrial capacity, nuclear technology, and foreign nuclear assistance. Recent studies have shown the importance of nuclear diffusion through the outside assistance (e.g., Kroenig 2009) and proliferation rings or networks (e.g., Chestnut 2007).

First, economic development simplifies a nation's acquisition of nuclear weapons by providing sufficient resources (Jo and Gartzke 2007; Singh and Way 2004). For instance, Singh and Way (2004, 862) argued that states "may achieve the capability to assemble nuclear weapons by an explicit intentional effort or as an implicit by-product of economic and industrial development."

Second, nuclear technology can provide states with the opportunity to build nuclear weapons (Jo and Gartzke 2007; Singh and Way 2004). According to Jo and Gartzke (2007, 169), nuclear technology is not considered easily obtainable. For instance, Hymans (2012, 8) discussed the common claims about the role of nuclear technology in the sense that "states that have more prior experience with nuclear technology might be able to make the bomb more quickly after deciding to do so." Nonetheless, nuclear technology is required to build nuclear weapons, regardless of how it is obtained-through national research or outside assistance and nuclear networks.

Third, nuclear assistance refers to the international spread of nuclear arms through providing nuclear transfers to non-nuclear powers and nuclear proliferation networks (Braun and Chyba 2004; Chestnut 2007; Kroenig 2009; Montgomery 2005). Most of the proliferation literature de-

depends on the demand-side approach. Kroenig (2009), however, by criticizing the current overdependence on the demand-side explanation, showed the importance of the supply-side model of nuclear proliferation. He argued that the patterns of sensitive nuclear assistance to non-nuclear states may be explained by the strategic characteristics of the suppliers. Fuhrmann (2009) also found that civilian nuclear assistance is more likely to lead to some features of nuclear proliferation such as the initiation and acquisition of nuclear weapons due to its lowering nuclear technology barriers. According to Braun and Chyba (2004), proliferation rings-e.g., a Pakistani scientist Khan's network-lead to nuclear technology transfers and challenge global nonproliferation efforts. Thus, foreign nuclear assistance can be one of the main determinants of nuclear weapons proliferation.

In the next section, I will present a theoretical discussion about possible impacts of U.S. economic statecraft on the nuclear reversal commitment by looking into U.S. positive inducements and negative economic sanctions.

2.3 Theory: U.S. Economic Statecraft and Nuclear Reversal

A nuclear aspiring state considers its distributional effects of international pressures on its regime survival in regard to the policy concession of nonproliferation. Since embarking on a nuclear weapons program requires strong support from key political actors or ruling elites, state leaders *rarely* reverse their nuclear paths due to anticipated political costs compared to benefits arising from the nuclear policy change. Nonetheless, since 1970s, key members of the international nonproliferation community have experienced some cases of nuclear rollbacks.⁶ What then

⁶According to Levite (2002, 62), countries including Argentina, Australia, Brazil, Canada, Egypt, Germany, Indonesia, Italy, Japan, Netherlands, Norway, Romania, South Korea, Sweden, Switzerland, Taiwan, Yugoslavia pursued but reversed their nuclear weapons programs. Countries such as Belarus, Kazakhstan, South Africa, Ukraine acquired and gave up nuclear bombs. In addition, Iran is now in the process of nuclear nonproliferation.

drives nuclear reversal? Does U.S. economic statecraft induce nuclear aspirants to give up ongoing nuclear development programs? First, let us consider how nuclear proliferation scholars define nuclear reversal. [Levite \(2002, 67\)](#) stated that nuclear reversal is⁷

a governmental decision to slow or stop altogether an officially sanctioned nuclear weapons program. At the core this definition is the distinction between states that have launched (indigenously or with external assistance) a nuclear weapons program and then abandoned it and those that never had such a program in the first place. Nuclear reversal excludes both termination of unauthorized nuclear weapons-related activity within a government and private-sector research and development in a nuclear weapons-related field (e.g., nuclear fuel-cycle technologies) if the latter was not formally pursued as part of an effort either to create a bomb or at least to acquire standby status.

This definition is commonly mentioned in existing literature on nuclear (non-)proliferation studies, which can be appropriately linked with my theoretical argument. However, the dichotomous classification of nuclear proliferation/reversal may overlook an important path of nuclear proliferation. So in theoretical and practical senses nuclear reversal might be disaggregated into a few outcomes. For example, [Lodgaard \(2010, 116\)](#) argued that nuclear proliferation and rollback include “rejection, hedging, restraint, active pursuit and acquisition” among which the former three terms are considered nuclear rollback.⁸ Similarly, recent studies on nuclear proliferation pay attention to the feature of nuclear latency ([Fuhrmann and Tkach 2015](#); [Sagan 2010](#)). They contend that current scholarship of nuclear proliferation relatively overlook the importance of nuclear latency in

⁷Another simple definition of nuclear reversal is the rollback which is “a process in the opposite direction (of proliferation that moves forward weaponization), reversing intentions and/or capabilities to acquire nuclear arms” ([Lodgaard 2010, 115](#)).

⁸According to [Lodgaard \(2010, 116\)](#), the three outcomes of nuclear rollbacks can be defined as follows: (1) rejection is the non-consideration of the option to acquire nuclear weapons, (2) hedging indicates the “maintenance of an indigenous capacity to produce nuclear weapons on relatively short notice,” and (3) restraint option makes a state refrain from “proceeding to prominent nuclear activities such as testing of nuclear explosive devices, production of weapon-grade materials and construction of fuel-cycle facilities that may be used for military ends.”

accounting for the causes of nuclear weapons development. Meyer (1986) also posited that a state is said to “have a latent capacity when it has sufficient technical, industrial, material, and financial resources to support a wholly indigenous weapons program.”⁹ Fuhrmann and Tkach (2015, 2) built the dataset focusing on “the development of enrichment and reprocessing facilities” which “provide countries with the ability to produce fissile material - weapon-grade highly enriched uranium or plutonium.”¹⁰ Nuclear reversal outcomes may include “stable non-nuclear status” or states with “a certain preparedness for going nuclear if changing circumstances so suggest” (Lodgaard 2010, 115). In accordance with the significance of a state’s nuclear latent capabilities in nuclear proliferation, nuclear development paths are here disaggregated into three outcomes: stable non-nuclear status, nuclear latency status, and nuclear pursuit/acquisition.¹¹

Before moving on to the theoretical argument, I first delineate the theoretical background of the political survival approach to international relations to identify the role of U.S. economic statecraft on nuclear reversal. First, I assume that state leaders make foreign policy choices with the purpose of maximizing the likelihood of their political survival (Bueno de Mesquita et al. 2003; Schultz 2001). A variety of research groups using the domestic level (of analysis) in international relations posit that political leaders concern about their domestic political survival as the *sine qua non* of foreign policy decisions (Bueno de Mesquita et al. 2003; Fearon 1994; Mintz 1993). Fearon (1994), for instance, argued that political leaders generate domestic audience costs that they pay

⁹I recite this from the research website of Latent Capacity Proliferation Model at <http://es.rice.edu/projects/Poli378/Nuclear/Proliferation/model.html>. The concept of nuclear latency is diversely described by scholars. According to Stoll’s broad conceptualization, a state with a nuclear latent capacity has “sufficient technical, industrial, material, and financial resources to support a wholly indigenous weapons program” (Montgomery and Sagan. 2009, 85). In contrast, Fuhrmann and Tkach (2015) more narrowly conceptualize nuclear latency, primarily limiting “the development of enrichment and reprocessing (ENR) facilities.”

¹⁰For more information about the concept/measurement of nuclear latency, see Fuhrmann and Tkach (2015, 3-10).

¹¹With regard to a nuclear proliferating state’s response to economic sanctions, I assume that stable non-nuclear status is the perfect policy concession of nonproliferation, nuclear latency is partial/suboptimal compliance, and nuclear pursuit/possession is non-compliance to the sanctioner’s nonproliferation demands.

when they back down after having made a public threat during the international crisis. [Smith \(1998\)](#) emphasized the domestic constituencies' evaluation of their leaders' policy performance. In particular, national leaders revealed to have low competence in foreign policy tasks are more likely to be removed through re-election, coup, or assassination. Leaders who want to retain power in office should adopt policies that help them achieve that goal. By the same token, leaders in the nuclear aspiring state tend to reveal a noncompensatory decision rule for eliminating in the first place policy alternatives that might harm their political survival ([Mintz 1993](#)).¹² Thus, political leaders hardly roll back a nuclear program in progress, given that it typically requires an enormous financial and technological investment that should have a broad base of support among key domestic constituencies ([Fuhrmann and Sechser 2014](#)).

Since the domestic political constraints make leaders in the nuclear aspirant reluctant to withdraw the existing (and/or ongoing) nuclear weapons (program), major determinants of nuclear proliferation may play a minor role, at most, of inducing nuclear reversal. In this case, international factors such as major world powers' influence may affect a state's domestic political/policy decisions (e.g., [Gourevitch 1978](#); [Pevehouse 2002](#)). American statecraft is one of the critical factors to influence the behaviors of other countries. The United States, after all, is a country that possesses sufficient resources to pursue its national interest throughout the world ([Ross 2007](#)). Therefore, in explaining nuclear reversal outcomes, this study focuses on the role of the United States and its economic statecraft, in particular. The argument put forward is that American economic statecraft influences nuclear rollback behaviors of nuclear proliferators that have already pursued and even acquired nuclear bombs. The next section provides possible theoretical explanations regarding the

¹²Based the so-called "poliheuristic theory" using the noncompensatory decision principle, the most undesirable option for nuclear aspirants may be perfect nuclear withdrawal of existing nuclear development program and infrastructure.

impacts of American negative sanctions and positive inducements on nuclear proliferating states' reversal behaviors.

2.3.1 The Effects of U.S. Negative Sanctions on Nuclear Reversal

The United States has employed negative sanctions as a foreign policy instrument of coercive diplomacy to maintain international stability and/or resolve international crises. Sanctions are used to “presuppose the sender country’s willingness to interfere in the decision-making process of another sovereign government, but in a measured way that supplements diplomatic reproach without the immediate introduction of military force”(Hufbauer et al. 2007, 5). If the United States imposes sanctions against the target state, that state’s political leaders suffer domestic audience costs that increase as sanctions produce a negative externality such as international isolation, economic depression/hardship, and higher inflation. In particular, economic sanctions threaten incumbent leaders’ political survival because they are likely to generate political costs for the targeted leaders through economic damage, political disintegration among domestic societal groups, and even political protests or violence (Allen 2008b; Marinov 2005; McGillivray and Stam 2004). The domestic political costs from sanctions can lead a targeted government to make a policy concession to the sanctioning state. But, the sanctioning state can extract the target’s compliance only if sanction costs for noncompliance outweigh the benefits for noncompliance. In nuclear rollback decisions, target leaders should calculate the costs and benefits of reversing the nuclear development that has already been pursued.

However, sanctions rarely extract policy concessions from the target nation.¹³ The target state

¹³Existing sanction literature presents some arguments on how a target state can be reluctant to give compliance to the sender, avoiding the negative externality of economic sanctions. First, political leaders in the target state tend to divert the economic cost of the sanctions to the sender. Sanctions are designed to impose economic costs to the

is likely to resist the demands of the sanctioning state when it has an issue of high salience, such as nuclear weapons development, that involves the state's national security concerns (Adrian and Peksen 2007). Since nuclear weapons programs are financially expensive and politically important to a target state, the state's leaders face high audience costs if they back down from going nuclear (Gartzke and Jo 2009). These costs force target leaders to resist making the concessions to the sanctioning state's demands for nonproliferation. Instead, the targeted nuclear aspirant seeks to avoid political and economic damage from imposed sanctions. At the same time, countries facing critical security threats will seek to build their own nuclear bombs if they have no credible security guarantees that a nuclear states will provide, according to the security model of nuclear proliferation. Thus, U.S. international sanctions decrease the likelihood that the target government will reverse the nuclear weapons development due to its expectation of a potential conflict with the sanctioning state and its coalition countries.

A nuclear aspirant targeted by negative sanctions would expect potential military conflict with the U.S. and its coalition states. This conflict expectation may lead the target state to accelerate its nuclear weapons program rather than suspend it. In this sense, U.S. sanction imposition is indirectly linked with the external security threats to which the target state may respond by building nuclear bombs or strengthening its military capabilities. Negative sanctions generate the costly

target state. Economic blockade and trade disruptions make the target economy suffer negative externalities, such as a higher rate of inflation and quite heavy job losses. The target state, however, searches for alternative trading partners to reduce negative distributional effects of sanctions. Under this circumstance, some third-party countries play a sanction-busting role of spoiling sanction effectiveness by offering the opportunistic trade relations to and/or investing in targeted countries (Drezner 2000; Early 2009, 2011; Lektzian and Biglaiser 2013; McLean and Whang 2010). In addition to the busting behaviors of third-party countries, target leaders use political manipulation to diminish the negative impacts of U.S. economic sanctions on their economy. It is widely accepted in the sanction literature that negative sanctions cause a "rally-round-the-flag effect" through which a targeted state's leaders generate a nationalistic sentiment within the society, which would make sanctions less successful (Verdier and Woo 2011). The sanctioned governments are likely to frame the U.S. demands for nuclear withdrawal and its sanction imposition as foreign threats to the national sovereignty (Drezner 2001).

signaling effects so the sender is likely to initiate military conflicts against a target after sanction imposition (Drezner 1998). When a target's leaders face sanction imposition of the sender, they are likely to realize the sender's resolve because of its costly signaling role. For instance, Lektzian and Souva (2007, 416) argued that economic sanctions are positively associated with the use of military force by functioning "a costly signal of a state's commitment to have a dispute resolved." Drezner (1998) also discussed the notion that sanctioning countries are likely to impose sanctions as an alternative when future conflict is anticipated. The Bush administration began putting more pressure for the North Korean regime for its nuclear weapons development than did its predecessor the Clinton administration (Pardo 2014).¹⁴ With the U.S. slow commitments to the 1994 Agreed Framework and its more hawkish policies toward North Korea, the Pyongyang government perceived the U.S. tough sanctions and other measures as significant threats to its regime survival. Yet rather than give a concession, North Korea accelerated its nuclear weapons development and even quickly began nuclear testing (Byun and Snyder 2007). Therefore, North Korea, perceiving itself as a U.S. adversary, was strongly reluctant to make any concessions to the U.S. and its allies (Drezner 2001).

The discussion described above may lead one to believe that a target state's chances of terminating its nuclear weapons program is low. Political leaders in the sanctioned country expect potential conflicts with the U.S. and its coalition countries when they become a target of U.S. sanctions. Thus, when the United States imposes negative sanctions against a nuclear aspiring state, the target state will be likely to resist America's nonproliferation demands, even trying to accelerate nuclear weapons development.

¹⁴Pardo (2014) described the situation for the North Korean nuclear issue during the October 2005-October 2006. He mentioned that the Bush administration's freezing North Korean accounts in Banco Delta Asia made Pyongyang suspicious of the U.S.'s sincere commitment to the normalization of bilateral relations whereas North Korea decided to engage in high-intensity brinkmanship, such as going ahead with its nuclear and missile tests.

Hypothesis 2.1 *Nuclear aspiring states targeted by U.S. negative sanctions have a lower likelihood of reversing their nuclear pursuits.*

2.3.2 The Effects of U.S. Multilateral IO Sanctions on Nuclear Reversal

Another factor that might influence nuclear reversal behavior of the target state is U.S. sanction imposition through international institutions. The United States has implemented both multilateral sanctions and sanctions through international organizations. This section includes as another main independent variable U.S. sanctions through international institutions rather than multilateral sanctions. As discussed above, negative sanctions are considered ineffective in part because of third-parties' sanction-busting and backsliding behaviors. Scholars of economic sanctions argue that multilateral sanctions, especially through international institutions, are more effective in extracting policy concessions from the target state than are other sanctions (Bapat and Morgan 2009; Bapat et al. 2013; Drezner 2000; Drury 1998). Sanctions through international organizations should resolve enforcement problems such as sanction-busting behaviors of third parties to a considerable extent. Drezner (2000), for instance, contends that "sanctions with reasonably high levels of international cooperation should impose greater costs on the target country because of the inability to find alternative markets and suppliers." International institutions possess enforcement powers to prevent other countries from defecting and to reduce the probability of backsliding.¹⁵

Thus, political leaders in a target state need to recalculate the anticipated benefits for pursuing nuclear weapons programs and costs of U.S. sanction through international organizations. If they

¹⁵In addition, sanctions through international institutions may show higher legitimacy so that the target state has a difficulty of framing the issue in favor of it and relying on the rally-round-the-flag sentiment.

choose to pursue nuclear weapons development, a target state's leaders may gain political benefits. Leaders in a target state improve its military power deterring potential security threats from attacking it and strategically symbolizes nuclear bombs as a national pride.

However, when an international organization is in the U.S. sanction coalition, a target country cannot help but to encounter potential threats from overseas as well as domestically. A target state faces domestically much greater economic and political costs of sanctions in which the U.S. and other members in an international organization would support for the U.S.-led sanctions against nuclear proliferating state. In this case, it is hard for a target state to find alternative trading routes and investors in order to avoid negative externalities of sanctions. Resisting nonproliferation demands from the U.S. and the international community is not a good choice for a sanctioned nuclear aspirant. Economic damages from sanctions may be sufficient enough to put the political survival of target leaders in danger.

For example, in response to North Korea's nuclear and ballistic missile tests on January 6, 2016, the United States recently led the tightened sanctions through the United Nations Security Council against Pyongyang and its government officials/agencies and companies (Morello 2016). It was said that the sanctions would be "more robust than any imposed in decades" because the UN sanctions require member states to inspect all cargo going to or coming from North Korea to ensure it does not contain anything that would further the country's nuclear or missile programs."¹⁶

The US-led multilateral sanctions through international organization (esp. the UN) may improve the effectiveness of sanctions to extract some policy concessions because the United States is one of the only countries in the world with an extensive defense alliance system. Using intra

¹⁶According to a CBS news report (April 6, 2016), "China has banned most imports of North Korea coal and iron ore, the country's main exports, in a significant increase in pressure on the North under UN sanctions against its nuclear and missile tests." <http://www.cbsnews.com/news/china-tightens-the-trade-screws-on-north-korea/>

alliance politics, the U.S. could induce its third party allies to join sanctions against the target countries (Early 2012). When the U.S. forms asymmetric alliance with less powerful countries, it can receive those countries' support for US-led multilateral sanctions. There is a tradeoff of security and policy concession between the U.S. and its weaker allies (Morrow 1991). For example, the recent nuclear deal between Iran and the US and its coalition states shows that Iranian sanctions primarily implemented by the U.S. were complemented by the strong cooperation of the EU countries and member states of the UN in 2006, forcing Iran to change nuclear policy (Borhani 2015). In addition, South Korea, a U.S. ally, joined the US-led Iranian sanctions under the pressure of the US-Korean alliance, adding "the names of 102 Iranian firms and 24 people to the blacklist of those with whom South Koreans cannot do business and also promised to inspect cargo from Iran more diligently and hold back on investment in oil and gas enterprises." Like South Korea, the EU, Canada and Japan have also joined the U.S. sanctions against Iran (Kirk 2010).

Bapat and Morgan (2009) also found that "multilateral sanctions do appear to work more frequently than do unilateral sanctions" because they have "the potential to create more coercive power than unilateral sanctions." In their recent study, Early and Spice (2015) argued that economic sanctions through smaller international institutions can extract secondary sanctioners' deeper commitments not to spoil sanction effectiveness than those through larger international institutions. This indicates that despite the variation in sanction effectiveness between the different size of international institutions, sanction imposition through international organizations is still effective at inducing the target's compliance. According to Palkki and Smith (2012), for an illustration, regardless of Libya's poor economic performance the actual impact of unilateral U.S. sanctions between 1986 and 1992 was insignificant due to Libya's capacity to continue looking for alternative markets and foreign petroleum investors. Yet the United States was able to impose substantial costs

to Qaddafi's regime using the international institution sanctions, in particular through the United Nations (Jentleson and Whytock 2005).¹⁷

Hypothesis 2.2 *Nuclear aspiring states targeted by U.S. sanctions through international organizations have a higher likelihood of reversing their nuclear pursuit.*

2.3.3 The Effects of U.S. Positive Inducements on Nuclear Reversal

Reward dimension of coercive diplomacy refers to a strategy that “can use positive inducements and assurances” to influence an adversary. According to George (1991), “the magnitude and significance of the carrot can range from a seemingly concessions that bring about a settlement of the crisis through a genuine, balanced quid pro quo” (10). Positive inducements may have an influence on the policy change of a target state in two regards. As foreign rewards or assistance increase, a sanctioned state becomes more accountable to the sender country than to its domestic constituencies. So, when a target state is more dependent upon foreign positive inducements, it is likely to make a policy concession to the sanctioning state in exchange for material benefits. Like negative sanctions, on the other hand, positive inducements also have a costly signaling effect. In contrast to negative sanctions, foreign positive rewards may signal to the target the sender's positive attitude toward the target state.

Fist, U.S. positive inducements may lead to the target state's policy change through ‘aid-for-policy’ deal. Target leaders tend to be accountable to the aid provider (Bueno de Mesquita and Smith 2009b). Based on this logic, a target nation may reverse the nuclear development programs

¹⁷As Jentleson and Whytock (2005, 82) explain the three phases of the US-led sanctions against Libya: (1) phase 1: the “very limited United States-European cooperation”; (2) phase 2: “the UN Security Council gave its normative legitimacy and economic weights to the sanctions”; and (3) phase 3: “the United States and Britain worked closely together were key factors in the variation in coercive diplomacy success.”

responding to the aid donor's nonproliferation request. A target state's leaders benefit their ruling supporters using foreign aid in exchange for withdrawing the existing nuclear development. If target leaders believe that the policy concession does not result in regime change or breakdown, positive inducements may strengthen the power of the moderates within the incumbent government. Positive sanctions have distributional consequences in the target state in the sense that they may improve and/or strengthen the target government's political legitimacy through the distribution of economic benefits from them. On the other hand, when the aid-recipient country does not make a concession, it is likely to become a sanction-target and lose economic benefits that it has been receiving. In this case, the target nation should be loss-averse. For example, South Korea, at one point attempted to build nuclear weapons for security purposes but then made a decision to withdraw its nuclear weapons program because of the U.S. pressure, i.e., the threat of cutting its assistance and security guarantees (Hersman and Peters 2006). Indeed, South Korea was a major recipient of U.S. economic and military aid in the post-Korean War period.¹⁸ Egypt also initiated a nuclear program in the 1960s but gave it up in the 1970s because Anwar Sadat, a successor of Gamal Abdel Nasser, sought to avoid giving much power to the existing ruling elites but preferred market-oriented reforms (Nincic 2011). At the same time, Egyptian government needed to withdraw its nuclear exploration in order not to lose economic aid from the US.

Second, U.S. positive inducements retain a significant effect on a target country and third-party countries as well. Positive rewards such as foreign aid are a positive signal to a recipient country itself and other countries because a sender spends a considerable amount of its resources in the aid allocation. For instance, Garriga and Phillips (2014) argued that U.S. aid allocation is prone

¹⁸South Korea has received from the US aid of a "total of \$11 billion by 1973" and "\$3.5 billion during the period between 1954 and 1970" which was "equivalent to nearly 5% of South Korea's total gross national product for the same period. American economic and military aid combined account for nearly 10% of South Korea's GNP in that period"(Han 1980, 1076).

to follow geo-strategic concerns. Especially during the Cold War, U.S. foreign assistance to a recipient country played a role in signaling that it was strategically important to the U.S. or at least the U.S. may not implement hostile policies.

Hypothesis 2.3 *Nuclear aspiring states receiving U.S. positive inducements have a higher likelihood of reversing their nuclear pursuit.*

2.4 Research Design

This study evaluates the testable hypotheses of a theory of U.S. economic statecraft and nuclear reversal, using a time-series cross-sectional dataset that include 18 countries and the time period lasting from 1970 through 2004. The test period is primarily based on a theoretical reason. Since the birth of nuclear age, the first nuclear club-i.e., the US, USSR/Russia, the United Kingdom, France, and China-has attempted to deter nuclear proliferation. In particular, the U.S. government has adopted a nonproliferation policy since the establishment of the 1970 Nuclear Proliferation Treaty (NPT) (Dunn 2006). Thus, the first club nations are excluded from this dataset. Also excluded are countries such as Japan and Sweden that withdrew their nuclear weapons programs before 1970. This doesn't necessarily cause a sampling problem because the U.S. nuclear nonproliferation activity does not apply to them as targets. This dataset is well documented by previous studies (Singh and Way 2004; Jo and Gartzke 2007). It does, however, need to be modified for testing the hypotheses of the nuclear reversal based on updated information (Levite 2002; Cirincione and Rajkumar 2005).

2.4.1 Dependent Variables

The outcome variable of interest is whether a nuclear-proliferating state that has explored and/or pursued nuclear weapons programs reverses or keeps pursuing, in a given year, its nuclear weapons development. To be included in the dataset, the country must have at least begun an initial exploration and/or pursuit of nuclear weapons, or engaged in nuclear weapons activity.

Existing quantitative studies of nuclear proliferation tend to place the variable of nuclear latent capabilities on the side of the independent variables. In reality, many nuclear proliferating countries have retained nuclear latent capacity in the process of nuclear pursuit. Some countries removed the entire infrastructure and technology with latent capacity after renouncing nuclear weapons programs. Some countries have maintained nuclear latent capabilities even though they have suspended existing nuclear weapons development.

The measurement of nuclear reversal conceptually relies on Lodgaard's discussion on nuclear rollback. According to Lodgaard (2010, 115), nuclear reversal "is a process in the opposite direction (of nuclear proliferation), reversing intentions and/or capabilities to acquire nuclear arms. Some states have rolled back to a stable non-nuclear status. Others have kept a certain preparedness for going nuclear if changing circumstances so suggest. Yet others have rolled back and forth between different degrees of interest in the nuclear option and different degrees of material preparedness to exercise it." Thus, I regard a state in *stable non-nuclear status* when it discarded both the intention and capability to construct nuclear bombs. I also consider a state in *nuclear latency* status when it still maintains some degrees of nuclear latent capacity to build nuclear weapons within some time period if it wants to do while it removes the willingness to make nuclear bombs. To code dates of nuclear reversal paths for each state, I discuss coding rules from four different

dataset: Bleek and Lorber (2014), Kroenig (2016), Levite (2002), and Way and Weeks (2014).

Based on the conceptualization of the paths of nuclear weapons development, I use the dependent variable, which consists of two measures. The first dependent variable is a binary measurement. A dichotomous outcome variable, *Nuclear reversal*, is coded 1 if a nuclear proliferating state makes a decision to reverse its nuclear weapons development in a given year and 0 if not.

The second dependent variable has value 0 for all country years for no nuclear pursuit (*Non-nuclear status*), value 1 for *Nuclear pursuit*, and value 2 for *Nuclear latency*. Data for the dependent variable are collected by Way and Weeks (2014) for nuclear paths with nuclear latency from Fuhrmann and Tkach (2015). A state having an ENR plant in operation is considered a state with nuclear latency capacity (Fuhrmann and Tkach 2015). But, nuclear latency status as a category of nuclear reversal outcomes is coded if the state ever acquires and possesses nuclear latent capability in spite of its renouncing nuclear weapons development. I code a state as in a non-nuclear status if a state not only has no intention to pursue its nuclear weapons development but also lacks nuclear latent capacity to quickly restart nuclear weapons programs when circumstances suggest. The data are a recent updated version, which includes cases ignored by past studies.¹⁹

2.4.2 Independent Variables

The data on independent variables primarily depend on the HSEO dataset (Hufbauer et al. 2007). To estimate the impact of U.S. sanctions on the targeted state's nuclear reversal, *U.S. negative sanctions* are measured in a dichotomous way in terms that they are coded 1 for each year that

¹⁹A recent review of nuclear proliferation research criticizes existing studies for not accounting for new cases (Montgomery and Sagan. 2009; Sagan 2011). Way and Weeks (2014) claimed that their data updated Singh and Way's (2004) proliferation data in the sense that they either added or revised the cases of Egypt, Syria, Iraq, Libya, and North Korea.

the HSEO dataset records all sanctions imposed by the United States, and 0 otherwise. Another sanction variable is U.S. economic sanctions through international organizations. The *US multilateral IO sanctions* is coded as 1 for each year that the United States has imposed negative sanctions through international organizations. I also analyze the effect of U.S. sanctions on a variation in nuclear reversal behaviors using *US sanction duration* and *US nuclear sanctions*. Including U.S. sanction duration in the equation reflects a possibility that sanctions are more likely to have the cumulative effect over time rather than the immediate effects. The variable of U.S. nuclear sanctions is also measured in a dichotomous way. The aim of U.S. nuclear sanction is specifically to prevent nuclear proliferation.

The *US aid (% GDP)* variable as a proxy for U.S. positive inducements is a country's is a country's annual inflows of U.S. total aid as a percentage of domestic product (GDP). It appropriately captures a country's aid-dependence on the U.S., which indicates that the country has more incentives to give policy concession to the U.S. in exchange for U.S. aid allocation. Alternatively, the *US aid* variable includes U.S. economic aid and military aid flowing into targeted countries. It is measured as the natural logarithm of U.S. total aid in a given year (the result is reported in the section of Appendix.). It is argued that the the increase in superpower aid (e.g., U.S. aid) by the aid-recipient country is regarded as the actual increase of the superpower's support to the recipient country no matter how big the recipient's economic size is (Mintz and Heo 2014).

2.4.3 Control Variables

For controlling for other factors to a proliferating state's affect nuclear reversal behaviors, the study includes several relevant variables including *Sensitive nuclear assistance*, *Civil nuclear co-*

operation, NPT ratification, US security alliance, Trade openness, GDP per capita (log), Polity score, Disputes, and Rivalry.

First, then, in line with the recent studies on the supply-side of nuclear proliferation, I include both foreign sensitive nuclear assistance (Kroenig 2009)²⁰ and civil nuclear cooperation (Fuhrmann 2009). *Sensitive nuclear assistance* is a dichotomous variable coded 1 if a nuclear proliferating state obtained sensitive nuclear materials or technologies from abroad, and 0 otherwise. Sensitive nuclear transfers enable nuclear aspiring states to overcome technical obstacles in pursuing nuclear weapons development. At the same time, purchasing foreign sensitive nuclear technology is said to be less expensive than the indigenous nuclear weapons development in part because of nuclear suppliers' strategic interest in helping nuclear aspirants to obtain sensitive nuclear technology (Kroenig 2009). However, it still should not be always less expensive to obtain foreign sensitive nuclear assistance given that international community works hard to take measures to deter the spread of nuclear weapons technology. In that situation, nuclear aspiring states need to pay both political and economic costs as it becomes more difficult for them to obtain the access to sensitive nuclear technology from abroad. For example, according to a news report, North Korean government "bribed top military officials" in Pakistan "to obtain access to sensitive nuclear technology in the later 1990s" through the secretive deal with transferring more than \$3 million in payments (Smith 2011). Thus, it is expected that *Sensitive nuclear assistance* is negatively associated with a state's nuclear reversal (Bleek and Lorber 2014; Kroenig 2009; Reiter 2014).

Civil nuclear cooperation is a variable, which counts the aggregated number of bilateral civil-

²⁰"Sensitive nuclear assistance takes three forms. States receive sensitive assistance when they receive assistance in the design and construction of nuclear weapons, receive significant quantities of weapons-grade fissile material, or receive assistance in the construction of uranium-enrichment or plutonium-reprocessing facilities that could be used to produce weapons-grade fissile material" (Kroenig 2009, 168)

ian nuclear agreements that a proliferating state has signed in a given year (Fuhrmann 2009). Civil nuclear cooperation is said a key determinant of nuclear proliferation because a such cooperation enables a state to obtain the capacity to pursue nuclear weapons programs. The probability of nuclear proliferation is said to be increased by the number of civil nuclear agreement (Fuhrmann 2009). Some scholars, however, argued that civil nuclear agreements often used by the international community may play a role in dissuading nuclear aspiring states from obtaining access to sensitive nuclear technology (Bluth et al. 2010, 190). Thus, the number of civil nuclear agreements may also decrease a proliferating state's incentive to pursue nuclear weapons development.

Second, a state's nuclear behaviors tend to be affected by domestic variables. Previous research has found that political factors have no significant impact on nuclear proliferation (Jo and Gartzke 2007). However, some recent studies has founded that domestic political variables have a significant influence on a state's nuclear development commitments (Fuhrmann 2009; Kroenig 2009). For instance, Way and Weeks (2014) found that "personalistic" dictatorships are more likely to pursue nuclear weapons than are other political regimes. It is expected that more democratized countries are more likely to reverse nuclear weapons development than less democratized countries (*Polity score*). *Polity score* reflects a proliferating state's regime type based on the 21-point scale (Marshall and Gurr 2011). This variable ranges from -10 to +10, with higher values representing greater levels of democracy and with lower values indicating greater levels of autocracy.

The Nonproliferation Treaty membership (*NPT ratification*) is a dichotomous variable measured 1 if a proliferating state has ratified the NPT in a given year and 0 if not. A state's ratification of the Nonproliferation Treaty (NPT) tends to signal its willingness to conform to international rules/norms over the nonproliferation commitments. It is expected that a state's *NPT ratification* is more likely to increase the probability of its nuclear rollback commitments (Bleek and Lorber

2014; Fuhrmann 2009).

Third, several international factors may influence a state's nuclear reversal behaviors. Security guarantees through defense pacts are likely to reduce a state's motivation to go nuclear. It is expected then that security alliance with the U.S. (*US security alliance*) is more likely to increase the probability that a proliferating state withdraws its nuclear weapons development in accordance with the existing findings (Bleek and Lorber 2014; Gerzhoy 2015; Kroenig 2009; Reiter 2014). A state's involvement in international disputes (*Disputes*), however, may decrease its incentive to withdraw the ongoing nuclear development (Brown and Kaplow 2014; Fuhrmann 2009; Reiter 2014). In a similar vein, having an enduring rivalry (*Rivalry*) may decrease a state's intention to reverse its ongoing nuclear pursuit due to security concerns. The next international factor is a state's openness to trade (*Trade openness*). When a state is more open to the international economy and economically more interdependent, it is more likely to stop nuclear development and rollback its nuclear programs because it does not want such risky behaviors to hurt its economy and ruling elites (Solingen 1994, 2012). It is expected that the more open a state's economy is, the higher the probability that it reverses its nuclear weapons development (Brown and Kaplow 2014; Kroenig 2009).

Lastly, I takes into account, using a method suggested by Carter and Signorino (2010), the temporal dependence in the data. The study includes a variable that counts the number of years that pass with a nuclear pursuit or non-nuclear-pursuit (Years) with its square (Years²) and its cube (Years³). All independent and control variables are measured as the lagged one due to possible lag-effect of sanctions on nuclear behaviors.

2.5 Methods and Results

To test this paper’s arguments, the study estimates a series of binary logit and multinomial logit model (MNLM).²¹ However, the analysis produced the warning message of “... observation completely determined. Standard errors questionable,” when running a standard logit regression. This results from problems of complete- or quasi-separation in the small-sample data. Some studies suggest that researchers should implement penalized likelihood logistic regression to cope with the problems of separation and finite sample biases (Allison 2004; Brown and Kaplow 2014; Firth 1993; Zorn 2005). In this case, one or more of my independent variable are excellent predictors of nuclear reversal (Brown and Kaplow 2014; Zorn 2005). To run a penalized likelihood logistic model, I use the command “firthlogit” in Stata.

It begins with the binary dependent variable-nuclear pursuit vs. nuclear reversal. Table 2.1 shows the results of five logistic regressions that test whether U.S. economic statecraft is associated with a change in the likelihood of a nuclear aspirant’s reversing a nuclear weapons development. Regarding the effects of U.S. economic statecraft on nuclear reversal, Models 1 and 2 include U.S. negative sanctions, U.S. sanction duration, and U.S. aid (% GDP) plus control variables while Models 3 and 4 include U.S. multilateral IO sanctions and U.S. non-IO sanctions plus control variables. First, the coefficient for *U.S. negative sanctions* is statistically insignificant and negative, which is, however, in the expected direction. The coefficient for U.S. sanction duration is also insignificant but positive. The result in Model 3, on the other hand, shows that the variable of U.S. non-IO sanctions decreases the probability that a nuclear-aspiring state reverses its nuclear pursuit. For instance, the logit coefficient on U.S. non-IO sanctions is -1.990 and its odd ratio is

²¹Quantitative literature on nuclear proliferation conducts multinomial logit and event history or hazard model to deal with multi-outcome dependent variable (Singh and Way 2004; Bleek and Lorber 2014; Kroenig 2016).

0.137. This means that, other things being equal, the odds of a nuclear proliferating state reversing its nuclear pursuit are almost 0.14 times as likely when under U.S. non-IO sanctions than when under no such sanctions. In fact, becoming a target of U.S. non-IO sanctions decreases the odds of reversing nuclear pursuit by over 86 percent. However, U.S. sanctions with IO involvement have a positive sign (direction toward nuclear reversal) but are not statistically significant in affecting a state's nuclear reversal behavior. The coefficient for U.S. multilateral IO sanctions is, for instance, 2.141 in Model 4. The odds ratio for the variable is 8.5. This means that, other things being equal, the odds of reversing nuclear weapons development increase by over 750 percent. Regarding the impacts of U.S. positive inducements, *U.S. aid (% GDP)* has a insignificant but positive effect on nuclear reversal in all five models (Models 1-5). Overall, these findings show that, in a binary choice setting (nuclear reversal vs. pursuit), neither U.S. negative sanctions nor U.S. nuclear sanctions are not influential factors in extracting policy concessions of nuclear nonproliferation from a target state. But, U.S. multilateral IO sanctions are effective in inducing a state's reversal behavior.

Let us now turn to the determinants of each of a trichotomous nuclear behavior, using a multinomial logit model (MNL) to examine the likelihood that a specific outcome is determined in nuclear development paths. In the multinomial logit models, the study estimates the effects of U.S. economic statecraft for stable non-nuclear status (outcome 0), nuclear pursuit/acquisition (outcome 1), and nuclear latency status (outcome 2). The reference category of the dependent variable is non-nuclear status. Model 6 in Table 2.2 shows the effects of U.S. negative sanctions on each outcome of a state's nuclear proliferation commitments. U.S. negative sanction imposition lead to a positive effect on nuclear pursuit. However, they are not statistically significant in pursuit and latency outcomes. U.S. sanction duration in Model 7 is also insignificant in affecting both nuclear pursuit and latency outcomes. Model 8 shows that, when the U.S. imposes economic

Table 2.1: Logit Analysis of Nuclear Reversal, 1970-2004

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>
US negative sanctions	-0.593 (0.646)				
US sanction duration		0.0142 (0.0360)			0.0262 (0.0327)
US multilateral IO sanctions			1.724 (1.174)	2.141 ⁺ (1.245)	
US non-IO sanctions			-1.990* (0.947)	-1.803 ⁺ (0.992)	
US nuclear sanctions				-1.057 (0.997)	-1.439 (0.909)
US aid (% GDP)	0.138 (0.127)	0.121 (0.121)	0.164 (0.120)	0.111 (0.134)	0.0608 (0.161)
Polity score	0.128* (0.0559)	0.134* (0.0555)	0.163** (0.0627)	0.152* (0.0623)	0.128* (0.0566)
Trade openness (log)	1.312 ⁺ (0.779)	1.211 ⁺ (0.706)	1.784* (0.727)	1.867* (0.727)	1.373 ⁺ (0.701)
Sensitive nuclear assistance	-0.117 (0.730)	-0.183 (0.687)	0.0934 (0.623)	0.247 (0.635)	0.134 (0.678)
Civil nuclear cooperation	0.0733* (0.0362)	0.0665 ⁺ (0.0349)	0.128* (0.0500)	0.125* (0.0501)	0.0709* (0.0334)
GDP per capita (log)	-0.716 (0.459)	-0.650 (0.453)	-1.244* (0.621)	-1.231 ⁺ (0.630)	-0.630 (0.470)
NPT ratification	3.048** (1.051)	2.812** (0.978)	4.159** (1.266)	4.160** (1.267)	2.973** (1.009)
US security alliance	0.556 (0.627)	0.663 (0.618)	0.565 (0.674)	0.643 (0.668)	0.800 (0.643)
Disputes	-0.102 (0.360)	-0.152 (0.282)	0.124 (0.128)	0.164 (0.117)	0.0754 (0.190)
Rivalry	-0.430 (0.365)	-0.460 (0.341)	-0.612 ⁺ (0.331)	-0.589 ⁺ (0.333)	-0.557 (0.374)
Proliferation years	0.396 (0.313)	0.430 (0.329)	0.376 (0.332)	0.391 (0.314)	0.444 (0.320)
Non-proliferation years	6.885** (2.163)	7.367** (2.405)	6.382** (2.282)	6.465** (2.081)	7.450*** (2.075)
Constant	-4.809 (4.188)	-5.071 (4.045)	-3.217 (4.226)	-3.764 (4.297)	-6.323 (4.477)
Observations	528	528	528	528	528
<i>AIC</i>	49.84	44.78	44.62	44.89	43.23
<i>BIC</i>	126.7	121.6	125.7	130.3	124.3
<i>Log likelihood</i>	-6.918	-4.391	-3.310	-2.444	-2.615

Note: Penalized likelihood coefficients with standard errors in parentheses.

All time-variant explanatory variables are lagged 37 t-1.

Squared and cubed terms for temporal dependence are not reported.

⁺ $p < 0.10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

sanctions against a nuclear aspirant through international organizations, it can extract suboptimal and/or partial compliance i.e., a nuclear latency outcome. This result indicates that when it comes to America's higher goals (a target state's complete and/or optimal concessions of nuclear nonproliferation), U.S. economic sanctions are generally ineffective. However, with lower or sub-optimal goals (nuclear power with nuclear disarmament; (Miller and Sagan 2009), U.S. economic statecraft is moderately successful and effective in nonproliferation outcomes.

In regard to the substantive interpretation of the results (Table 2.2), this study interprets the results using the relative risk ratios (rrr), similar to odd ratios in the logistic estimation. In Model 8, for example, for the category of nuclear latency, the rrr value for the U.S. IO sanctions is 37.6. This means that the relative risk of choosing nuclear latency over non-nuclear status is approximately 38 times for a state targeted by U.S. sanctions involving international organizations relative to a state under no such sanctions. The rrr value for the U.S. multilateral IO sanctions is 64 in Model 9. U.S. aid (% GDP) is, in Models 8 and 9, both positively and significantly associated with nuclear latency outcome, relative to non-nuclear status. For instance, the rrr value for U.S. aid (% GDP) is 1.35 for the category of nuclear latency in Model 8. This represents the effect of a change of one percent of U.S. aid/GDP in changing the odds of selecting either nuclear latency or non-nuclear status. The odds of 1.35 means that for every percent of U.S. aid/GDP, the odds of a state adopting nuclear latency over non-nuclear status increase by almost 1.5 times.

Figures 2.1 and 2.2 plot the predicted probabilities of key independent variables (i.e., U.S. multilateral IO sanctions and U.S. aid (% GDP) for each category of nuclear development outcomes. In Figure 2.1, plots the predicted probability for U.S. IO sanctions based on Model 9. The predicted probability of continuing nuclear pursuit is around 0.9 and is highest (near 1) but drops to near 0.5 when the U.S. imposes sanctions through an international organization. However, it is

Table 2.2: Multinomial Logit Analysis of Nuclear Reversal, 1970-2004

	<i>Model 6</i>	<i>Model 7</i>	<i>Model 8</i>	<i>Model 9</i>	<i>Model 10</i>
Base outcome (Non-nuclear)					
Nuclear pursuit					
US negative sanctions	1.123 (1.167)				
US sanction duration		0.00528 (0.0528)			
US multilateral IO sanctions			-0.338 (1.062)	0.00470 (1.032)	
US non-IO sanctions			3.039 (2.157)	3.086 (2.174)	
US nuclear sanctions				-0.641 (0.922)	0.0503 (0.881)
US aid (%GDP)	-0.0919 (0.142)	-0.0771 (0.126)	-0.113 (0.207)	-0.138 (0.251)	-0.0964 (0.128)
Sensitive nuclear assistance	0.602 (1.187)	0.454 (1.078)	0.460 (1.244)	0.479 (1.177)	0.329 (0.973)
Polity	-0.128* (0.0620)	-0.120* (0.0584)	-0.135* (0.0596)	-0.136* (0.0602)	-0.119* (0.0598)
Trade openness (log)	-3.551** (1.126)	-3.372** (1.254)	-4.017*** (1.141)	-3.928*** (1.051)	-3.286** (1.226)
Civil nuclear cooperation	-0.139*** (0.0403)	-0.130** (0.0406)	-0.192** (0.0587)	-0.191** (0.0594)	-0.124*** (0.0371)
GDP per capita (log)	0.473 (0.608)	0.300 (0.560)	0.894 (0.774)	0.897 (0.815)	0.342 (0.605)
NPT ratification	-2.146 (1.499)	-1.737 (1.341)	-2.983 (1.950)	-3.028 (2.110)	-1.876 (1.410)
US security alliance	-0.155 (0.685)	-0.476 (0.557)	-0.0261 (0.729)	-0.0126 (0.707)	-0.493 (0.494)
Disputes	0.0466 (0.177)	0.0837 (0.156)	-0.0325 (0.139)	-0.0110 (0.132)	0.0532 (0.135)
Rivalry	0.817* (0.417)	0.782 ⁺ (0.408)	0.913* (0.438)	0.917* (0.438)	0.782 ⁺ (0.411)
Proliferation years	0.769** (0.252)	0.887*** (0.200)	0.624* (0.301)	0.640* (0.305)	0.880*** (0.194)
Constant	11.38 ⁺ (6.889)	12.00 ⁺ (7.090)	10.67 (6.915)	10.27 (7.118)	11.45 (7.193)

	<i>Model 6</i>	<i>Model 7</i>	<i>Model 8</i>	<i>Model 9</i>	<i>Model 10</i>
Base outcome (Non-nuclear)					
Nuclear Latency					
US negative sanctions	0.0610 (0.637)				
US sanction duration		0.0188 (0.0380)			
US multilateral IO sanctions			3.628* (1.598)	4.159* (1.797)	
US non-IO sanctions			-0.831 (1.133)	-0.782 (1.233)	
US nuclear sanctions				-1.539 (2.919)	-2.196 (2.471)
US aid (%GDP)	0.307*** (0.0907)	0.298** (0.0923)	0.302*** (0.0661)	0.279*** (0.0840)	0.273** (0.104)
Sensitive nuclear assistance	1.090 (1.191)	1.045 (1.138)	1.317 (1.166)	1.342 (1.153)	1.132 (1.189)
Polity	0.0637 (0.0631)	0.0526 (0.0618)	0.0806 (0.0754)	0.0769 (0.0742)	0.0641 (0.0668)
Trade openness (log)	-3.123* (1.469)	-3.137* (1.498)	-2.999* (1.500)	-2.895+ (1.501)	-3.085* (1.492)
Civil nuclear cooperation	-0.0567 (0.0440)	-0.0541 (0.0429)	-0.0566 (0.0484)	-0.0552 (0.0478)	-0.0568 (0.0434)
GDP per capita (log)	-0.726 (0.505)	-0.596 (0.516)	-0.984 (0.789)	-1.055 (0.778)	-0.888 (0.555)
NPT ratification	2.139 (1.850)	2.095 (1.822)	2.267 (1.907)	2.319 (1.883)	2.274 (1.815)
US security alliance	1.383 (0.904)	1.292 (0.892)	1.759* (0.796)	1.818* (0.807)	1.443+ (0.844)
Disputes	-0.0464 (0.170)	-0.0668 (0.174)	-0.0416 (0.164)	0.0161 (0.137)	0.0287 (0.138)
Rivalry	0.0547 (0.326)	0.0709 (0.324)	0.0263 (0.325)	-0.0336 (0.373)	-0.0393 (0.351)
Proliferation years	-0.783 (0.543)	-0.780 (0.504)	-0.865 (0.686)	-0.845 (0.686)	-0.775 (0.521)
Constant	16.65* (8.135)	15.62+ (8.211)	18.04 (11.03)	18.17+ (10.82)	17.81* (8.410)
Observations	528	528	528	528	528
<i>AIC</i>	399.0	402.3	374.4	373.1	398.7
<i>BIC</i>	471.6	474.8	447.0	445.7	471.3
<i>Log likelihood</i>	-182.5	-184.1	-170.2	-169.6	-182.4

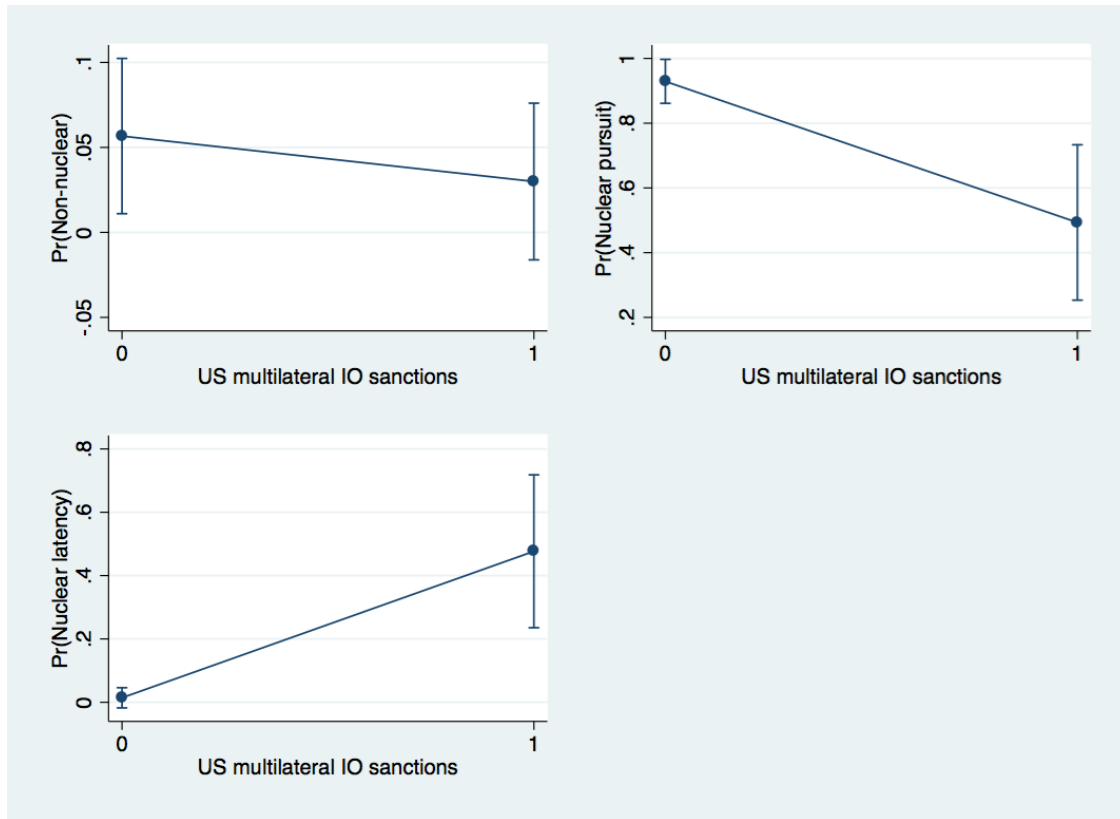
Note: Robust standard errors adjusted for clustering over country appear in parentheses.

All time-variant explanatory variables are lagged at t-1.

Squared and cubed terms for temporal dependence are not reported.

+ $p < 0.10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$ 40

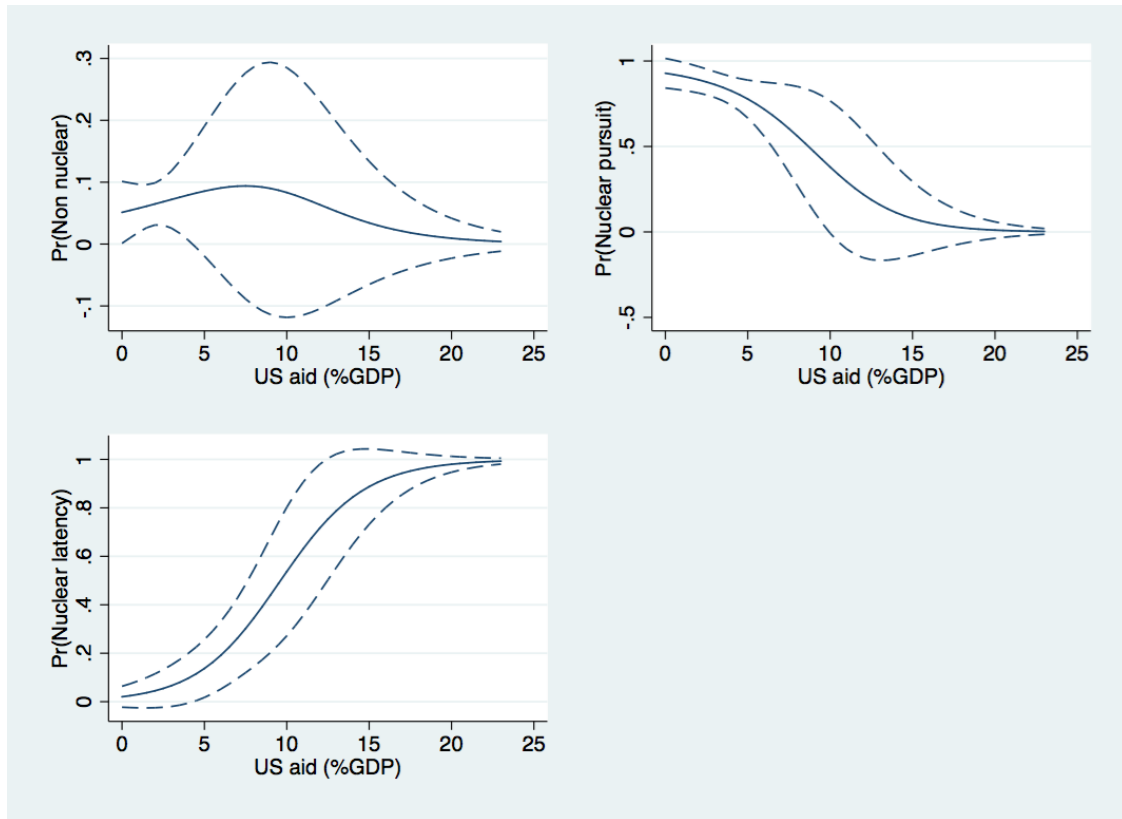
Figure 2.1: U.S. IO sanctions and Predicted Probabilities of Nuclear Reversal Outcomes



not statistically significant. The probability of adopting nuclear latency status climbs slightly to near 0.5 from near zero when a state becomes a target of U.S. multilateral IO sanctions. In Figure 2.2, the predicted probability of continuing pursuit is highest (almost 1.0) at the lowest US aid (% GDP) and drops to a low level (near 0) at the highest level of US aid (% GDP) in a target state. The probability of opting for nuclear latency is the lowest (almost 0) at the lowest level of US aid (% GDP), and climb to near 1, at the highest level of US aid (% GDP).

Models 11-15 in Table 2.3 investigates whether U.S. IO sanctions and U.S. aid (% GDP) lead to

Figure 2.2: U.S. aid (% GDP) and Predicted Probabilities of Nuclear Reversal Outcomes



the transition from nuclear pursuit to nuclear latency status. The coefficients for U.S. multilateral IO sanctions have a statistically significant and positive effect on a state's nuclear latency behavior in Models 13 and 14. U.S. aid (% GDP) has a significant impact in all models (Models 11-15). In contrast, Models 16-19 investigate the onset of nuclear reversal outcomes (i.e., from nuclear pursuit to nuclear latency or to non-nuclear) only, excluding decisions to continue nuclear reversal. In the model of the transition from pursuit to latency (Models 16 and 17), the presence of U.S. IO sanctions has a positive and significant effect on the probability of transition in nuclear latency

status. U.S. aid (% GDP) has , on the other hand, an insignificant impact in Models 16 and 19 (i.e., nuclear latency and non-nuclear status).

The remaining section of the results deals, based on the existing findings, with the influence of control variables in explaining nuclear reversal outcomes. First, a state's *NPT ratification* has a consistent and positive relationship with its commitment to nuclear reversal in almost all models in logit analysis of nuclear reversal (Models 1-5 in Table 2.1). This finding confirms the evidence gathered from existing studies (Bleek and Lorber 2014; Fuhrmann 2009). But, the variable has no significant effect on nuclear latency and nuclear pursuit in all models in multinomial logit regression in Table 2.2 in spite of its expected direction.

Second, the previous research emphasizes the deterrent effect of U.S. security alliances in preventing the spread of nuclear weapons. The result of analysis offers up mixed findings with inconsistent significance-in Models 8-10, *US security alliance* has a significant and positive effect on nuclear latency outcome. U.S. security alliance also has a positive and significant effect on the transition from nuclear pursuit to latency (Models 11-15 in Table 2.3) or to latency onset (Models 15 and 17 in Table 2.4).

Third, some scholars have focused on the role of a state's openness to the world on nuclear proliferation (Solingen 1994, 2009). The findings in the logit regression are consistent with the results of the existing quantitative studies in that an increase in trade openness opens up more incentives for a state to reverse its nuclear weapons development (Models 1-5). *Trade openness* variable also yields similar findings in the multinomial logistic models. *Rivalry* variable is negatively associated with a proliferating state's nuclear reversal in logit analysis (Models 3-4) while it has a positive impact only on nuclear pursuit status in multinomial logit analysis (Models 6-10). The results confirm previous findings (Brown and Kaplow 2014; Fuhrmann and Horowitz 2015).

Disputes variable has, however, no significant relationship with nuclear reversal in spite of the expected direction.

Finally, according to the existing literature (e.g., Fuhrmann 2009; Kroenig 2009), the supply-side determinants to nuclear proliferation are expected to influence nuclear reversal outcome(s). On one hand, *sensitive nuclear assistance* is anticipated to encourage a state to develop its nuclear weapons (Kroenig 2009). It has no significant influence on a proliferating state's nuclear policy change in logit and multinomial logit models in Tables 2.1 and 2.2. Such a finding does not confirm the previous findings (Bleek and Lorber 2014; Kroenig 2009; Reiter 2014). However, the variable is statistically and positively significant in logit analysis-transition from pursuit to latency in Models 11-15. In contrast, *civil nuclear cooperation* have a significant relationship with nuclear reversal in both logit and multinomial logit regression. These findings contradict previous findings in that the international community may use civil nuclear agreements to dissuade a state from obtaining access nuclear weapons technology (Bluth et al. 2010, 190).

2.5.1 Robustness Analysis

Overall, the findings in the previous section are consistent with this study's hypotheses. To avoid the spuriousness of statistical results, a few robustness checks were conducted on the empirical analysis to show the validity of the inference from the data. The detailed results can be found in Appendix 1. First, one of the most problematic issues in nuclear proliferation literature, however, is the measurement of nuclear behavior because nuclear programs are usually implemented in secrecy (Montgomery and Sagan. 2009; Sagan 2010). Recent quantitative works on nuclear proliferation have constructed several new datasets with nuclear proliferation dates by updating and/or

Table 2.3: Logit Analysis of U.S. Economic Statecraft and Nuclear Reversal: from pursuit to latency

	<i>Model 11</i>	<i>Model 12</i>	<i>Model 13</i>	<i>Model 14</i>	<i>Model 15</i>
US negative sanctions	-0.282 (0.590)				
US sanction duration		0.000713 (0.0244)			0.00753 (0.0246)
US multilateral IO sanctions			2.655* (1.058)	2.646* (1.040)	
US non-IO sanctions			-3.435** (1.251)	-3.419** (1.208)	
US nuclear sanctions				0.266 (0.941)	-1.456 (1.059)
US aid (% GDP)	0.337*** (0.0879)	0.332*** (0.0878)	0.338*** (0.0942)	0.339*** (0.0955)	0.315*** (0.0898)
Sensitive nuclear assistance	1.019* (0.435)	1.022* (0.437)	1.252** (0.444)	1.250** (0.444)	1.123* (0.436)
Polity	0.0975** (0.0343)	0.0946** (0.0334)	0.100** (0.0373)	0.100** (0.0374)	0.104** (0.0355)
Trade openness (log)	-1.892*** (0.471)	-1.893*** (0.484)	-1.945*** (0.520)	-1.948*** (0.527)	-1.729*** (0.496)
Civil nuclear cooperation	-0.0350* (0.0157)	-0.0350* (0.0158)	-0.0376* (0.0168)	-0.0377* (0.0169)	-0.0355* (0.0159)
GDP per capita (log)	-0.802* (0.391)	-0.763* (0.383)	-1.080* (0.420)	-1.077** (0.416)	-0.966* (0.418)
NPT ratification	1.982** (0.707)	1.895** (0.717)	2.073** (0.693)	2.067** (0.690)	1.896** (0.735)
US security alliance	1.428** (0.496)	1.440** (0.497)	1.819** (0.555)	1.818** (0.553)	1.637** (0.525)
Disputes	-0.386+ (0.207)	-0.399+ (0.205)	-0.350+ (0.205)	-0.354+ (0.206)	-0.349+ (0.210)
Rivalry	-0.0786 (0.312)	-0.0701 (0.312)	-0.103 (0.317)	-0.101 (0.316)	-0.150 (0.322)
Proliferation years	-0.931** (0.343)	-0.942** (0.341)	-0.836** (0.323)	-0.831** (0.322)	-0.920** (0.342)
Non-proliferation years	0.699* (0.353)	0.704* (0.351)	0.795* (0.372)	0.799* (0.372)	0.712* (0.352)
Constant	10.77** (3.635)	10.44** (3.625)	12.74*** (3.720)	12.73*** (3.685)	11.46** (3.750)
Observations	528	528	528	528	528
<i>AIC</i>	149.9	143.8	137.0	138.8	143.0
<i>BIC</i>	226.8	220.7	218.1	224.1	224.2
<i>Log likelihood</i>	-56.96	-53.92	-49.51	-49.38	-52.52

Note: Penalized likelihood coefficients with standard errors in parentheses.

All time-variant explanatory variables are lagged at t-1.

Squared and cubed terms for temporal dependence are not reported.

+ $p < 0.10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Table 2.4: Logit Analysis of Nuclear Reversal Onset

	pursuit-to-latency		pursuit-to-non nuclear	
	<i>Model 16</i>	<i>Model 17</i>	<i>Model 18</i>	<i>Model 19</i>
US multilateral IO sanctions	2.582* (1.172)	2.589* (1.245)	-0.0364 (0.957)	0.128 (1.242)
US non-IO sanctions	-2.010 (2.082)	-1.892 (2.060)	-2.508* (1.220)	-2.491+ (1.294)
US nuclear sanctions		-0.500 (1.138)		-0.312 (1.564)
US aid (% GDP)	0.165 (0.472)	0.132 (0.548)	-5.471 (5.361)	-5.450 (5.213)
Sensitive nuclear assistance	0.250 (1.226)	0.349 (1.181)	-1.533 (1.414)	-1.492 (1.541)
Polity	0.0827 (0.111)	0.0790 (0.115)	-0.155+ (0.0855)	-0.159+ (0.0835)
Trade openness (log)	0.312 (1.011)	0.418 (1.104)	2.234* (1.059)	2.266* (1.105)
Civil nuclear cooperation	0.0463 (0.0693)	0.0455 (0.0705)	0.127** (0.0458)	0.128** (0.0446)
GDP per capita (log)	-0.768 (0.845)	-0.741 (0.841)	-0.937 (0.659)	-0.909 (0.734)
NPT ratification	3.680 (2.521)	3.618 (2.598)	1.982* (0.818)	1.991* (0.825)
US security alliance	3.385** (1.183)	3.368** (1.198)	0.768 (1.053)	0.770 (1.077)
Disputes	-0.0684 (0.329)	-0.0483 (0.344)	0.174 (0.170)	0.189 (0.133)
Rivalry	-0.290 (0.486)	-0.317 (0.510)	-0.998 (0.859)	-0.994 (0.864)
Proliferation years	0.143 (0.611)	0.149 (0.604)	0.484 (0.407)	0.488 (0.420)
Constant	-3.916 (9.500)	-4.452 (9.338)	-6.665 (7.118)	-7.097 (8.249)
Observations	399	399	448	448
<i>AIC</i>	95.41	97.29	120.8	120.7
<i>BIC</i>	159.2	165.1	186.5	186.4
<i>Log likelihood</i>	-31.70	-31.64	-44.39	-44.37

Note: Robust standard errors adjusted for clustering over country appear in parentheses.

All time-variant explanatory variables are lagged at t-1.

Squared and cubed terms for temporal dependence are not reported.

+ $p < 0.10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

revising the existing periods of nuclear proliferation-the updated datasets of [Jo and Gartzke \(2007\)](#) and [Kroenig \(2016\)](#). Second, the empirical findings are robust to alternative measures of U.S. positive inducements-US aid (log). It is argued that the the increase in superpower aid (e.g., U.S. aid) by the aid-recipient country is regarded as the actual increase of the superpower's support to the recipient country no matter how big the recipient's economic size is ([Mintz and Heo 2014](#)). The substantive results are unchanged. Third, as another robustness check, the study also subset the data by excluding non-NPT nuclear weapons states that possessed nuclear weapons-India, Israel, and Pakistan. The substantive results are still robust. Fourth, the Cold War and the Post-Cold War were separatged because for many countries in the world the dissolution of the Soviet Union led to a decrease in the efficacy of possession nuclear weapons ([Fuhrmann and Sechser 2014](#); [Sagan 1996](#)). Despite adding the *Cold war* variable, the results still support the main hypotheses. Lastly, I add the variable of *Liberalization* for a state's openness with the international economy, in addition to trade openness ([Solingen 2009](#)). The finding remains unaltered. All these findings of robustness tests are reported in the appendix.

2.6 Conclusion

This paper tests whether U.S. economic statecraft influences nuclear reversal. The empirical evidence suggests that U.S. negative sanctions have a detrimental effect on counterproliferation in both the logistic and multinomial logistic estimations. In other words, when states that have initiated or pursued nuclear development come under U.S. sanction imposition, they are less likely to reverse their nuclear pursuit. The findings indicate that with regard to nonproliferation U.S. sanctions result in counterproductive outcomes. U.S. sanctions produce negative political and

economic externalities, as sanctioned states may anticipate the U.S. using of military force against them (Lektzian and Souva 2007).

In contrast, when nuclear reversal outcomes are disaggregated into non-nuclear status, nuclear latency, and nuclear latency, U.S. positive inducements including US aid (% GDP) have a positive impact on a proliferating state's decision to maintain nuclear latent capacity in exchange for renouncing nuclear weapons development. These findings suggest that U.S. aid allocation provides a costly signal to recipient countries; they are sufficiently important geo-strategically that their political survival will not be hurt and that they are not potential targets for U.S. military attack (Garriga and Phillips 2014). U.S. sanctions through international institutions leads to a state's decision to choose nuclear latency over nuclear pursuit.

These findings offer several important contributions to the current literature on nuclear (non-)proliferation. They confirm the detrimental effects of U.S. negative sanctions on unintended products such as a state's continuing to pursue nuclear weapons development due to potential imminent threats from the U.S. and its coalition countries. However, the results indicate that if the U.S. were to adopt a lower standard of success in its economic statecraft (e.g., U.S. sanctions through international institutions, U.S. positive inducements), it could extract from a proliferating state a sub-optimal policy concession like "nuclear latency status" or "nuclear power without nuclear proliferation." At the same time, when the U.S. induces more international cooperation using its negative sanctions, it may lead to a partial nonproliferation outcome. The 1994 Agreed Framework between the U.S. and DPRK illustrates, despite its later breakdown, the effectiveness of positive inducement in nonproliferation and/or nuclear reversal. The recent negotiation and the conditional agreement over nuclear withdrawal between the West (in particular the U.S.) and Iran imply that U.S. sanctions through international institutions and U.S. positive inducements (e.g.,

lifting existing sanctions) can be effective enough to extract a nuclear-aspiring state's compliance with nonproliferation.

2.7 Appendix I

2.7.1 Robustness Analysis

- **Alternative nuclear datasets (Models A1-A2).** As I discussed in the paper, it is sometimes difficult to identify whether states are pursuing the bomb in light of the secrecy that often shrouds nuclear weapons programs. To address this issue, I recode the dependent variable using two alternative nuclear behavior datasets coded or produced by (Jo and Gartzke 2007) and (Kroenig 2016). The results show that *U.S. IO sanctions* remains closely associated with a state's nuclear latency behavior when I use the Jo and Gartzke (2007) and Kroenig (2016) dataset to construct my dependent variable.
- **Alternative measure of U.S. positive inducements (Models A3-A4).** Alternatively, the *US aid* variable includes U.S. economic aid and military aid flowing into targeted countries. It is measured as the natural logarithm of U.S. total aid in a given year. It is argued that the increase in superpower aid (e.g., U.S. aid) by the aid-recipient country is regarded as the actual increase of the superpower's support to the recipient country no matter how big the recipient's economic size is (Mintz and Heo 2014). The results show that U.S. aid (log) is positively associated with the category of nuclear latency status indicating that a state receiving the higher level of U.S. total aid, regardless of its economic size, adopts nuclear latency status.
- **Excluding non-NPT nuclear weapons states (Models A5-A6).** The study also subsets the data by excluding non-NPT nuclear weapons states (i.e., India, Pakistan, and Israel) that acquired nuclear weapons. One could argue that de facto non-NPT nuclear weapons states

have already acquired nuclear bombs and lack the intention to reverse their existing nuclear weapons development. Thus, those countries are unlikely to ever reverse nuclear pursuit. Yet, the findings are similar when the study exclude country-year observations representing three de facto nuclear weapons states and even coefficients for main independent variables- U.S. IO sanctions and U.S. aid (% GDP) have a much stronger explanatory power in determining nuclear latency status. Unlike previous findings, U.S. sanction duration has a positive and significant relationship with nuclear latency outcome when the study exclude non-NPT nuclear weapons states.

- **Including Cold War dummy (Model A7).** The change of international structure influences a state's behavior according to neo-realist argument. The collapse of the Soviet Union might decrease a nuclear proliferating state's incentive to keep pursuing nuclear weapons development in part due to the reduction of security threats. My findings remain largely unchanged when I control for the Cold War period.
- **Superpower alliance (Model A8).** This study argued that security alliance with the U.S. tends to discourage proliferating states to keep pursuing nuclear weapons program. It is said that alliances with nuclear-armed superpowers (i.e., the U.S. and the USSR/Russia) can play a deterrent role in dissuading a state from pursuing nuclear weapons development and also provide it with nuclear umbrella (Fuhrmann and Horowitz 2015). A robustness analysis shows that the findings are similar to previous ones.
- **Adding liberalization variable (Model A9).** My initial empirical tests include, based on Solingen (2009) argument, trade openness representing a state's integration with the international economic system. For another robustness check, the study also include the variable

of a state's *liberalization* measuring 5-year changes in trade openness over time (Bleek and Lorber 2014). Model 8 shows, however that both U.S. IO sanctions and *U.S. aid (% GDP)* remain statistically significant when I add another factor that might influence a state's reversal behavior.

2.7.2 Summary Statistics, Nuclear Proliferation Period, US Economic Sanctions, 1970-2004, Operationalizations of Control Variables

Table 2.5: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Nuclear reversal	0.35	0.477	0	1	555
Nuclear reversal outcomes	0.884	0.651	0	2	630
US negative sanctions	0.395	0.489	0	1	612
US nuclear sanctions	0.208	0.406	0	1	612
US sanction duration	5.835	10.538	0	54	612
US multilateral IO sanctions	0.157	0.364	0	1	612
US non-IO sanctions	0.284	0.451	0	1	612
US aid (% GDP)	0.647	2.155	0	22.5	612
Sensitive nuclear assistance	0.363	0.481	0	1	612
Polity2	-1.017	7.599	-10	10	597
Trade openness (log)	3.68	0.72	0.6	5.9	612
Civil nuclear cooperation	14.871	13.372	0	63	612
GDP per capita (log)	8.640	0.823	6.9	10.6	599
NPT ratification	0.629	0.483	0	1	612
US security alliance	0.33	0.471	0	1	612
Disputes	1.376	2.071	0	27	612
Rivalry	0.763	1.183	0	5	612

Table 2.6: Operationalizations of Control Variables

Variables	Measurement	References
US security alliance	a dichotomy: 1 if a state has a defense pact with the US ; 0	ATOP alliance data (Leeds et al. 2002)
Sensitive nuclear assistance	a dichotomy: 1 if a state receives sensitive nuclear assistance; 0	(Kroenig 2009)
Trade openness	(export+imports)/GDP in a country-year	(Gleditsch 2002)
Civil nuclear cooperation	number of civilian nuclear agreements in a country-year	(Fuhrmann 2009)
NPT ratification	a dichotomy: 1 if a state joins the NPT in a country-year	(CNS 2012)
GDP per capita (log)	a natural log of GDP per capita in a country-year	(Haber and Menaldo 2011)
Disputes	number of militarized disputes (MIDs) in a country-year	(Ghosn, Palmer and Bremer 2004)
Polity	-10 to + 10: -10 - most autocratic, +10 -most democratic	Polity IV data (Jaggers and Gurr 1995)

Table 2.7: Nuclear Proliferation Period (updated)

	Singh and Way (2004)			Jo and Gartzke (2007)	
	Explore	Pursue	Acquire	Program	Acquire
Algeria	1983-				
Argentina	1968-1977	1978-1990		1978-1990	
Australia	1956-1960	1961-1973			
Brazil	1953-1977	1978-1990		1978-1990	
Egypt	1960-1964	1965-1974			
India	1954-1963	1964-19787	1988-	1964-1987	1988-
Iran	1976-1984	1985-		1974-	
Iraq	1976-1982	1982-1995		1973-2002	
Israel	1949-1957	1958-1968	1955-1965	1966-	
Korea, North	1965-1979	1980-2005	2006-	1982-2005	2006
Korea, South	1959-1969	1970-1978		1971-1975	
Libya	1970-2003	1970-2003		1970-2003	
Pakistan		1972-1986	1987-	1972-1986	1987-
Romania	1985-1990			1981-1989	
South Africa	1969-1973	1974-1978	1979-1991	1971-1978	1979-1990
Syria		2000-2009			
Taiwan (1)		1967-1977		1967-1976	
Taiwan (2)	1987-1988				
Yugoslavia	1974-1988			1982-1987	

Source: Way and Weeks (2014)

Table 2.8: US Economic Sanctions, 1970-2004

country	Sanction Periods	Sanction Goals
Argentina	1977-1983	Improve human rights
	1978-1982	Adhere to nuclear safeguards
Brazil	1977-1984	Improve human rights
	1978-1981	Adhere to nuclear safeguards
India	1971	Cease fighting in East Pakistan (Bangladesh)
	1978-1982	Adhere to nuclear safeguards
	1998-2001	Retaliate for nuclear test Constrain nuclear program
Iran	1979-1981	Release hostages
	1984-	Settle expropriation claims Terminate support for international terrorism End war with Iraq & Renounce WMD
Iraq	1980-2003	Terminate support for international terrorism Renounce WMD
	1990-1991	Withdraw from Kuwait & Release hostages
	1991-2003	Renounce WMD & Destabilize Huessein government
Israel	1970-1983	Withdraw from Sinai & Implement UN Resolution 242 Push Palestinian autonomy talks
Korea, North	1970-	Impair military potential Destabilize communist government
	1993-1994 / 2002-	Renounce nuclear weapons
Korea, South	1973-1977	Improve human rights
	1975-1976	Forgo nuclear reprocessing
Libya	1978-2004	Terminate support for international terrorism Destabilize Gadhafi government Stop pursuit of chemical, nuclear weapons
Pakistan	1971	Cease fighting in East Pakistan (Bangladesh)
	1979-2001	Adhere to nuclear safeguards & stop pursuit of nuclear weapons
	1999-2001	Restore democracy
Romania	1983-1989 / 1990-1993	Improve human rights & Ease restrictions on emigration Establish democracy, election
South Africa	1975-1982	Adhere to nuclear safeguards Avert explosion of nuclear device
	1985-1991	End apartheid
Syria	1986-	Terminate support for international terrorism
Taiwan	1976-1977	Forgo nuclear reprocessing
Yugoslavia	1991-2001	End civil war in Bosnia, Croatia
	1998-2001	Stop aggression in Kosovo & Destabilize Milosevic

Source: Hufbauer, Schott, Elliott and Oegg (2007, 20-33)

Table 2.9: Multinomial Logit Analysis of Nuclear Reversal, 1970-2004

	Jo & Gartzke (2007)		Kroenig (2016)	
	<i>Model A1</i>		<i>Model A2</i>	
	Nuclear Pursuit	Nuclear Latency	Nuclear Pursuit	Nuclear Latency
US IO sanctions	1.271 (0.946)	2.420** (0.845)	1.609 (1.038)	2.181 ⁺ (1.211)
US non-IO sanctions	0.347 (0.792)	-0.497 (0.819)	0.978 (0.870)	-1.774 (1.648)
US aid (% GDP)	3.257 (2.951)	-1.818 (3.063)	0.543 (0.432)	0.657 (0.419)
Sensitive nuclear assistance	0.438 (0.735)	0.415 (1.351)	-0.425 (0.646)	1.406 (1.032)
Polity2	-0.0979* (0.0397)	0.192* (0.0781)	-0.00769 (0.0550)	0.00151 (0.0597)
Trade openness	-0.0210 ⁺ (0.0116)	-0.0788*** (0.0239)	-0.00252 (0.00804)	-0.0530* (0.0269)
Civil nuclear cooperation	0.0284 (0.0366)	-0.0946*** (0.0253)	-0.0586* (0.0267)	-0.0470 (0.0308)
GDP per capita (log)	1.277 (1.025)	0.392 (1.009)	0.708 (0.807)	0.808 (0.631)
NPT ratification	-1.517 (1.134)	1.735* (0.773)	-3.566* (1.455)	-0.455 (0.936)
US security alliance	-2.406 ⁺ (1.337)	2.512*** (0.657)	-1.051 (0.670)	0.133 (0.702)
Disputes	0.846*** (0.205)	-0.272 (0.312)	0.0430 (0.144)	-0.0282 (0.186)
Rivalry	0.141 (0.291)	0.0856 (0.0856)	0.0918 (0.340)	0.158 (0.341)
Year	1.437*** (0.350)	-1.013 ⁺ (0.606)	0.400 (0.248)	-0.489 (0.354)
Year ²	-0.0738*** (0.0224)	0.184* (0.0817)	-0.0205 (0.0248)	0.0548 (0.0356)
Year ³	0.00101 ⁺ (0.000522)	-0.00621* (0.00311)	0.000332 (0.000580)	-0.00153 (0.000961)
Constant	-11.33 (8.985)	-1.375 (8.636)	-2.603 (6.331)	-3.450 (5.712)
Observations	460		523	
Log-likelihood	-180.7		-251.5	

Robust standard errors adjusted for clustering over country appear in parentheses.

All time-variant explanatory variables are lagged at t-1.

⁺ $p < 0.10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Table 2.10: Robustness multinomial logit analysis of nuclear reversal, 1970-2004

	US aid (log)		Excluding nuclear weapons states		Cold War dummy	Superpower alliances	Liberalization
	Model A3	Model A4	Model A5	Model A6	Model A7	Model A8	Model A9
<i>Nuclear pursuit</i>							
US multilateral IO sanctions	-1.595 (1.354)	-1.068 (1.115)	2.630 (2.186)	2.751 (2.425)	-0.359 (1.651)	-0.357 (0.989)	-0.382 (1.055)
US non-IO sanctions	3.010 (2.257)	3.127 (2.041)	3.379 (2.814)	3.457 (2.956)	3.389 (2.436)	2.993 (1.833)	2.944 (2.049)
US nuclear sanctions		-1.452 (0.914)		-0.436 (1.598)			
US aid	-0.122** (0.0396)	-0.139*** (0.0383)	-0.146 (0.200)	-0.159 (0.205)	0.0588 (0.204)	-0.130 (0.200)	-0.100 (0.197)
Sensitive nuclear assistance	0.130 (1.210)	0.184 (1.148)	0.878 (1.981)	0.932 (2.090)	0.635 (1.261)	0.390 (1.132)	0.374 (1.209)
Polity	-0.161** (0.0589)	-0.175** (0.0571)	-0.247* (0.0979)	-0.246** (0.0956)	-0.189** (0.0612)	-0.139* (0.0578)	-0.134* (0.0579)
Trade openness (log)	-3.685*** (1.115)	-3.636*** (1.043)	-4.118** (1.330)	-4.088** (1.272)	-4.827*** (1.327)	-4.030*** (1.175)	-3.929*** (1.032)
Civil nuclear cooperation	-0.211** (0.0676)	-0.213** (0.0653)	-0.178** (0.0680)	-0.179* (0.0697)	-0.221*** (0.0667)	-0.186*** (0.0486)	-0.192*** (0.0561)
GDP per capita (log)	0.360 (0.652)	0.283 (0.632)	1.682 (1.294)	1.678 (1.278)	1.026 (0.784)	0.872 (0.754)	0.844 (0.767)
NPT ratification	-3.796* (1.904)	-3.807* (1.841)	-2.692 (2.203)	-2.737 (2.326)	-3.196 (2.188)	-2.951 (1.935)	-2.982 (1.931)
US security alliance	1.106 (0.817)	1.327+ (0.742)	0.596 (1.192)	0.631 (1.209)	0.373 (0.832)		0.0133 (0.772)
Disputes	-0.0175 (0.222)	0.0611 (0.171)	0.0697 (0.179)	0.0855 (0.173)	-0.0887 (0.153)	-0.0319 (0.146)	-0.0436 (0.148)
Rivalry	0.908* (0.411)	0.912* (0.416)	0.654 (0.415)	0.665 (0.437)	1.214** (0.460)	0.914* (0.444)	0.888* (0.438)
Cold war					2.177* (1.023)		
Superpower alliances						-0.318 (0.759)	
Liberalization							-0.00733 (0.0173)
Proliferation years	0.642** (0.242)	0.686** (0.230)	0.496+ (0.287)	0.506+ (0.285)	0.831** (0.313)	0.631* (0.293)	0.633* (0.285)
Constant	15.27* (5.978)	15.66** (5.671)	3.189 (9.000)	3.096 (8.873)	12.05 (7.656)	10.99 (7.051)	10.81 (7.020)

	US aid (log)		Excluding nuclear weapons states		Cold War dummy		Superpower alliances		Liberalization	
	Model A3	Model A4	Model A5	Model A6	Model A7	Model A8	Model A9	Model A8	Model A9	Model A9
Nuclear latency										
US multilateral IO sanctions	3.615 ⁺ (1.849)	4.170* (2.012)	5.869** (1.994)	6.050* (2.368)	3.829 (2.470)	3.590* (1.569)	3.688* (1.595)			
US non-IO sanctions	-0.220 (1.171)	-0.227 (1.095)	-0.360 (1.179)	-0.359 (1.225)	-0.389 (0.967)	-1.453 (0.984)	-0.886 (1.156)			
US nuclear sanctions		-0.359 (1.865)		-1.106 (3.079)						
US aid	0.198*** (0.0538)	0.200*** (0.0526)	0.345*** (0.104)	0.324* (0.131)	0.539*** (0.114)	0.299*** (0.0683)	0.301*** (0.0670)			
Sensitive nuclear assistance	1.934 (1.282)	1.944 (1.284)	1.541 (1.156)	1.555 (1.161)	1.485 (1.256)	1.276 (1.150)	1.330 (1.131)			
Polity	0.0585 (0.0667)	0.0585 (0.0660)	0.107 (0.0906)	0.106 (0.0894)	0.0158 (0.0712)	0.0847 (0.0728)	0.0807 (0.0752)			
Trade openness (log)	-3.677** (1.243)	-3.652** (1.279)	-2.957+ (1.606)	-2.890+ (1.611)	-4.392*** (1.112)	-2.949+ (1.574)	-3.028* (1.426)			
Civil nuclear cooperation	-0.0941+ (0.0508)	-0.0937+ (0.0504)	-0.0562 (0.0508)	-0.0555 (0.0503)	-0.112* (0.0462)	-0.0528 (0.0477)	-0.0571 (0.0480)			
GDP per capita (log)	0.644 (0.817)	0.659 (0.739)	-1.131 (1.020)	-1.207 (1.023)	-1.021 (0.748)	-0.931 (0.724)	-0.991 (0.804)			
NPT ratification	2.115 (1.594)	2.124 (1.568)	2.393 (1.988)	2.422 (1.946)	2.272 (2.011)	2.317 (1.947)	2.296 (1.908)			
US security alliance	1.996** (0.744)	2.012** (0.743)	1.840* (0.809)	1.871* (0.811)	2.901*** (0.839)	1.762* (0.815)	1.762* (0.815)			
Disputes	0.0000918 (0.152)	0.0160 (0.135)	-0.0500 (0.156)	-0.00153 (0.132)	-0.195 (0.185)	-0.0541 (0.156)	-0.0319 (0.159)			
Rivalry	-0.268 (0.311)	-0.275 (0.339)	0.196 (0.420)	0.160 (0.468)	0.451 (0.340)	0.0743 (0.293)	0.0254 (0.330)			
Cold war					2.929** (0.996)					
Superpower alliances						1.562+ (0.864)				
Liberalization							0.00222 (0.0132)			
Proliferation years	-0.681 (0.512)	-0.701 (0.521)	-0.743 (0.655)	-0.732 (0.674)	-0.756 (0.650)	-0.846 (0.667)	-0.876 (0.680)			
Constant	4.234 (9.539)	3.943 (8.881)	18.80 (13.74)	19.16 (13.60)	22.51* (9.408)	17.35 (10.56)	18.17+ (10.92)			
Observations	528	528	428	428	528	528	528			
AIC	343.3	341.6	348.7	348.1	347.8	374.7	374.2			
BIC	415.9	414.1	405.6	405.0	420.4	447.3	446.8			
Log likelihood	-154.6	-153.8	-160.4	-160.1	-156.9	-170.4	-170.1			

Robust standard errors adjusted for clustering over country appear in parentheses.

All time-variant explanatory variables are lagged at t-1. All variables for temporal dependence are not reported.

+ $p < 0.10$, * $p < 0.05$, ** $p < .01$, *** $p < .001$

Chapter 3

Another Aid Curse?: U.S. Foreign Aid, Autocratic Institutions, and Political Violence against Americans, 1970-2007

Abstract. This paper examines the determinants of political violence against Americans abroad, situating such violence in the context of U.S. aid policies. Despite a growing number of studies on anti-Americanism (Chiozza 2010; Katzenstein and Keohane 2007), few studies pay attention, in a systematic or empirical way, to the violence dimension of anti-Americanism. The political violence literature has paid little attention to exploring the phenomena of political incidents against specific subjects, in particular U.S. citizens and properties. When it comes to anti-American violence, the literature offers an important rationale. Anti-government groups in a country tend to exercise violent behaviors against U.S. citizens and/or properties when the U.S. backs up for their repressive dictators by providing them with free resources including U.S. foreign assistance. I hypothesize here that a recipient's constituencies can consider U.S. aid as bad money because it can facilitate the lengthening of its autocrat's tenure and record of repression. The role of U.S. aid varies depending on a recipient's political institutions. Especially, when a recipient state is an autocratic regime but is bounded to nominal-democratic institutions, it has a lower likelihood of experiencing anti-U.S. violence.

3.1 Introduction

Since the end of World War II, the United States has become the object of both hatred and love. People living outside the U.S. have, in a variety of ways, expressed their discontent with the country and its foreign policies. Anti-American sentiments are seen in published criticism, non-violent demonstrations and deadly terrorist attacks. Protesters are often seen in front of U.S. embassies burning American flags. Others detonate explosives on U.S.-owned properties such as local branches of U.S. banks, multinational corporations, and even American churches. Such violent behaviors are often a reaction to the U.S.'s support of dictators. In the late 1960s, the United States did back the Greek military junta and in the 1950s began supporting the Franco regime of Spain. In Africa, the United States offered its backing for decades to Mobutu Sese Seko who coercively governed the Democratic Republic of Congo. In Latin America, the United States provided material and political support to the Pinochet regime of Chile after its coup in 1973. In Asia, U.S. government became an important sponsor of President Ferdinand Marcos of the Philippines (The Economist, Feb. 19, 2005). During the Cold War, many anti-American incidents took place in all of those countries.

Anti-American resentment and violence persists even today. During the recent “Arab Spring,” protesters in Cairo accused the United States of protecting the Mubarak regime for 30 years by assisting it with a large amounts of aid while relatively ignoring the political liberalization for Egyptian people (England 2011). In 2012, the U.S. Ambassador to Libya was killed in Benghazi due to terrorist attacks on the U.S. Special Mission Compound and Annex. With anti-Americanism's resurgence in many third world, scholars have revisited anti-Americanism research primarily focusing on public opinion/attitude (e.g., Blaydes and Linzer 2012; Bush and Jamal 2015; Chiozza

2010; Katzenstein and Keohane 2007) and terrorism (e.g., Krieger and Meierrieks 2015; Neumayer and Plümper 2011). Despite these academic efforts, few have systematically investigated anti-Americanism in the context of political violence looking into causal mechanisms through which U.S. foreign aid leads to political actions against Americans in a recipient state.

A growing number of studies have focused on the externalities of foreign aid in recipient countries. Proponents of foreign aid posit that aid flows are (conditionally and) positively associated with boosting economic activity and subsequently lead to economic growth (Bearce and Tirone 2010; Karras 2006; Minoiu and Reddy 2010). At the same time, recipient governments increase their investment in public goods and improve the welfare conditions of the general public (Alvi and Senbeta 2012). Pessimists of aid effectiveness point to the counterproductive impacts of aid on the political economy of authoritarian recipients. For example, foreign aid helps autocrats stay in office and lowers the risk of ouster by revolutionary threats (Ahmed 2012; Bueno de Mesquita and Smith 2009b; Licht 2010; Smith 2008) and decreases the likelihood of democratization or regime change (Kono and Montinola 2013; Kono, Montinola and Verbon 2015; Morrison 2012; Wright 2009).

This essay empirically investigates the effect of U.S. aid on the frequency of anti-American incidents by proposing a theory that accounts for how U.S. foreign aid leads political groups outside the winning coalition to resort to violent behaviors against Americans in dictatorships. The study focuses on the negative externalities of U.S. aid to domestic politics in autocracies. As U.S. foreign aid influences autocratic recipients' domestic policies and/or governance, it may also increase or decrease extreme opposition groups' incentives to behave aggressively toward Americans in their national territory. The study argues that U.S. foreign aid flowing to an authoritarian recipient gives rise to more political incidents against Americans than it does when flowing to a democracy. Vari-

ation in autocratic institutions has an intervening effect on the relationship between U.S. foreign assistance and anti-Americanism. To test this argument, the study employs a series of statistical estimations to deal with count data for 117 developing countries from 1970 to 2007. The results confirm the positive impact of U.S. aid on the frequency of anti-American incidents in autocracies compared to in democracies when the study uses U.S. aid as a share of gross domestic product (GDP) of a recipient country. the study also finds that when an autocratic recipient has politics institutions, the effect of U.S. aid on anti-American incidents in that country is significant. A substantive interpretation of the results indicates that autocracies having institutional constraints are predicted to experience fewer anti-American incidents than either democracies or autocracies without such constraints.

This research makes a significant contribution to both existing anti-Americanism and American foreign policy studies. Earlier studies have tended to focus on the attitudinal aspect of anti-Americanism. However, previous work pays less attention to the behavioral dimension of anti-Americanism across countries. The research also adds to the growing body of literature that looks at the adverse effects of U.S. foreign policy as represented by foreign aid in recipient countries. It offers theoretical and empirical findings that a dictatorship with a more inclusive institutional process is particularly prone to experience fewer anti-American incidents.

The next section reviews the literature regarding the concepts and the determinants of anti-Americanism. The study then offers a theory regarding the condition on which U.S. foreign aid increases the frequency of anti-American incidents in recipient states. To evaluate the hypotheses, the section on the research design consists of measurement and the methodological techniques. The study relies on a series of statistical models using zero-inflated negative binomial (ZINB) regression to account for both the overdispersion and excessive zero in the data. Results and

implications are discussed at the end.

3.2 Literature Review: Defining and Analyzing Anti-Americanism

Scholars have proposed the concepts about anti-Americanism focusing on two dimensions¹: (1) anti-Americanism is associated with attitudes/views toward the United States, U.S. society, culture, and foreign policies, and (2) anti-Americanism is about behaviors/actions toward Americans and U.S. foreign policies.

A growing number of studies emphasize the attitudinal approach of anti-Americanism. **Katzenstein and Keohane (2007, 12)** regarded “anti-Americanism as a psychological tendency to hold negative views of the United States and of American society in general.” Anti-Americanism may be viewed as an attitude. **Oh and Arrington (2007, 331)** posited that anti-American sentiment represented “the negative attitudes of foreigners toward the US, her policies, and/or the consequences of those policies” in evaluating anti-Americanism in South Korea.² **Naghmi (1982, 508)** defined anti-Americanism as “an unfavorable, or hostile attitude toward the American people, government, symbols, or policy” when looking to Pakistan’s public attitude toward the United States. **Friedman (2012, 5)** posited that “the term anti-Americanism is variously defined as an ideology, a cultural prejudice, a form of resistance, a threat, or as opposition to democracy, the rejection of modernity,

¹**Datta (2014)** summarized well the literature on defining anti-Americanism in three ways. According to his review, scholars described anti-Americanism in the sense of “actions or statements” against U.S. policy, society, and values, “a prejudice” against the United States, and “an attitude” on policies/values of Americans and the U.S. government (Datta 2014, 5). **Krastev (2004, 7)** posited that “[a]nti-Americanism is a systematic opposition to American as a whole” by accommodating the expression forms of both the attitudinal and behavioral perspectives—from “[t]errorist acts against American citizens, unfavorable verdicts in opinion polls, commercial boycotts, hostile campaign speeches and media coverage, and graffiti on city walls.”

²According to **Shin (1996, 789)**, anti-Americanism “encompasses a great variety of attitudes, beliefs, and circumstances: it may arise out of nationalism, anti-Western sentiment, anti-capitalism or anti-modernity, fear of nuclear war, in defense of traditional ways of life and culture, and out of resentment of political and economic dominance.”

or neurotic envy of American success.”

On the other hand, some studies pay more attention to the behavioral dimension of anti-Americanism. Scholars like [Tai, Peterson and Gurr \(1973\)](#) and [Rubinstein and Smith \(1988\)](#) described anti-Americanism in the sense of actions or statements against U.S. policy, society, and values. For example, [Rubinstein and Smith \(1988, 36\)](#) defined anti-Americanism as “any hostile action or expression that becomes part and parcel of an undifferentiated attack on the foreign policy, society, culture, and values of the United States.”

Studies on anti-Americanism propose various typologies of anti-Americanism regarding the causes of anti-American sentiment. Some factors are common across studies. Recently, international relations scholars revisited anti-Americanism not only focusing on a conceptual discussion but also empirically analyzing anti-Americanism (e.g., [Chiozza 2010](#); [Katzenstein and Keohane 2007](#)). In particular, [Katzenstein and Keohane \(2007, 35-41\)](#) broadly categorized anti-Americanism as following one of four approaches: liberal, social, sovereign-nationalist, and radical anti-Americanism. First, liberal anti-Americanism is common in advanced industrialized countries. This kind of identity tends to share a liberal ideology such as Western values. Second, social anti-Americanism is associated with democracies embedded in social welfare policies and the acceptance of various types of democracy. Third, sovereign-nationalist anti-Americanism is mainly related with nationalism, national sovereignty, and people’s perceptions of power relations in the world. For instance, with their nations penetrated by foreign economic and military presences, indigenous citizens are hostile to the United States out of their tendency to protect themselves and their identity ([Tai, Peterson and Gurr 1973, 458](#)). Lastly, radical anti-Americanism is strongly associated with violent actions against Americans.

Liberal anti-Americanism posits that people in advanced democracies share similar ideals and

political freedoms as do the United States citizens. Yet they criticize U.S. foreign policies and/or the hypocrisy of U.S. behaviors. Since the 9/11 terrorist attacks, the U.S. wars on terror has stirred up a considerable amount of anti-American sentiment around the world. This is partly because U.S. foreign policy has been perceived as being relatively unilateral. Unlike the widespread support for U.S. military campaigns against the Taliban in Afghanistan in 2001, American military intervention in Iraq in 2003 led to an outbreak of severe anti-Americanism in Europe. A large number of people in Europe stood against U.S. unilateralism. They expressed their sentiments against U.S. foreign policy through mass demonstrations (Fabbrini 2010). Some scholars have noted that U.S. post 9/11 foreign policy has given rise to a new wave of anti-Americanism, “provoking the widespread public expression of antipathy toward the United States” (Singh 2007, 26).

The second approach, social anti-Americanism, “derives from a set of political institutions that embed liberal values in a broader set of social and political arrangements that help define market processes and outcomes left more autonomous in the U.S.” (Katzenstein and Keohane 2007, 31). It is closely associated with the conflicts of social values that both Americans and people in other countries regard as salient. Such conflicts over social values include the negative perceptions of the market-driven American value system, the death penalty, social protection, and so on. In practice, social anti-Americanism is not stronger than other forms of anti-Americanism (Katzenstein and Keohane 2007).

The third, sovereign-nationalist anti-Americanism, can be found in most of the developing world. According to Katzenstein and Keohane (2007, 32), nationalists tend to emphasize “sovereignty” and collective “nationalism.” Nationalist identities tend to generate the potential for anti-American sentiments while sovereignty “becomes a shield against unwanted intrusions from America.” The concept of sovereignty is critical to nationalists in developing countries. Members of national-

ist groups may consider foreign interventions and penetrations as a threat to national sovereignty. Sovereignty and nationalism are linked with some factors that may create potential anti-American sentiments within a country: U.S. economic/military presence and U.S. foreign direct investment.

American economic and military presence faced strong resistance from a hosting country because nationalist-revolutionary groups often regarded the foreign direct investment (FDI) as a symbol of economic exploitation or the foreign military deployment as an infringement on their national sovereignty in the developing world (Rubinstein and Smith 1988; Tai, Peterson and Gurr 1973). Rubinstein and Smith (1988, 41) contended that revisionist or revolutionary groups tend to resist the spread of American capitalism since they identify it with “the perpetuation of traditional values and institutions” that they want to overthrow. In their study on terrorism, Krieger and Meierrieks (2015) evaluated the impact of capitalism on anti-American terrorism. They found that anti-market political groups intentionally attack the U.S. as a primary supporter of market-capitalism and globalization. Especially, during the transition from clientalism to market-capitalism, traditional power groups that have usually benefited from “the pre-market clientalist-traditionalist order” in the country may strategically target the United States “to effectively voice dissent and rollback pro-market developments” (Krieger and Meierrieks 2015, 59).

Nationalists regard foreign military deployment as an infringement on their sovereignty (Rubinstein and Smith 1988; Tai, Peterson and Gurr 1973). A foreign political/military presence in a nation may directly motivate nationalists to resist it. In particular, the asymmetry of a security alliance between the U.S. and less powerful countries can cause ambivalent responses from a hosting country. Its people welcome the military security while feeling discontented about the decrease of national autonomy.

Lastly, the fourth possible approach to anti-Americanism is radical anti-Americanism, which

renounces all U.S. economic policies and institutions in the world (Katzenstein and Keohane 2007). For revolutionary groups, their incumbent governments embrace U.S. institutional features and values that these groups strongly disapprove of. In extreme cases, this type of anti-Americanism can be fomented into revolutionary movements that attack both their own governments and Americans. This is similar to “revolutionary” anti-Americanism as defined by Rubinstein and Smith (1988). They argued that revolutionary/opposition groups seek to “overthrow regime closely identified with the United States,” and such an attempt also includes violent attacks against the U.S. government and Americans (Rubinstein and Smith 1988, 42).

Of these aforementioned types of anti-Americanism, the latter two are what most often produce anti-U.S. violence. The next section explores a theoretical argument about how U.S. foreign aid influences anti-American incidents.

3.3 Theoretical Argument: U.S. Aid and Anti-American Violence

In pursuing its national interests, every country employs several foreign policy instruments including military intervention or use of force, economic sanctions, foreign aid, and public diplomacy (Goldstein and Pevehouse 2014). The available range of those tools depends on a country’s available resources. The more resourceful a country is, the more extensive her policy instruments are. In this respect, the United States has been one of the most resourceful countries, as it has available to it many policy tools. Among such tools, foreign aid has been leveraged to maximize U.S. national interest. The United States has can operate as a donor government and buy from recipient countries policy concessions or cooperation; leaders of the recipient countries gain additional and unearned income that they can freely spend to promote economic development and improve public

goods and services.

Critics contend, however, that foreign aid is ineffective at economic development and/or the poverty reduction in a recipient country. Its ineffectiveness is due to its fungibility. In using foreign aid, leaders in a recipient country can freely convert it to their own use, for example, to maximize their leadership tenure. Thus, the theoretical arguments begin with the general assumption of the existing literature. What the leader of a country prioritizes is political survival (Bueno de Mesquita et al. 2003). Autocratic leaders in the developing world tend to utilize available resources and/or tools to stay in power.

In estimating anti-Americanism, this study proposes theoretical explanations for anti-American incidents. The study discusses why U.S. foreign aid can increase the frequency of anti-American events in the developing world. It then accounts for the intervening effect of political institutions on the relationship between U.S. aid and anti-American incidents. Existing studies on aid-survival relationships suggest that the negative externality of foreign aid might be of increasing the dissident's opportunities to express their discontent to both the home government and the donor country (esp. the United States) (Ahmed 2012; Kono and Montinola 2009; Licht 2010; Bueno de Mesquita and Smith 2007, 2009b; Smith 2008).

Why and how does U.S. aid raise the number of anti-U.S. violence in recipient countries. This section identifies two theoretical explanations-the “accountability” hypothesis³ and “aid-fungibility” hypothesis. The accountability hypothesis assumes that unlike a democracy, an autocratic aid-recipient state becomes accountable to ruling coalition groups, a small segment of the

³According to literature on comparative political system, democratic institutions make political leaders accountable for their policy performances to a broad range of domestic constituencies. In similar vein, authoritarian leaders should also be accountable to their selectorate groups. Those groups comprise insiders who have the ability to depose an incumbent dictator (Bueno de Mesquita et al. 2003; Li and Gilli 2014).

entire population, while relatively ignoring the general public when its resource is more dependent upon foreign aid. The aid fungibility hypothesis, on the other hand, posits that since political leaders may divert foreign aid to resources so as to maximize their political survival (e.g., through co-optation and repression), opposition groups outside the winning coalition have an incentive to express, through violent actions, their discontent with the U.S.

The first causal link is that U.S. foreign aid may generate a negative externality through so-called aid-for-policy deals. Such deals create some policy conditionality in that recipient leaders make policy concessions; they exchange their policies for donors' aid (Bueno de Mesquita and Smith 2009b; Morrison 2012). The policy concessions may suit the donor's policy preferences but are often at odds with the preferences of domestic political groups outside the ruling coalition. Thus, policy concessions, since they make their incumbent leaders much less accountable to other segments of social groups in the country, may increase the political opportunity of such groups to express their discontent with their government as well as with the United States. In particular, policy concessions to donors may lead to domestic opposition/discontents from their constituencies, particularly nationalists and revolutionaries. Those nationalists and/or revolutionary groups consider the aid-for-policy deals as a loss of sovereignty/autonomy; they condemn the United States as the enemy of the national autonomy and pride. Political leaders in the developing world have taken an anti-communist stance in deference to U.S. foreign policy interests and in return have received U.S. economic and military assistance. As a way of preventing the spread of communism, the United States has given economic aid to authoritarian countries that border communist countries, such as Pakistan and Honduras (Meernik and Poe 1998). According to French (1997), Zaire was strongly supported by the United States during the Cold War because of its anti-communist frontline in the Central African region. (Askin and Collins 1993) described U.S. support for the

Mobutu regime as follows: “In 1983, after Zaire sent troops to defend U.S.-backed Chadian President Hissen Habre, President Reagan praised Mobutu’s courageous action” and rewarded him with a request to Congress for the doubling of U.S. foreign aid” (79).

These kinds of deals provide a recipient state with foreign aid as unearned revenues and this makes them less to domestic groups outside the ruling coalition (Knack 2004; Smith 2008). As their dependence on foreign aid increases, autocratic leaders rely much less on domestic ordinary citizens and thus have little incentive to expand public goods and/or invest in good governance for the general public than do their democratic counterparts (Bueno de Mesquita and Smith 2007). Instead, autocratic leaders tend to spend aid money on their winning coalition by increasing private goods. Autocratic countries use foreign aid for economic development and social welfare to a much lesser degree than do democratic countries. Aid in fact tends to increase inequality as it may be spent on projects that have no productive value or are for the public goods and services. For the general public in a recipient country (esp. an autocratic country), foreign economic assistance seems to improve their social welfare very little and to increase the inequality between the ruling elites and ordinary people outside the ruling coalition. Like oil wealth, foreign aid may lead to another source of rent-seeking among ruling elites. Political corruption resulting from ruling coalition’s rent-seeking behaviors may increase the level of grievances among political groups outside the ruling coalition. In their use of foreign aid, authoritarian leaders tend to implement patronage politics rather than carry out productive policies. Unless the institutional process take into account their demands or grievances, political actors left out from this rent-seeking have an incentive to resort to political violence. In this context, political groups outside the ruling groups may either rely on direct violence to the incumbent government or strategically take out their grievances on a third-party target-especially, the aid-donor country (e.g., the United States) that

the incumbent government cares strongly about. According to some studies, a large number of Muslim publics supported, with such political reasons, for political violence against Americans (Berger 2014; Tessler and Robbins 2007). Islamist radicals and extreme groups opposing their governments often committed violent attack on Americans, taking advantage of those support from the publics.

Secondly, the aid fungibility argument holds that foreign aid has a detrimental impact on the socio-political conditions of recipient countries, as it augments the autocratic surviving capacity. Autocratic rulers try to stay in power as long as possible using co-optation and repression in general. Foreign aid seems like bad money because it might help dictators survive longer and effectively prevent revolutionary threats and opposition movements. As free resources, incumbent autocrats discretionally allocate dollars from U.S. foreign aid through private goods so as to survive politically. Dictators invest free money to repress revolutionary movements, for instance increasing defense spending and strengthening security forces. Democratic recipients tend to redistribute it to the general public as public goods (Bueno de Mesquita and Smith 2010). Bader and Faust (2014, 576) mentioned that “autocratic recipient governments use foreign aid at least partly for their survival, be it by redistributing additional rents to strategic groups or by financing repression.”

To maintain a regime, dictators must handle only a small winning coalition, which permits them to relatively ignore the general public and its welfare. To keep their power, they merely distribute private goods and great privilege to the ruling elites. Autocrats employ a repressive strategy of suppressing political dissidents and deterring revolutionary threats. Aid inflows from foreign donors tend to increase the resources available to repress dissidents.

The fungibility of foreign aid posits that aid may often be converted as military expenditures,

which can contribute to the development of its military capability to defend the country from foreign invasions or to deter/repress dissident movement in autocracies. Kono and Montinola (2013), in their study on the relationship between aid and domestic unrest, argued that foreign aid expands dictators' repressive capacity to deter dissidents, to fund repressions. In particular, they found that foreign aid helped autocrats reduce domestic unrest by using the repressive strategy and by increasing military spending to deter opposition movements. In response, opposition/revolutionary leaders in autocratic regimes have a strong incentive to manipulate and utilize anti-American sentiments in order to boost mass support and to compensate for their vulnerability to incumbent dictators. In this context, Americans and U.S. properties abroad can be very useful targets of scapegoating for threatened political groups. For opposition groups, the United States is the primary donor country to support authoritarian leaders but is also one of the most visible and powerful countries (Neumayer and Plümper 2011; Tai, Peterson and Gurr 1973). At the same time, the United States has, since the end of World War II, established and maintained a U.S.-led international system along with its Western allies. Revolutionary groups strategically blame the U.S. for all of their internal political struggles between themselves and incumbent governments. So, they may attain the internal cohesion and anticipate political support from the ordinary public by attacking the U.S., especially the U.S. embassies and the properties of U.S.-owned multinational corporations. In this respect, revolutionary-opposition groups take advantage of anti-Americanism as an instrumental purpose (Rubinstein and Smith 1988). Blaydes and Linzer (2012) and Rubin (2002) seek to find the source of Islamic anti-Americanism and maintain that elites and radical Islamists tend to receive great political benefits for popular anti-American appeals. In particular, "political elites need to persuade mass public to feel it possible to spit on the United States" (Rubin 2002, 83). According to the discussion of Ratner (2009), political challengers often implement

anti-Americanism to weaken and also delegitimize incumbent dictators.

Lai and Morey (2006, 388-389) also explained how U.S. aid for anti-communist power was transferred to boost autocrats' repression capacity during the Cold War. They discussed the Iranian case where the United States "provided aid and training for the national police and intelligence services of the Shah (in Iran), which shared responsibility for internal security. The United States security assistance programs greatly improved the effectiveness of Iran's security forces and therefore substantially increased the Iranian state's ability to use repression." Kono and Montinola (2013) also argued that authoritarian rulers primarily rely on the military or coercive forces in suppressing public discontent. To pay for this costly coercive capability, autocrats sometimes rely on foreign aid. For instance, "with no strong state or party as his beck and call, Marcos (of Philippines) had little choice but to rely on the military" (Slater 2010, 177). As an important U.S. ally during the Cold War, the Philippines has, since 1970, received about 80% of its military aid from the United States government (Lee 2008). This misuse of foreign aid might help autocrats stay in power and even develop their repressive capacity to deter revolutionary threats. This will generate greater sources of anti-American sentiments to dissidents and/or discontented groups and further strengthen the incentive to resort sometimes to violent behaviors against Americans. This suggests the following hypothesis:

Hypothesis 3.1 *As U.S. aid increases, autocratic regimes experience more anti-American incidents than democracies.*

The Role of Psuedo-Democratic Institutions: Two Competing Explanations

Do anti-American incidents vary across autocratic countries? The existing literature on authoritarianism point out that dictators in maximizing their political survival use their main instruments such as “co-optation” and “repression” (Frantz and Kendall-Taylor 2014; Gandhi and Przeworski 2007; Magaloni 2008). The political survival of autocrats is primarily based on the support of their winning coalition. The maximization of regime survival may rely on autocrats’ governance and/or policies regarding both public and private goods. Recent scholarship demonstrates that authoritarian countries exhibit a considerable variation in their governance patterns. What makes autocrats’ governance so varied are “nominal-democratic institutions” (e.g., political party and/or legislature). Autocratic institutions play the role of deterring potential revolutionary threats from both inside and outside the winning coalition. Through a co-optation strategy, autocrats respond to the demands of ruling elites by distributing to them private goods and material benefits. In other words, autocratic countries with institutions tend to be more accountable to the winning coalition groups than do other dictatorships with no institutions and/or a relatively small winning coalition. This variation in accountability implies that autocratic rulers have different incentives in distributing unearned foreign incomes (i.e., foreign aid and oil rent). Foreign aid inflows can be an enormous source of both economic and political benefits to members of the winning coalition and/or sometimes even to the broader segment of population in a country. Aid inflows in institutionalized autocracies create positive externalities to public goods such as trade openness, foreign direct investment and economic development. Compared to other types of autocracies, dictatorships with pseudo-democratic institutions are likely to spend non-tax revenues from foreign aid inflows to deliver the better governance. In particular, more institutionalized autocracies utilize foreign aid not only to benefit their patronage but also to buy off potential political challengers outside the

winning coalition. Hence, the relatively better governance in institutionalized dictatorships may reduce the potential challengers' incentive to resort to anti-American behaviors.

Autocratic leaders with pseudo-democratic institutions tend to pursue more extensive and inclusive policies to co-opt ruling elites and a broader swath of society; domestic constituencies have little incentive to divert their discontent with their governments that are economically and militarily supported by the United States. In contrast, autocrats without those kinds of institutions tend to rely more on co-optation of ruling coalition groups and more repression of potential challengers and dissent groups. [Gandhi and Przeworski \(2007\)](#) argued that “seemingly democratic institutions” such as legislature play an instrumental role in making more extensive policy concessions by inducing cooperation from a larger segment of population in a society. Specifically, institutionalized autocracies tend to focus more on public goods such as trade openness ([Hankla and Kuthy 2013](#)), investment ([Gehlbach and Keefer 2011, 2012](#)), and economic growth ([Gandhi 2008](#); [Wright 2008](#)). [Hankla and Kuthy \(2013\)](#) found that autocrats with more institutional constraints tend to rely on an open economy, which may lead to economic development because of their longer time horizons and relative regime stability. In addition, [Wright \(2008\)](#) maintains that dictators with more binding institutions experience higher economic growth rates and domestic investment. He also investigates the impact of foreign aid on economic growth in recipient countries. [Wright \(2008\)](#) found that dictators with longer time horizons have an incentive to invest foreign aid in public goods, which is strongly associated with good economic performance. [Kim and Gandhi \(2010\)](#) demonstrated that autocratic regimes retaining various institutions face lower levels of labor protests than military dictatorship because of the trade-off between material benefits and workers' cooperation with the regime. [Wright \(2008\)](#) argued that foreign aid tended to promote economic growth in dictatorships with long time horizons, which led to stable authoritarian regimes.

Again, autocrats buy off opposition groups to prevent or deter potential challenges or revolutionary threats. Autocratic regimes with pseudo democratic institutions can effectively co-opt potential challengers through this institutional channel. At the same time, institutional autocracies tend to extract public support by investing more in public goods such as investment, trade, and social spending. Those kinds of relatively inclusive policies may improve regime legitimacy and instead, weaken the political power of some opposition groups and/or revolutionaries that are excluded from the power-sharing political process.

As free resources such as foreign aid increase, institutional autocracies are more likely to use them for the long-term economic performance and expansion of public goods because of their tenures' long time horizons. Consequently, institutional dictators can even gather strong support from domestic constituencies. As revolutionaries or dissidents lose their political legitimacy to oppose the autocratic incumbents, they tend to boost nationalist sentiments by targeting foreigners or foreign countries. When autocrats are more dependent on foreign aid, the revolutionaries target donor countries. Or they target foreigners or Americans.

Some studies have posited that foreign aid helps incumbents win the elections, even in autocracies. [Gandhi and Lust-Okar \(2009\)](#) discussed autocrats' manipulation of elections to ensure their political survival. They emphasized the cooptation of opposition groups in autocratic countries. For example, autocrats take advantage of elections by "provid(ing) mixed incentives to opposition parties, who may oppose the current dictatorship but also want to benefit from the spoils of government" ([Gandhi and Lust-Okar 2009](#), 405). Hence, dictators who even allow the elections and multiple parties take advantage of foreign aid to win elections, compared to opposition parties or groups. Incumbent autocrats possess enormous resources in part from aid flows in the elections. For instance, [Jablonski \(2014\)](#) examined the relationship between foreign aid and electoral out-

comes by exploring how the incumbent diverted foreign aid to draw political support from voters in the elections. This may make some segment of opposition groups weak in terms of political power. Even when incumbent dictators allow some opposition groups to join the existing political process but exclude others, the excluded groups of the opposition can become radicalized.

Within a political system, according to Lust-Okar (2004), there are two types of groups-the loyalists and the illegal opposition. The opposition can be divided into moderate and radical groups. Moderate groups can be coopted by incumbent dictators through quasi-democratic institutions. Incumbent dictators may allow moderates to participate in political institutions and also distribute economic benefits and political privilege to them. As foreign aid inflows increase, autocratic incumbents can strategically use this unearned income to buy off the opposition moderates in part through power-sharing arrangements. However, dictators still exclude other segments of the opposition, such as radical or extremist groups, from the winning coalition. The selective co-optation and repression strategy in institutional autocracies make the radicals or dissidents within opposition groups lose their public support and become weak. The power-sharing argument posits that power sharing between incumbent autocrats and their supporting elites through institutions tends to deter potential rebellion. After all, institutions reduce autocrats' commitment problems in terms of their power-sharing promises to them. This power sharing even expands the size of the winning coalition through coopting opposition groups (Boix and Svolik 2013; Svolik 2009).

This kind of institutional autocrats' governance may make a certain opposition groups radicalized. In other words, radicalized groups within the opposition cannot help, given their weakened power, but resort to political violence to express their grievances or discontents. In particular, when U.S. foreign aid inflows increase and help autocrats effectively co-opt moderates within opposition groups, radical groups are excluded and have a weak political stance. Thus, they are more likely to

rely on violent behaviors against foreigners or a foreign country in part to boost nationalism and a rally-round-the-flag. From the above two competing arguments, I draw the following hypotheses:

Hypothesis 3.2 *As U.S. foreign aid increases, autocratic countries with pseudo-democratic institutions experience fewer anti-American incidents than those with no such institutions or democracies.*

Hypothesis 3.3 *As U.S. foreign aid increases, autocratic regimes with nominal democratic institutions experience more anti-American incidents than do other political systems.*

3.4 Research Design and Data

This section examines the systematic impact of U.S. aid on anti-American incidents. The dependent variable is the count of anti-American incidents, which capture both violent and non-violent behaviors against Americans. They include protests, demonstrations, terrorist activities and/or violence such as bombing, physical attacking, and kidnapping. The data for analysis are based on a composite indicator using multiple sources rather than one separate source.⁴ Anti-American incidents data come from three sources including the Global Terrorism Database (GTD) of the Center for the Study of Terrorism and Responses to Terrorism, the RAND Database of

⁴Existing data on terrorism do not include some incidents of anti-American incidents because those incidents are not considered as terrorist attacks. For instance, an incident that occurred in El Salvador in 1987 was not included in the terrorism datasets such as Global Terrorism Database (GTD) or the RAND Database of Worldwide Terrorism Incidents (RDWTI). The annual report of anti-American political violence released by U.S. Department of State describes some anti-American incidents that are not recorded in other terrorism datasets. For instance, there was an incident against American government property in El Salvador in 1987. It is not reported in either GTD or RDWTI dataset. The 1987 report of Political Violence Against Americans describes that “[A]pproximately 250 leftist students marched to the American Embassy where they staged a protest against U.S. support of the Duarte government” (Significant Incidents of Political Violence Against Americans: 1987, April 1998).

Worldwide Terrorism Incidents (RDWTI) of the RAND Corporation and the reports of Political Violence against Americans released by the U.S. Department of State.⁵ For the validation of measurement, the study adopts following strategies that cover 117 developing countries from 1970 to 2007, broken down into country-year observations. First, the study takes into account only incidents that target Americans and/or U.S. owned properties on purpose. On April 22, 1999, for instance, guerrillas with the Colombian National Liberation Army (ELN) hijacked an airplane that carried 46 passengers including some U.S. citizens. I exclude cases in which international terrorist groups that were not bound in the country. I also exclude the cases in which international terrorist groups involve with the multiple bases of their operations. For example, many religion-based terrorists such as al-Qaeda in the Middle East have operated within a large number of countries from the Middle East, Asia, Africa, and even Europe. Certainly, incidents against Americans carried out by those kinds of terrorists should not be considered as anti-American violence due to their relative lack of domestic political consideration in a given country's territory. Regarding coding strategies, I do not include the cases in which an attacker group's nationality and/or origins is different from that of an incident's location and then reconfirm it after checking the description of the incident in the GTD database, in particular. RDWTI dataset and PVAA reports tend to describe the incidents' information in detail and thus I can figure out the incidents' full stories. Third, I check the overlapped incidents cross datasets by taking into account incidents' time, location, targets, attackers, and incidents' contents. For example, when a similar incident occurs at same location with the same target and the same content but different reported date, I consider is as the same incident.

⁵The report of Political Violence Against Americans - formerly Significant Incidents of Political Violence Against Americans and formerly Lethal Attacks Against Americans Abroad 1968-1997-is created by the Bureau of Diplomatic Security's Office of Intelligence and Threat analysis (DS/DSS/ITA) with "a comprehensive picture of the broad spectrum of political violence that American citizens and interests have encountered abroad on an annual basis." The series have been released for the years 1968-2013 while not produced for the years 2003-2007.

Different reported data should be within less than a 2-day range. Practically, most of the incidents across datasets share the same dates but are at least within a 1 or 2-day time range.

3.4.1 Independent Variables

The purpose of this analysis is to evaluate the impacts of the U.S. foreign aid on anti-American incidents in the developing world. The independent variable is U.S. foreign aid representing U.S. aid (% GDP). *U.S. aid/GDP (%)* is a country's annual inflows of U.S. economic assistance as a percentage of gross domestic product (GDP). The data for U.S. aid are collected by the AidData (Tierney et al. 2011). The study expresses U.S. aid as a percentage of GDP because it not only is commonly used in aid studies but it also does capture a recipient country's aid dependence (Kono and Montinola 2009; Licht 2010).

In measuring the institutionalization of political regimes, the study makes use of the regime indicator taken from Cheibub, Gandhi and Vreeland (2010)'s the Democracy and Dictatorship (DD) dataset. The variable Institutions is measured as a trichotomous indicator, which is coded 0 if a non-democratic regime does not have pseudo-institutions, 1 if a non-democratic regime allows for nominal-democratic institutions such as legislatures and at least one political party, and 2 as democracy (Kim and Gandhi 2010).

3.4.2 Control Variables

Previous literature has discussed potential determinants of violence against Americans. First, economic sanctions may influence the frequency of anti-American political violence. Economic sanctions is positively associated with the political violence against Americans because they tend to

negatively affect the socio-economic and political conditions of ordinary people in a target nation. For the variable of U.S. economic sanctions (*US sanction*), the study treats it as a dichotomy based on the fact that a state is either subject to sanctions in a given country-year or not. The indicator is coded as 1 for every year that the sanctions were in place and 0 otherwise. But, the variable is also one-year lagged because it can be assumed that the last-year sanctions have realistic impacts on the target in current year. The study uses the dataset of economic sanctions compiled by [Hufbauer, Schott, Elliott and Oegg \(2007\)](#). Secondly, to measure *Regime duration*, the study uses “agereg” in the CGV dataset that measures the total number of years that the current regime type has existed in the country.

Another control is alliance between U.S. and weaker counterparts. The alliance should also be a potential indicator to increase the motivations and incentives of a ally’s people to express anti-American sentiment primarily based on the nationalist assumption ([Tai, Peterson and Gurr 1973](#)). An asymmetric alliance (*US defense alliance*) can lead to anti-American violence as it involves a more powerful country and a less powerful one. One important distinction about an asymmetric alliance is that powerful nations are strong enough to provide weaker counterparts with security guarantees. The study codes a country as 1 if it is in an alliance with the U.S. and 0 otherwise. None of the authoritarian countries are signatories of a symmetrical alliance with the U.S.⁶ The alliance data come from Alliance Treaty Obligations and Provisions (ATOP) created by [Leeds, Ritter, Mitchell and Long \(2002\)](#).

Besides these, the study also includes a set of control variables widely used in explaining political actions such as domestic protests or unrest and terrorism. First, the study uses *GDP per*

⁶My consideration of major powers is primarily based on the criteria of the Correlates of War (COW) designate it as a major power. It includes U.S. United Kingdom, France, Germany, Russia, China, and Japan.

capita (log) to account for the impact of economic development on anti-American terrorism. The data of GDP per capita are taken from the World Bank's World Development Indicators (WDI). In addition, population that also comes from WDI, is logged. *Political violence* is measured as the "total summed magnitudes of all societal" conflicts including civil violence, civil war, ethnic violence, and ethnic war. The data come from 'Major episodes of political violence and conflict regions, 1946-2012' (the Center for Systemic Peace). To control the effects of regional variation and the change of international structure, the study uses region-fixed dummies from the World Bank and a dummy of Cold War.⁷

The study also includes two different sources of foreign aid that may influence the occurrence of anti-American incidents. When a country receives more foreign aid from other countries or international institutions than from the United States, it may not experience anti-U.S. sentiment. To test the impacts of other aid sources on anti-American violence, the study include non-U.S. aid amount divided by the GDP of the recipient country (*Non-US aid/GDP (%)*). Non-US aid measure is also taken from AidData (Tierney et al. 2011). Another source of foreign aid is multilateral aid (*Multilateral aid/GDP (%)*). This is the total official gross disbursements from multilateral aid agencies controlled by Development Assistance Committee (DAC) in OECD (Kersting and Kilby 2014).

⁷I include region-fixed effects in order to control unobserved heterogeneity. In general, a number of time series-cross national analyses employ country-fixed effects to control potential heterogeneity across countries. However, despite my attempt to use country-fixed effects, the convergence problem in (zero-inflated) negative binomial models fails to produce results. Instead, I use group-fixed estimators within models as "intermediate to pooled and fixed effects estimators" (Bester and Hansen 2016). In addition, I include the alternative measure of civilization that consists of ten categories: African, Buddhist, Hindu, Islamic, Japanese, Latin American, Orthodox, Sinic, Western, and Others (Henderson and Tucker 2001)

3.5 Methods and Result

The study examines whether U.S. foreign aid determines the frequency of anti-American political incidents using a series of count-data estimation. Its dependent variable is a nonnegative integer-counts of anti-American incidents. Ordinary Least Squares (OLS) is appropriate if the dependent variable is independently and identically distributed. However, the use of OLS for count outcomes can result in inefficient, inconsistent and biased estimates if one or more OLS assumptions go unmet. Thus, statistical techniques other than OLS regression have been used to deal with the count data. This study considers two possible regressions-the Poisson regression and the negative binomial regression models. First of all, the Poisson model assumes that the variance of Y is equal to the means. But, in the study's incident data there is high probability that the count variable has a variance greater than the mean, which is called over-dispersion. In this case, the Poisson model is not appropriate so it is necessary to employ the negative binomial regression model.

To begin with, the study checks whether or not the data has a Poisson distribution. If the mean of the dependent variable (i.e., political incidents against Americans) is surely less than the variance, then the candidate model will be a negative binomial model. The descriptive statistics shows that the variance(5.943) is higher than the mean (0.494). For the next step, I run the negative binomial regression model and then compare it with the Poisson model using the Vuong test for the model selection. The test rejects the null hypothesis that two models are not different. Thus, the negative binomial regression model-an alternative to the Poisson model- is preferred. However, the study also considers the zero-inflated negative binomial regression to deal with the excessive zeros because the large portion of the dependent variable is zero counts (e.g., > 80 percent). For the model selection, an additional Vuong tests is performed along with AIC/BIC post-estimation

statistics to check the comparative appropriateness of the two models. The test statistics show both Vuong ($z=7.07^{***}$) and AIC/BIC tests prefer the zero-inflated model to the standard negative binomial model with the statistical significance. In addition, the hurdle model can be another estimation to deal with many zeros. In the zero-inflated model, the zero values include two different sources. The first source consists of countries that always have zero counts of anti-U.S. violence (Long 1997; Zorn 1998). For instance, some countries had undergone anti-American violence but not in a given year. Other countries were entirely free of anti-U.S. incidents. That is, their experiencing anti-American violence was assumed to be on a negative binomial distribution that includes both zero and non-zero counts. However, the hurdle model assumes that the zero observations can come from only countries that always have non-zero counts. The Vuong tests consistently prefer the zero-inflated negative binomial model to the hurdle model ($z=1.607^*$) (See Table 3.4 in the Appendix II).

The lagged values for all independent and control variables were used for two reasons. On one hand, regressors are going to take some time to influence anti-American incidents. Many studies on domestic violent behaviors (e.g., protests, demonstration, unrest, and terrorism) tend to use lagged regressors for that reason (Murdie and Bhasin 2011; Pierskalla and Hollenbach 2013). Secondly, to lag all explanatory variables help avoid potential endogeneity problem and reverse causality (Garriga and Phillips 2014; Krieger and Meierrieks 2015).

Table 3.1 presents the main results of zero-inflated negative binomial (ZINB) models with standard errors clustered on country. First, the study introduces the base-line analysis. Model 1 represents the comparison between a democracy and an autocracy regarding the outcome of anti-American violence. In the count equation, the predictor *US aid/GDP (%)* has a coefficient of 0.251 with a statistical significance at 99.9% confidence level. This indicates that for one-unit increase

Table 3.1: ZINB Regression of Anti-US Political Violence, 1970-2007: Full Sample

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	democracy vs. autocracy		democracy/institutional vs. non-institutional autocracy			
	Interaction		Additive		Interaction	
	Count	Binary (zero)	Count	Binary (zero)	Count	Binary (zero)
US aid/GDP (%)	0.251*** (0.077)	0.245 (0.154)	0.028 (0.041)	-0.159 (0.168)	0.005 (0.072)	-0.424 (0.393)
Democracy	0.354* (0.211)	0.795* (0.462)	-0.176 (0.229)	-1.057 (0.683)	-0.157 (0.254)	-0.152 (0.771)
Institutional autocracy			-0.518*** (0.182)	-2.045** (0.840)	-0.717*** (0.228)	-1.364 (1.025)
Democracy x US aid/GDP (%)	-0.244*** (0.090)	-0.401** (0.163)			-0.157 (0.072)	-0.152 (0.388)
Institutional autocracy x US aid/GDP (%)					0.422*** (0.155)	1.136* (0.595)
Regime duration	0.006 (0.007)	0.014 (0.018)	0.011** (0.006)	0.046** (0.019)	0.011* (0.006)	0.029 (0.021)
Openness with US (log)	0.167 (0.111)	0.221 (0.337)	0.213*** (0.080)	0.314 (0.244)	0.214** (0.096)	0.381 (0.260)
US defense alliance	1.722*** (0.241)	2.316* (1.296)	1.692*** (0.283)	2.849** (1.186)	1.809*** (0.281)	2.484* (1.287)
US sanctions	0.260 (0.174)	-0.337 (0.571)	0.157 (0.171)	-0.875 (0.706)	0.208 (0.182)	-0.346 (0.600)
Political violence	0.042 (0.040)	-0.992 (0.791)	0.050 (0.037)	-2.496 (2.423)	0.059 (0.043)	-0.536* (0.322)
GDP per capita (log)	-0.013 (0.169)	-0.510 (0.380)	-0.165 (0.134)	-0.849** (0.391)	-0.084 (0.177)	-0.591 (0.379)
Population (log)	0.014 (0.106)	-0.953*** (0.277)	-0.010 (0.087)	-1.386*** (0.333)	-0.027 (0.101)	-1.143*** (0.295)
Cold war	0.239 (0.151)	-0.564 (0.417)	0.277** (0.136)	-1.027** (0.476)	0.282* (0.151)	-0.435 (0.353)
Latin American & Caribbean	0.501 (0.460)	-1.507 (1.578)	0.509 (0.440)	-1.654 (1.768)	0.162 (0.478)	-2.361 (1.760)
Sub-Saharan Africa	0.920** (0.389)	2.360* (1.254)	0.655* (0.368)	2.750 (1.699)	0.757* (0.429)	2.004** (0.920)
Middle East & North Africa	0.750 (0.591)	-0.033 (1.819)	0.415 (0.487)	-15.996*** (2.290)	0.157 (0.576)	-2.362 (2.679)
Asia	0.403 (0.520)	0.456 (1.723)	0.256 (0.432)	1.146 (1.928)	0.060 (0.540)	-0.443 (1.682)
Past anti-US violence	0.123*** (0.026)	-2.358*** (0.539)	0.128*** (0.025)	-2.008*** (0.506)	0.117*** (0.026)	-2.154*** (0.457)
Constant	-3.770** (1.596)	10.419*** (3.722)	-2.321* (1.368)	17.243*** (4.881)	-2.507 (1.627)	12.816*** (3.958)
Observations	3,282		3,282		3,282	
Alpha	1.507 (0.200)		1.307 (0.149)		1.593 (0.198)	
Inalpha	0.410*** (0.132)		0.495*** (0.121)		0.369*** (0.133)	
AIC	3722.135		3291.502		3717.696	
BIC	3935.503		3437.383		3955.448	

Robust standard errors in parentheses. Reference region is West.

*** p<0.01, ** p<0.05, * p<0.1

in U.S. aid/GDP, the expected log count of the number of anti-U.S. incidents increased by 0.251, given the other variables are held constant. In other words, for every additional percentage in U.S. aid/GDP, an anti-American incident's mean increases approximately by 28.6 %, holding all other predictors constant. Democracy variable shows that a democracy experiences more anti-U.S. violence than an autocracy and is statistically significant. But, the coefficients on the constituent variables of interaction terms should be conditionally interpreted in the context of interactions. Regarding the interaction effect of U.S. aid/GDP and democracy variable, Figure 3.1 shows that as U.S. aid increases, an autocracy is more likely than a democracy to experience “No” anti-American violence in the zero-inflation equation. In other words, an autocracy has a lower likelihood of experiencing anti-American incidents than a democracy when it receives U.S. foreign aid. But, of countries experiencing anti-U.S. incidents, an autocracy is expected to have a higher number of anti-American incidents than a democracy as it is more dependent on U.S. aid (Figure 3.2).

Model 2 in Table 3.1 introduces the diverse effects of U.S. aid/GDP on anti-U.S. violence in different political systems-democracy, institutionalized autocracy, and non-institutionalized autocracy. First, in the count equation, regarding the effect of U.S. aid/GDP, for a standard deviation increase in the percentage of U.S. aid/GDP, the expected count of anti-U.S. violence increases by 4.8 %, holding all other variables constant. The coefficient, however, is not statistically significant. In regard to the effects of different political systems, being an institutional autocracy (compared to a non-institutional autocracy) multiplies the expected count of anti-U.S. violence by 0.518, holding other explanatory variables constant. In other words, an institutionalized autocracy decreases the number of anti-American incidents by 48.4 % compared to a non-institutionalized autocracy.

Model 3 shows the interaction effect of U.S. aid and a recipient country's political system. The coefficients on the interaction terms between U.S. aid/GDP and a recipient's political system are

positive and statistically significant at the level of 0.01 in the count model and 0.1 in the inflate model, respectively. First, in the count equation, the positive coefficient indicates that when a recipient country is an autocracy under nominal democratic institutions (institutionalized autocracy=1), an increase in the percentage of U.S. aid/GDP leads to an increase in the expected count of anti-American violence. However, the substantive interpretation of the interaction terms ⁸ is complicated. Hence, the study shows the marginal effects of US aid/GDP on the expected values of anti-U.S. incidents conditioned by a recipient's political institutions. Figure 3.2. displays the difference in the predicted values of anti-U.S. violence against three different types of political institutions. When the percentage of U.S. aid/GDP is zero, the expected value of anti-U.S. violence in institutional autocracies is a little higher than both democracy and non-institutional autocracy. However, as the U.S. aid/GDP percent increases, the expected count of anti-American violence increases until U.S. aid/GDP is around 2 %. Once past this point, the predicted count of anti-American incidents decreases. The expected value reaches almost zero as U.S. aid/GDP becomes around 15 %. For non-institutionalized autocracies, the expected value of anti-U.S. incidents increases as the percentage of U.S. aid/GDP grows.

Models 4-6 in the Table 3.2 show the results using the reduced sample in which the study conducted several outlier tests such as Bonferroni-adjusted outlier tests. Based on those tests, Columbia, Argentina, Chile, South Korea and Philippines were excluded from the analysis. The main findings of Table 3.2 are similar to those of Table 3.1 with regard to the interacted effect of U.S. aid/GDP and political systems.

⁸Brambor and Golder (2006) emphasize that analysts need to focus on the marginal effect of an independent variable conditioned by another independent variable when using the interaction term. According to Berry and Esarey (2010), analysts do not necessary get the significant interaction in influencing the dependent variable (e.g., a binary logit model).

Figure 3.1: Plot for ZINB regression: Inflation model

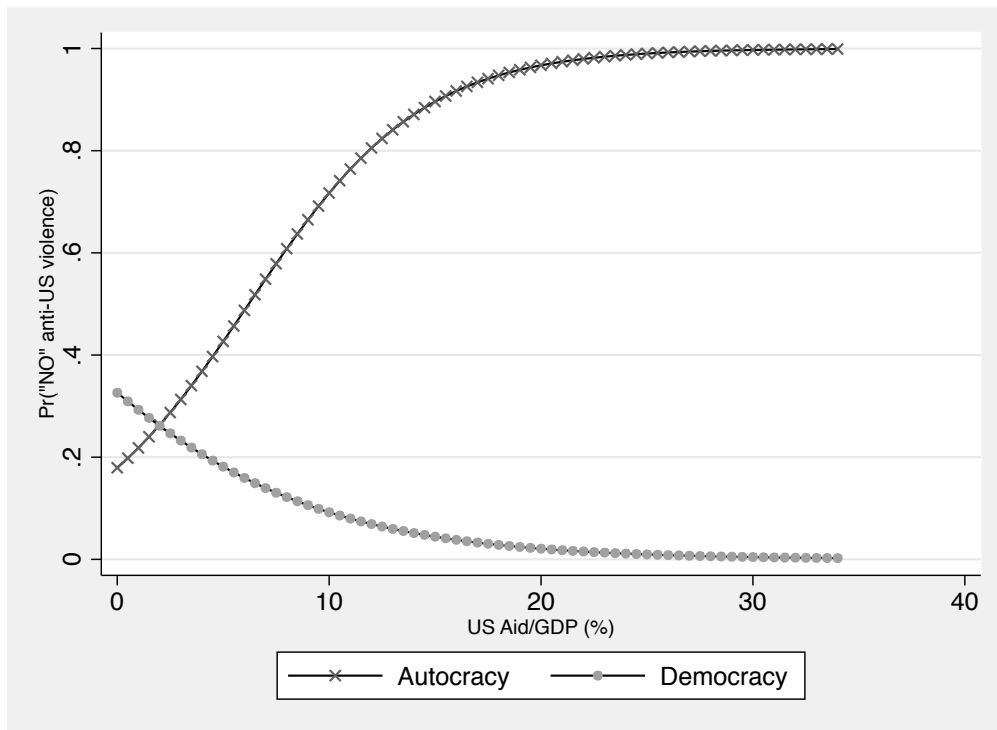


Figure 3.2: Plot for ZINB regression: Count model

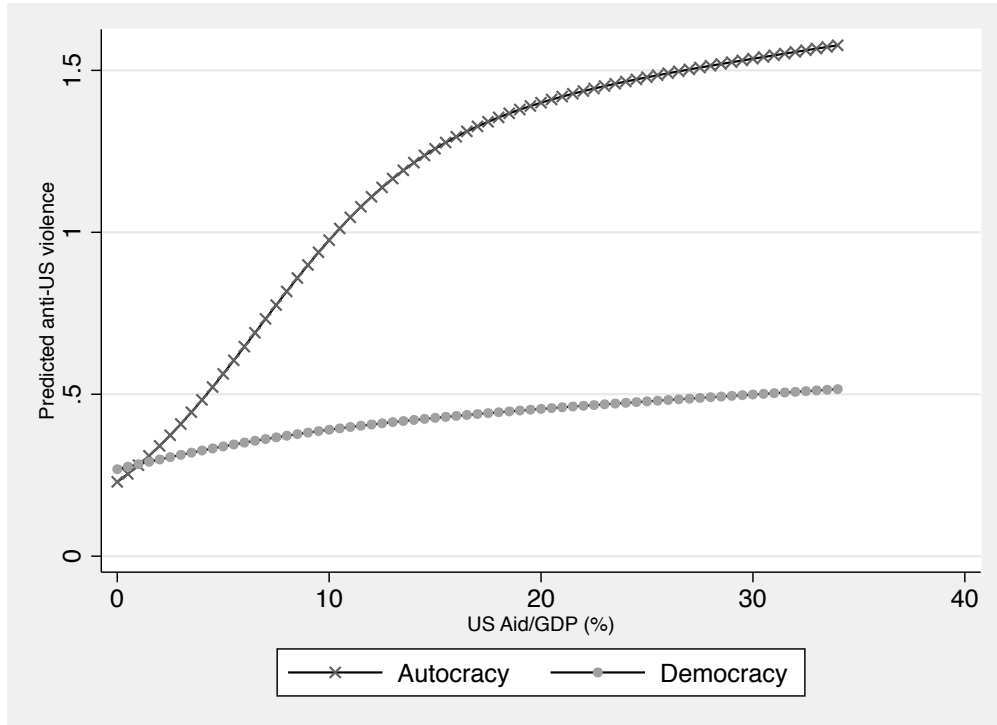


Figure 3.3: Plot for ZINB regression: Inflation model

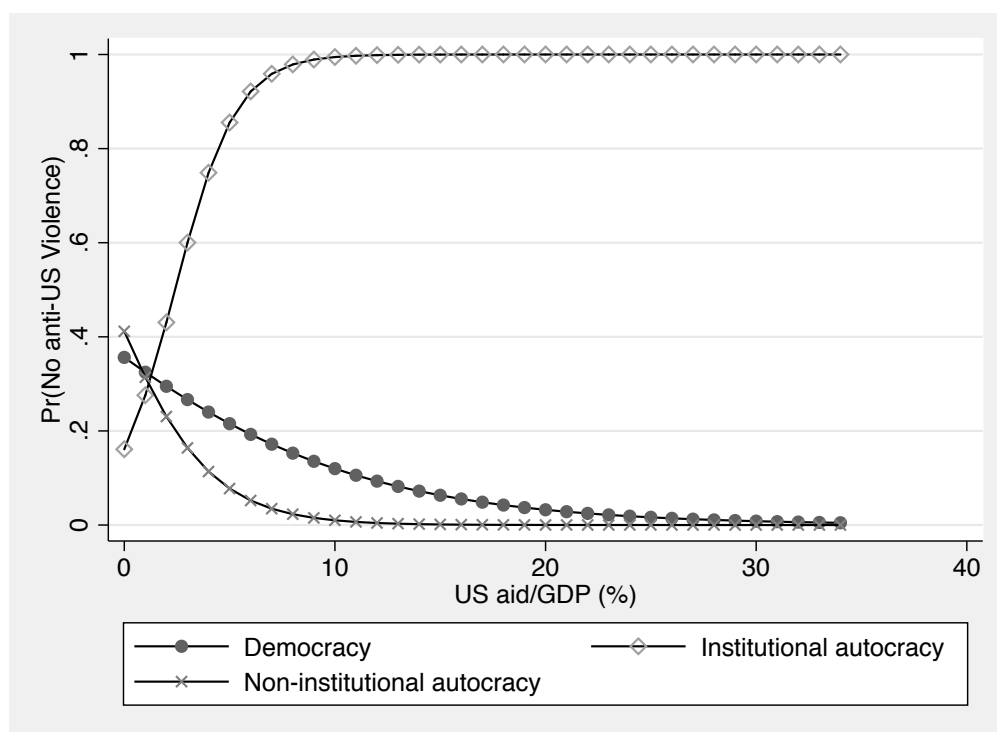


Figure 3.4: Plot for ZINB regression: Count model

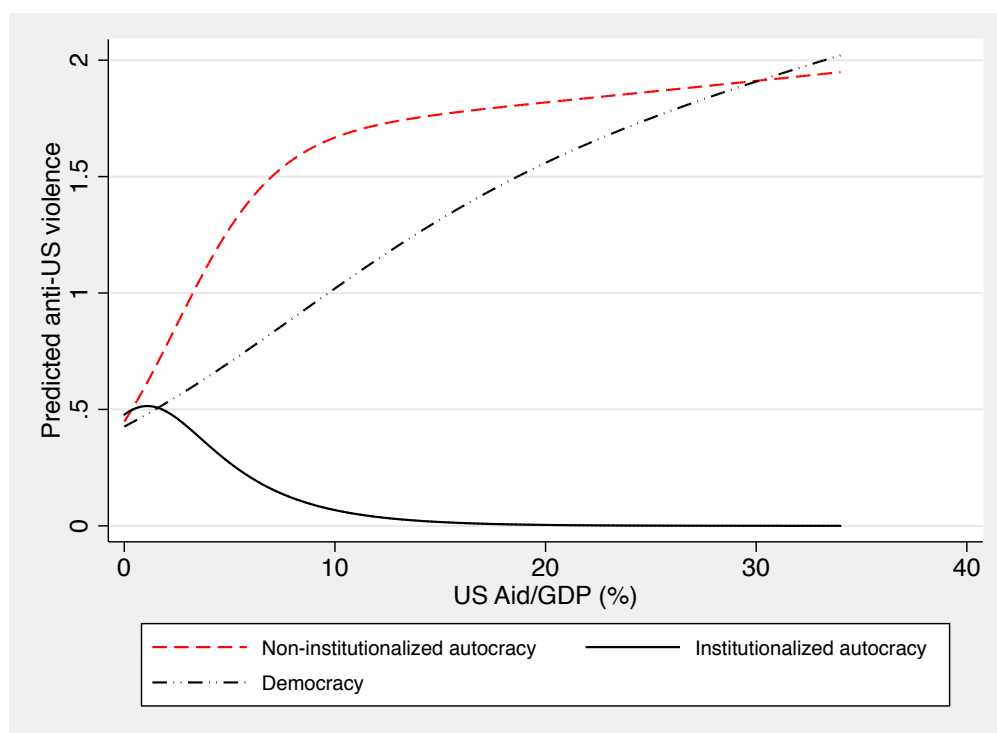


Table 3.2: ZINB Regression of Anti-US Political Violence, 1970-2007: Reduced Sample

	Model 4: Baseline		Model 5: Non-US Aid		Model 6: Multilateral Aid	
	Count	Inflate	Count	Inflate	Count	Inflate
US aid/GDP (%)	-0.0002 (0.042)	-0.203** (0.101)	-0.018 (0.058)	-0.216* (0.127)	0.0004 (0.048)	-0.175 (0.116)
Institutional autocracy	-0.494** (0.233)	-1.980 (1.223)	-0.562** (0.243)	-1.244 (0.914)	-0.644** (0.257)	-1.782 (1.604)
Democracy	0.171 (0.270)	1.089 (0.899)	-0.117 (0.298)	-0.441 (0.793)	0.079 (0.284)	0.022 (0.900)
Institutional autocracy x US aid/GDP (%)	0.269** (0.106)	1.244*** (0.453)	0.422*** (0.149)	0.998** (0.411)	0.410** (0.165)	1.111** (0.532)
Democracy x US aid/GDP (%)	-0.056 (0.064)	-0.903* (0.528)	0.319* (0.170)	0.395 (0.287)	-0.086 (0.085)	-0.759 (0.580)
Non-US aid/GDP (%)			0.033 (0.049)	0.075* (0.044)		
Multilateral aid/GDP (%)					0.009 (0.065)	0.032 (0.089)
Regime duration	0.010 (0.006)	0.051** (0.024)	0.007 (0.007)	0.019 (0.020)	0.007 (0.007)	0.027 (0.023)
Trade openness with US	0.177* (0.101)	0.159 (0.369)	0.210* (0.119)	0.363 (0.333)	0.248** (0.119)	0.440 (0.358)
US defense alliance	1.675*** (0.246)	3.278* (1.807)	1.742*** (0.257)	2.589** (1.066)	1.639*** (0.292)	2.696 (1.881)
US sanctions	0.159 (0.184)	-0.657 (0.769)	0.209 (0.187)	-0.221 (0.635)	0.216 (0.203)	-0.107 (0.770)
Political violence	0.039 (0.039)	-1.861* (1.035)	0.050 (0.044)	-0.595* (0.339)	0.051 (0.048)	-0.646 (0.593)
GDP per capita (log)	-0.095 (0.153)	-0.486 (0.369)	-0.020 (0.196)	-0.330 (0.355)	-0.113 (0.202)	-0.533 (0.447)
Population (log)	0.006 (0.114)	-1.240*** (0.359)	-0.014 (0.126)	-1.091*** (0.365)	-0.064 (0.138)	-1.231*** (0.387)
Cold war	0.221 (0.142)	-0.805 (0.534)	0.253* (0.144)	-0.323 (0.375)	0.272* (0.154)	-0.301 (0.438)
Latin American & Caribbean	0.356 (0.444)	-1.987 (1.617)	0.083 (0.525)	-2.346 (1.807)	-0.036 (0.499)	-2.963 (2.257)
Sub-Saharan Africa	0.767* (0.429)	3.369 (2.295)	0.813** (0.405)	2.254** (1.118)	0.728* (0.425)	2.332 (1.770)
Middle East & North Africa	0.385 (0.531)	-6.432* (3.454)	0.362 (0.600)	-1.899 (2.551)	0.229 (0.606)	-2.737 (2.911)
Asia	0.354 (0.424)	1.092 (1.831)	0.162 (0.543)	-0.378 (1.554)	0.042 (0.547)	-0.726 (2.036)
Past anti-US violence	0.179*** (0.033)	-2.027*** (0.507)	0.151*** (0.033)	-2.607*** (0.478)	0.158*** (0.039)	-2.604*** (0.653)
Constant	-2.890* (1.746)	12.874*** (4.462)	-3.251 (2.019)	10.259** (4.177)	-2.182 (2.161)	12.758*** (4.556)
Observations	3,093		3,093		3,024	
Alpha	1.730 (0.251)		1.494 (0.250)		1.537 (0.324)	
Inalpha	0.548*** (0.145)		0.401** (0.167)		0.430** (0.211)	
AIC	3036.479		3040.19			
BIC	3271.918		3287.703			
Wald χ^2	15.39***		14.91***		11.03**	

Robust standard errors clustered on country in parentheses. Reference region is West.

*** p<0.01, ** p<0.05, * p<0.1

Regarding the impacts of control variables on the dependent variable, the study includes three regressors that may influence anti-American incidents: *U.S. sanctions*, *U.S. security alliance*, and *U.S. trade openness*. Those control variables may directly affect domestic politics and socio-economic conditions in US targeted countries or U.S. allies. Only U.S. alliance is positively and significantly associated with anti-American violence across all models. In the inflate equation, a country under the U.S. alliance system have a higher likelihood of experiencing “no” violence against Americans. Of those experiencing anti-U.S. violence, an increase in anti-American incidents in a hosting country results from a U.S. security alliance. A country’s trade openness with the U.S. also leads to the increase in anti-U.S. incidents in the count equation of Models 2 and 3. But U.S. sanctions variable is not significant even if the causal direction is positive in the count equation and negative in the inflate equation, respectively. This indicates that U.S. sanctions are positively correlated with anti-American incidents. Regarding the effect of general political violence, the political violence variable has a positive and significant impact on anti-American incidents only in the zero equation of Model 3. In regard to regional effects, countries in the Middle East and North Africa, for example, have a lower chance of experiencing “always zero” incidents of anti-U.S. violence only in Model 2. The impact of international structure (cold war dummy) is also significant. In Models 2 and 3, countries have more expected count of anti-American incidents during the Cold War than during the Post Cold War. The results reflects the fact that anti-U.S. violence frequently occurred during the Cold War when the U.S. was often offering economic and political supports to dictators in exchange for policy concessions (i.e., anti-communist policy).

3.6 Robustness Checks

To confirm whether my analysis is robust, a series of additional regressions were conducted regarding both alternative specifications and methodological issues. First, the study estimates the analysis using alternative measures of the dependent variables. The analysis disaggregates anti-American violence into two separate incidents-anti-U.S. government violence and anti-U.S. civilian violence (Models A3-A6). According to some studies on anti-Americanism, this sentiment may hold an ambivalent attitude toward the United States (Katzenstein and Keohane 2007; Diven 2007). People around the world tend to criticize U.S. foreign policy and international influence while they accept U.S. culture and like buying products made in U.S. (Diven 2007). So, once anti-American violence is said to have resulted from the U.S. foreign policy (bilateral aid) impacting domestic politics, U.S. foreign aid should have more of an impact on the anti-U.S. government violence than on anti-U.S. civilian violence. To test this alternative explanation, the study measured anti-U.S. government incidents as incidents in which the targets were U.S. government properties (e.g., U.S. Embassy, U.S. culture center, etc.) and U.S. government officials. The study also measured anti-American civilian violence as violent incidents in which the targets were American civilian citizens and local branches/offices of U.S.-based multinational corporations. The results show that an increase in U.S. aid leads to a decrease in expected violence against U.S. government properties and/or officials in autocratic regimes having institutions, compared to non-institutionalized autocracies. However, when a rise in U.S. aid results in an increase in anti-U.S. civilian incidents in autocracies having institutions, it would seem to indicate that revolutionary groups or extremist groups tend to target non-government Americans such as U.S.-owned multi-corporations (e.g., McDonalds, Citibank branches, etc.) rather than U.S. government properties because American

civilian targets are relatively easy to attack.

The study estimated zero-inflated models using civilization dummies instead of the simple regional geographic dummies. At the same time, the study also took into account the outliers' influence by using both full sample and reduced sample excluding outlier states (Berger 2014; Henderson and Tucker 2001; Huntington 1993). The findings in Models A7-A12 overall support the hypotheses. Regarding the effects of different civilizations, Islamic countries have a lower probability of experiencing “no” anti-US violence at 0.1 confidence level. Developing countries in the Western world also have a lower likelihood of experiencing “no” anti-American incidents at 0.05 or 0.001 levels. However, among countries experiencing anti-American incidents, countries in the West have fewer expected count of anti-American violence.

Second, the study used two alternative indicators of U.S. aid to confirm the previous results in Models A13-18 (i.e., U.S. aid/GNI (%) and U.S. economic aid/GDP (%)). The overall findings support the main results.

Finally, in addition to model specifications with lagged dependent variables (LDVs), the study ran the models without LDVs for a robustness check for my statistical findings (Models 19-21). Some political methodologists raised doubts about the utility of using LDVs in the model. They believe the inclusion of LDVs might increase the risk of making inaccurate inference leading other regressors to lose their explanatory power (Achen 2000). The results of count data models without LDVs shows that coefficients for the interaction term between U.S. foreign aid and autocracy is still statistically significant and have more explanatory power than models with LDVs in zero-inflated negative binomial regression models.

3.7 Conclusion

This study has investigated whether and/or how U.S. foreign aid leads to anti-American incidents in a recipient country. Using the composite data based on several sources for 117 developing countries for the period between 1970 and 2007, the study has found the evidence suggesting that anti-American incidents are incited by U.S. foreign aid conditioned by autocrats' survival strategy through their institutional channels. Compared to democracies and non-institutionalized autocracies, in other words, institutions in autocracies play an moderating role in influencing the frequency of anti-American incidents. However, as the percentage of U.S. aid/GDP rises, so does the expected count of anti-U.S. violence, though it soon decreases in autocracies with pseudo-democratic institutions.

The study found, however, that U.S. foreign aid itself does not affect the likelihood of anti-American incidents regardless of its expected direction. Of those that do experience anti-Americans incidents, U.S. foreign aid is expected to increase their frequency in some model specifications. Nominal democratic institutions in autocracies influence the variation in autocrats' use of U.S. foreign aid. The number of anti-American incidents is affected by an interaction between U.S. aid and autocratic institutions in recipient countries. There are some policy implications in the findings. Pseudo-democratic institutions have a mediating effect on the causal nexus between the harmful role of U.S. aid and anti-American violence.

The results may create several avenues for further research. First, to deal with the endogeneity problem appropriate instrumental variables are needed. Even if this study tried to cope with reverse causality or endogenous issues, it is not sufficient enough to check reverse causality through the regression estimation on U.S. foreign aid/GDP (%). Also, the lagged variable on the right side of

the model equation partially, at most, dealt with the endogeneity problem.

Second, despite its broader range of anti-American incidents, this project needs to add more information on demonstrations and protests against U.S. government properties (e.g. demonstrations in front of U.S. Embassies in recipient countries). Further study could focus on collecting data on anti-American demonstrations and/or protests by looking into a variety sources including media coverage (e.g., New York Times, BBC News, etc.)

Lastly, another future study could reflect the recent phenomena in the Middle East and Africa. During the Arab Spring, people in several countries expressed anti-American sentiments on the street using nonviolent and sometimes violent protests. So it may be interesting to investigate the relationship between democratization or regime change and anti-American incidents.

3.8 Appendix II

3.8.1 List of Countries in the Sample (117)

Albania, Algeria, Angola, Argentina, Armenia, Azerbaijan, Bahrain, Bangladesh, Belarus, Benin, Bhutan, Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Congo, Djibouti, Dominican Republic, Ecuador, Egypt, El Salvador, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran, Israel, Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Laos, Lebanon, Lesotho, Liberia, Libya, Macedonia, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Russia, Rwanda, Saudi Arabia, Senegal, Sierra Leone, Slovakia, Slovenia, Solomon Islands, South Africa, South Korea, Sri Lanka, Sudan, Suriname, Swaziland, Syria, Tajikistan, Tanzania, Thailand, Togo, Trinidad and Tobago , Tunisia, Uganda, Ukraine, Uruguay, Uzbekistan, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe

3.8.2 Summary Statistics

Table 3.3: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Anti-US political violence	0.531	2.534	0	62	4490
US aid/GDP (%)	0.821	1.971	0	34.141	3763
Non-US aid/GDP (%)	3.123	5.308	0	78.804	3763
Multilateral aid/GDP (%)	3.225	5.012	0	86.173	3717
Regime type	0.89	0.74	0	2	4271
Regime duration	17.863	15.062	1	109	4271
Trade openness with US	5.466	2.418	0	12.881	4137
US defense alliance	0.263	0.441	0	1	4340
US sanctions	0.165	0.371	0	1	4229
Political violence	0.909	1.856	0	10	4088
GDP per capita (log)	7.165	1.198	3.913	10.49	3772
Population (log)	8.797	1.727	4.477	14.086	4262
Cold war	0.487	0.5	0	1	4490

3.8.3 Robustness Checks

1. Table 3.4: Comparison of ZINB and Hurdle Models
2. Table 3.5.: Alternative Dependent Variables: Anti-US Government and Anti-US Civilians
3. Table 3.5: Using civilization dummies (full sample)
4. Table 3.6: Using civilization dummies (reduced sample)
5. Table 3.7: Using an alternative measure of US aid - US Aid/GNI (%)
6. Table 3.8: Using an alternative measure of US aid - US Economic Aid/GDP (%)
7. Table 3.8: Without Lagged Dependent Variables

Table 3.4: ZINB Regression of Anti-US Political Violence, 1970-2007: Full Sample

	Model A1: ZINB		Model A2: Hurdle	
	Count	Inflate (zero)	Count	Logit
US aid/GDP (%)	0.002 (0.069)	-0.424 (0.359)	-0.013 (0.030)	0.028 (0.030)
Institutional autocracy	-0.708*** (0.230)	-1.293 (1.008)	-0.482* (0.287)	-0.539*** (0.209)
Democracy	-0.179 (0.259)	-0.234 (0.829)	-0.116 (0.280)	-0.292 (0.211)
Institutional autocracy x US aid/GDP (%)	0.421*** (0.150)	1.110** (0.550)	0.272** (0.113)	0.029 (0.042)
Democracy x US aid/GDP (%)	0.010 (0.069)	0.284 (0.357)	0.005 (0.019)	0.018 (0.035)
Regime duration	0.012* (0.006)	0.030 (0.021)	0.003 (0.007)	0.002 (0.005)
Trade openness with US	0.204** (0.100)	0.385 (0.255)	0.121* (0.065)	0.171* (0.103)
US defense alliance	1.804*** (0.278)	2.405** (1.166)	1.536*** (0.267)	1.254*** (0.297)
US sanctions	0.205 (0.186)	-0.390 (0.616)	0.326* (0.176)	0.292 (0.192)
Political violence	0.061 (0.043)	-0.512* (0.280)	0.168*** (0.038)	0.061 (0.047)
GDP per capita (log)	-0.084 (0.180)	-0.595 (0.382)	-0.021 (0.120)	-0.138 (0.146)
Population (log)	-0.029 (0.098)	-1.128*** (0.286)	0.278*** (0.080)	0.153 (0.107)
Cold war	0.274* (0.148)	-0.469 (0.348)	0.459*** (0.154)	0.399** (0.194)
Latin American & Caribbean	0.170 (0.479)	-2.275 (1.668)	-0.183 (0.511)	11.299*** (0.757)
Sub-Saharan Africa	0.747* (0.443)	1.914** (0.882)	-0.211 (0.496)	11.057*** (0.664)
Middle East & North Africa	0.123 (0.588)	-2.477 (2.828)	0.560 (0.521)	11.475*** (0.670)
Asia	0.074 (0.546)	-0.457 (1.594)	-0.516 (0.496)	10.695*** (0.755)
Past anti-US violence	0.118*** (0.026)	-2.132*** (0.449)	0.453*** (0.065)	0.113*** (0.024)
Constant	-2.420 (1.607)	12.766*** (3.957)	-6.046*** (1.247)	-14.460*** (1.465)
Observations	3,295		3,481	
Alpha	1.319 (0.211)			
lnalpha	0.373*** (0.131)		1.047*** (0.333)	
AIC	3759.89		4125.987	
BIC	3997.796		4366.035	
Vuong z-statistic: 1.607* ZINB > Hurdle				

Robust standard errors clustered on country in parentheses. Reference region is the West.

*** p<0.01, ** p<0.05, * p<0.1

Table 3.5: ZINB Regression of Anti-US Political Violence, 1970-2007: Full Sample

	Anti-US Government Violence			Anti-US Civilian Violence		
	Model A3: Non-US Aid Count Inflate	Model A4: Multilateral Aid Count Inflate	Model A5: Non-US Aid Count Inflate	Model A6: Multilateral Aid Count Inflate	Model A7: Non-US Aid Count Inflate	Model A8: Multilateral Aid Count Inflate
US aid/GDP	0.083*** (0.026)	-0.176 (0.173)	0.056 (0.043)	-0.485 (0.461)	-0.126** (0.057)	-0.142*** (0.033)
Institutionalized autocracy	-0.227 (0.186)	-1.216 (1.355)	-0.221 (0.192)	-1.319 (1.496)	-0.754*** (0.275)	-0.404 (0.303)
Democracy	-0.088 (0.223)	0.139 (2.069)	-0.078 (0.221)	0.102 (1.776)	-0.029 (0.339)	-0.357 (0.340)
Institutional autocracy X US aid/GDP	-0.211* (0.127)	-5.167** (2.390)	-0.216 (0.146)	-4.184** (2.002)	0.890** (0.423)	0.432*** (0.149)
Democracy X US aid/GDP	0.206** (0.098)	2.944*** (1.098)	0.258* (0.144)	5.235* (3.056)	-0.065 (0.131)	-0.218 (0.135)
Non-US aid/GDP	-0.036* (0.021)	-0.254 (0.169)			0.077** (0.034)	0.171** (0.068)
Multilateral aid/GDP			0.051** (0.025)	0.251* (0.152)		0.191*** (0.072)
Trade openness with US	0.051 (0.069)	0.311 (0.545)	0.030 (0.082)	-0.198 (0.870)	0.192 (0.118)	0.364 (0.235)
US defense alliance	1.595*** (0.239)	5.752* (3.079)	1.577*** (0.241)	4.286* (2.406)	1.887*** (0.287)	1.852*** (0.278)
US sanctions	0.134 (0.152)	-0.995 (1.314)	0.108 (0.155)	-2.497 (2.152)	0.356 (0.259)	0.626** (0.274)
Political violence	0.006 (0.033)	-9.939*** (3.699)	0.022 (0.034)	-7.278*** (2.678)	0.154*** (0.053)	-0.137 (0.060)
Regime duration	0.016*** (0.004)	0.108 (0.072)	0.015*** (0.004)	0.109*** (0.037)	-0.008 (0.008)	-0.012* (0.007)
GDP per capita (log)	-0.222* (0.120)	-2.121 (1.627)	-0.078 (0.133)	-0.463 (1.277)	0.259 (0.225)	0.530* (0.278)
Population (log)	0.051 (0.074)	-3.360** (1.638)	0.125 (0.094)	-1.908 (1.173)	-0.004 (0.146)	0.426* (0.217)
Latin American & Caribbean	-0.168 (0.442)	-3.054 (2.998)	-0.069 (0.453)	0.297 (7.799)	1.596** (0.636)	-1.178 (2.451)
Sub-Saharan Africa	-0.823* (0.493)	4.993* (2.701)	-0.897* (0.495)	5.270 (6.765)	2.385*** (0.621)	3.210*** (0.578)
Middle East & North Africa	-0.360 (0.472)	-18.848*** (6.175)	-0.254 (0.518)	-26.839** (10.464)	1.324* (0.712)	4.020*** (0.942)
Asia	-0.131 (0.480)	4.365 (2.992)	-0.065 (0.509)	5.277 (7.626)	1.066 (0.708)	1.582*** (0.659)
Cold war	0.648*** (0.202)	-2.857** (1.341)	0.734*** (0.203)	-1.623 (1.186)	0.085 (0.182)	0.103 (0.180)
Past US incidents	0.351*** (0.040)	-4.386** (1.812)	0.340*** (0.039)	-24.828*** (7.574)	0.113*** (0.038)	0.088*** (0.025)
Constant	-2.165* (1.149)	41.506* (22.958)	-4.060*** (1.463)	16.699 (19.157)	-6.914*** (2.216)	-12.817*** (3.402)
Observations	3,295	3,268	3,295	3,295	3,268	3,268
Inalpha	0.227 (0.149)	0.225 (0.143)	0.630*** (0.183)	0.377*** (0.135)		
AIC	1985.25	1983.634	2743.018	2740.004		
BIC	2235.356	2233.403	2993.124	2989.773		

Robust standard errors clustered on country in parentheses. Reference region is the West.

*** p<0.01, ** p<0.05, * p<0.1

Table 3.6: ZINB Regression of Anti-US Political Violence, 1970-2007: Full Sample

	Model A7: Baseline		Model A8: Non-US Aid		Model A9: Multilateral Aid	
	Count	Inflate	Count	Inflate	Count	Inflate
US aid/GDP (%)	-0.037 (0.062)	-0.547** (0.260)	0.087 (0.107)	-0.131 (0.170)	-0.087 (0.088)	-0.664* (0.394)
Institutional autocracy	-0.593** (0.235)	-0.635 (0.679)	-0.488** (0.246)	-0.247 (0.704)	-0.585** (0.236)	-0.677 (0.673)
Democracy	-0.157 (0.234)	0.080 (0.628)	-0.057 (0.255)	0.355 (0.667)	-0.162 (0.234)	0.011 (0.617)
Institutional autocracy x US aid/GDP (%)	0.351*** (0.119)	0.725** (0.281)	0.253 (0.163)	0.314 (0.203)	0.399*** (0.134)	0.846** (0.384)
Democracy x US aid/GDP (%)	0.036 (0.059)	0.358 (0.259)	-0.075 (0.118)	-0.006 (0.205)	0.083 (0.082)	0.490 (0.368)
Non-US aid/GDP (%)			0.043 (0.080)	0.086 (0.074)		
Multilateral aid/GDP (%)					0.050 (0.042)	0.019 (0.037)
Regime duration	0.013** (0.005)	0.026** (0.013)	0.012** (0.006)	0.022* (0.014)	0.013** (0.005)	0.026* (0.014)
Trade openness with US	0.157 (0.117)	0.177 (0.270)	0.153 (0.112)	0.167 (0.257)	0.154 (0.126)	0.181 (0.299)
US defense alliance	1.253*** (0.360)	0.089 (0.881)	1.304*** (0.418)	0.144 (1.045)	1.257*** (0.375)	0.066 (0.936)
US sanctions	0.143 (0.201)	-0.614 (0.575)	0.181 (0.203)	-0.602 (0.612)	0.179 (0.206)	-0.568 (0.588)
Political violence	0.061 (0.046)	-0.347* (0.198)	0.064 (0.051)	-0.366 (0.235)	0.071 (0.048)	-0.328* (0.172)
GDP per capita (log)	-0.199 (0.183)	-0.976** (0.428)	-0.101 (0.226)	-0.731** (0.368)	-0.123 (0.203)	-0.991** (0.450)
Population (log)	-0.018 (0.129)	-0.811** (0.363)	0.012 (0.133)	-0.731** (0.316)	0.014 (0.141)	-0.824** (0.371)
Cold war	0.254 (0.159)	-0.409 (0.399)	0.299* (0.169)	-0.238 (0.413)	0.274 (0.169)	-0.455 (0.416)
Buddhist	-1.187*** (0.385)	-1.163 (0.938)	-1.132*** (0.426)	-1.018 (1.041)	-1.078*** (0.407)	-1.139 (0.979)
Hindu	-0.427 (0.540)	-0.689 (4.401)	-0.304 (0.477)	-0.498 (3.065)	-0.335 (0.482)	-0.819 (3.038)
Islamic	-0.005 (0.302)	-1.175* (0.654)	0.052 (0.313)	-1.086* (0.660)	0.117 (0.338)	-1.084 (0.734)
Latin America	0.289 (0.514)	-0.846 (1.002)	0.280 (0.568)	-0.791 (1.133)	0.377 (0.557)	-0.727 (1.094)
Orthodox	-0.822* (0.423)	-0.859 (1.002)	-0.749* (0.449)	-0.702 (0.956)	-0.650 (0.423)	-0.857 (1.005)
Sinic	0.551 (0.829)	2.113** (1.020)	0.418 (0.927)	1.980* (1.068)	0.613 (0.854)	2.222** (0.999)
Western	-1.335** (0.643)	-21.416*** (0.944)	-1.235 (0.987)	-4.472 (3.441)	-1.078* (0.648)	-17.114*** (0.988)
Others	-0.005 (0.520)	-0.725 (0.891)	0.020 (0.577)	-0.671 (1.074)	0.104 (0.546)	-0.698 (0.944)
Past anti-US violence	0.112*** (0.025)	-2.043*** (0.472)	0.111*** (0.026)	-2.224*** (0.584)	0.110*** (0.026)	-1.981*** (0.430)
Constant	-0.771 (1.505)	15.240*** (4.771)	-2.023 (2.041)	12.127*** (3.632)	-1.851 (1.980)	15.346*** (4.889)
Observations	3,295		3,295		3,268	
Alpha	1.319 (0.211)		1.892 (0.271)		1.317 (0.200)	
lnalpha	0.277* (0.160)		0.283* (0.162)		0.275* (0.152)	
AIC	3765.222		4071.151			
BIC	4051.93		4266.357			

Robust standard errors clustered on country in parentheses. Reference civilization is African.

*** p<0.01, ** p<0.05, * p<0.1

Table 3.7: ZINB Regression of Anti-US Political Violence, 1970-2007: Reduced Sample

	Model A10: Baseline		Model A11: Non-US Aid		Model A12: Multilateral Aid	
	Count	Inflate	Count	Inflate	Count	Inflate
US aid/GDP (%)	-0.020 (0.063)	-0.484* (0.251)	0.007 (0.121)	-0.447 (0.369)	-0.005 (0.088)	-0.425 (0.406)
Institutional autocracy	-0.540** (0.269)	-0.501 (0.746)	-0.528* (0.271)	-0.502 (0.753)	-0.602** (0.262)	-0.495 (0.705)
Democracy	-0.120 (0.273)	0.161 (0.732)	-0.109 (0.281)	0.153 (0.680)	-0.107 (0.259)	0.228 (0.656)
Institutional autocracy x US aid/GDP (%)	0.329*** (0.124)	0.677** (0.283)	0.296 (0.210)	0.625* (0.380)	0.318* (0.191)	0.620 (0.450)
Democracy x US aid/GDP (%)	0.031 (0.063)	0.298 (0.251)	0.014 (0.101)	0.253 (0.362)	0.014 (0.083)	0.236 (0.385)
Non-US aid/GDP (%)			-0.023 (0.049)	0.011 (0.062)		
Multilateral aid/GDP (%)					-0.033 (0.058)	-0.013 (0.087)
Regime duration	0.013** (0.006)	0.022 (0.016)	0.013** (0.006)	0.020 (0.015)	0.012** (0.006)	0.021 (0.016)
Trade openness with US	0.230* (0.118)	0.254 (0.293)	0.229* (0.117)	0.263 (0.308)	0.276*** (0.103)	0.343 (0.260)
US defense alliance	1.101*** (0.241)	0.373 (0.655)	1.077*** (0.243)	0.350 (0.686)	1.064*** (0.215)	0.322 (0.676)
US sanctions	0.283 (0.223)	-0.341 (0.528)	0.277 (0.221)	-0.354 (0.587)	0.273 (0.216)	-0.369 (0.522)
Political violence	0.041 (0.047)	-0.392 (0.344)	0.032 (0.065)	-0.436 (0.587)	0.041 (0.051)	-0.402 (0.277)
GDP per capita (log)	-0.294 (0.192)	-0.977** (0.475)	-0.315 (0.196)	-0.955** (0.445)	-0.396* (0.209)	-1.113*** (0.429)
Population (log)	-0.077 (0.135)	-0.834* (0.453)	-0.078 (0.132)	-0.821** (0.396)	-0.145 (0.124)	-0.931*** (0.343)
Cold war	0.147 (0.182)	-0.493 (0.493)	0.137 (0.168)	-0.453 (0.460)	0.118 (0.162)	-0.512 (0.415)
Buddhist	-1.017*** (0.327)	-1.278 (0.799)	-0.965* (0.567)	-1.207 (1.183)	-1.078*** (0.349)	-1.296 (0.806)
Hindu	-0.365 (0.973)	-0.517 (7.781)	-0.375 (0.645)	-0.598 (5.993)	-0.459 (0.568)	-0.796 (3.621)
Islamic	0.046 (0.323)	-1.189* (0.627)	0.070 (0.483)	-1.161* (0.628)	-0.020 (0.320)	-1.264** (0.591)
Latin America	0.292 (0.383)	-1.264 (0.821)	0.320 (0.501)	-1.220 (0.870)	0.206 (0.383)	-1.363* (0.816)
Orthodox	-0.752 (0.516)	-0.947 (0.934)	-0.726 (0.747)	-0.832 (1.104)	-0.653 (0.449)	-0.861 (0.887)
Sinic	-2.077** (0.816)	-3.219 (16.370)	-2.091** (0.946)	-3.490 (21.014)	-2.094*** (0.607)	-3.320 (13.887)
Western	-1.278** (0.587)	-16.467*** (1.053)	-1.195 (0.772)	-15.803*** (1.714)	-1.339** (0.531)	-16.005*** (1.088)
Others	-0.014 (0.531)	-0.852 (0.845)	0.027 (0.657)	-0.772 (1.031)	-0.134 (0.487)	-1.027 (0.824)
Past anti-US violence	0.127*** (0.037)	-2.167*** (0.561)	0.129*** (0.043)	-2.191*** (0.630)	0.132*** (0.032)	-2.264*** (0.615)
Constant	0.002 (1.726)	15.080** (6.125)	0.195 (1.838)	14.711*** (5.222)	1.269 (2.080)	16.460*** (4.850)
Observations	3,128		3,128		3,059	
Alpha	1.212 (0.370)		1.220 (0.406)		1.195 (0.200)	
Inalpha	0.192 (0.305)		0.199* (0.332)		0.178 (0.285)	
AIC	2956.39		2956.792			
BIC	3240.653		3247.103			

Robust standard errors clustered on country in parentheses. Reference civilization is African.

*** p<0.01, ** p<0.05, * p<0.1

Table 3.8: ZINB Regression of Anti-US Political Violence, 1970-2007: US Aid/GNI

	Model A13: Baseline		Model A14: Non-US Aid		Model A15: Multilateral Aid	
	Count	Inflate	Count	Inflate	Count	Inflate
US aid/GNI (%)	0.978 (1.297)	10.052 (7.606)	0.048 (1.444)	3.164 (5.857)	0.085 (1.690)	3.847 (6.689)
Institutional autocracy	-0.668*** (0.200)	-1.779* (0.997)	-0.696*** (0.257)	-0.852 (1.329)	-0.703*** (0.215)	-1.020 (0.968)
Democracy	-0.044 (0.211)	0.050 (0.711)	-0.139 (0.330)	0.239 (1.182)	0.001 (0.226)	0.362 (0.742)
Institutional autocracy x US aid/GNI (%)	9.947*** (3.167)	13.566 (11.093)	14.384*** (3.095)	19.388* (10.371)	14.558*** (3.471)	20.616** (9.603)
Democracy x US aid/GNI (%)	-1.821 (1.909)	-34.988 (21.771)	-0.707 (1.720)	-12.848 (11.605)	-1.068 (1.706)	-11.408 (10.469)
Non-US aid/GDP (%)			0.059 (0.049)	0.102** (0.050)		
Multilateral aid/GDP (%)					0.040 (0.073)	0.045 (0.076)
Regime duration	0.009** (0.005)	0.034 (0.022)	0.011 (0.007)	0.025 (0.022)	0.009** (0.005)	0.030 (0.019)
Trade openness with US	0.252*** (0.076)	0.454 (0.362)	0.206* (0.108)	0.347 (0.322)	0.269*** (0.088)	0.465 (0.298)
US defense alliance	1.917*** (0.235)	2.610*** (0.999)	1.812*** (0.272)	2.354* (1.250)	1.839*** (0.315)	2.452 (1.650)
US sanctions	0.256* (0.155)	-0.392 (0.595)	0.224 (0.214)	-0.448 (0.834)	0.339* (0.200)	-0.076 (0.530)
Political violence	0.054 (0.034)	-1.949* (1.172)	0.079 (0.051)	-0.503 (0.476)	0.079* (0.047)	-0.478 (0.326)
GDP per capita (log)	-0.157 (0.119)	-0.768 (0.473)	0.001 (0.208)	-0.279 (0.404)	-0.085 (0.168)	-0.451 (0.337)
Population (log)	-0.027 (0.080)	-1.287*** (0.347)	-0.019 (0.104)	-1.047*** (0.318)	-0.058 (0.100)	-1.170*** (0.318)
Cold war	0.338** (0.150)	-0.655 (0.501)	0.303** (0.153)	-0.294 (0.395)	0.364** (0.162)	-0.334 (0.391)
Latin American & Caribbean	0.033 (0.420)	-2.551* (1.494)	0.181 (0.490)	-1.888 (1.801)	-0.044 (0.471)	-2.605 (2.047)
Sub-Saharan Africa	0.570 (0.376)	2.309 (1.436)	0.769 (0.475)	2.348* (1.296)	0.711* (0.381)	2.117** (1.078)
Middle East & North Africa	0.315 (0.398)	-3.259 (2.311)	0.138 (0.687)	-1.889 (3.638)	0.199 (0.450)	-2.669 (2.488)
Asia	-0.045 (0.421)	-0.034 (1.528)	0.109 (0.546)	0.006 (1.720)	-0.085 (0.508)	-0.659 (1.876)
Past anti-US violence	0.127*** (0.021)	-1.937*** (0.440)	0.116*** (0.027)	-2.156*** (0.544)	0.115*** (0.025)	-2.096*** (0.495)
Constant	-2.380** (1.113)	14.812*** (4.973)	-3.324* (1.816)	8.888** (4.159)	-2.724 (1.689)	10.860*** (3.524)
Observations	3,482		3,280		3,309	
Alpha	1.570 (0.0151)		1.442 (0.228)		1.419 (0.148)	
lnalpha	0.451*** (0.096)		0.366** (0.158)		0.350** (0.148)	

Robust standard errors clustered on country in parentheses. Reference region is the West.

*** p<0.01, ** p<0.05, * p<0.1

Table 3.9: ZINB Regression of Anti-US Political Violence, 1970-2007: US Economic Aid

	Model A16: Baseline		Model A17: Non-US Aid		Model A18: Multilateral Aid	
	Count	Inflate	Count	Inflate	Count	Inflate
US economic aid/GDP (%)	0.037 (0.047)	0.931 (1.105)	0.018 (0.025)	0.283 (0.231)	0.002 (0.026)	-0.025 (0.067)
Institutional autocracy	-0.514*** (0.188)	-1.379* (0.832)	-0.649*** (0.200)	-1.935** (0.911)	-0.683*** (0.219)	-0.960 (0.998)
Democracy	-0.057 (0.209)	-0.267 (1.065)	-0.198 (0.228)	-0.730 (0.670)	-0.044 (0.223)	0.200 (0.640)
Institutional autocracy x US economic aid/GDP (%)	0.149 (0.107)	-1.078 (1.204)	0.326** (0.135)	0.523 (0.390)	0.602*** (0.203)	0.902** (0.447)
Democracy x US economic aid/GDP (%)	-0.030 (0.053)	-1.413 (2.164)	-0.004 (0.024)	-0.396 (0.400)	0.001 (0.020)	-0.128 (0.329)
Non-US aid/GDP (%)			-0.019 (0.023)	-0.069 (0.048)		
Multilateral aid/GDP (%)					0.024 (0.071)	0.024 (0.080)
Regime duration	0.010** (0.004)	0.041** (0.019)	0.013** (0.006)	0.043** (0.019)	0.009* (0.005)	0.029 (0.022)
Trade openness with US	0.222*** (0.071)	0.254 (0.285)	0.203*** (0.077)	0.258 (0.235)	0.256*** (0.087)	0.422 (0.282)
US defense alliance	1.902*** (0.246)	2.829*** (0.926)	1.744*** (0.246)	2.655*** (0.913)	1.836*** (0.329)	2.328 (1.787)
US sanctions	0.231 (0.155)	-0.424 (0.708)	0.185 (0.171)	-0.714 (0.623)	0.298 (0.200)	-0.169 (0.531)
Political violence	0.046 (0.037)	-3.410 (2.341)	0.045 (0.038)	-2.018** (0.965)	0.072 (0.045)	-0.468* (0.244)
GDP per capita (log)	-0.190* (0.111)	-0.668 (0.513)	-0.167 (0.134)	-0.696* (0.392)	-0.118 (0.183)	-0.512 (0.370)
Population (log)	0.001 (0.078)	-1.322*** (0.415)	-0.029 (0.086)	-1.260*** (0.316)	-0.035 (0.099)	-1.088*** (0.308)
Cold war	0.311** (0.139)	-1.098** (0.466)	0.212 (0.143)	-1.063** (0.461)	0.334** (0.161)	-0.366 (0.358)
Latin American & Caribbean	0.296 (0.413)	-1.549 (1.391)	0.310 (0.395)	-2.000 (1.346)	0.019 (0.472)	-2.374 (2.058)
Sub-Saharan Africa	0.661* (0.361)	3.042** (1.536)	0.563 (0.367)	2.437 (1.583)	0.683* (0.367)	1.878* (0.973)
Middle East & North Africa	0.574 (0.411)	-5.892*** (2.084)	0.183 (0.490)	-5.471** (2.629)	0.280 (0.454)	-2.603 (2.641)
Asia	0.153 (0.415)	1.330 (1.588)	0.165 (0.400)	0.826 (1.579)	-0.070 (0.505)	-0.624 (1.823)
Past anti-US violence	0.129*** (0.022)	-2.090*** (0.634)	0.128*** (0.024)	-1.931*** (0.441)	0.115*** (0.025)	-2.193** (0.895)
Constant	-2.417** (1.104)	15.002** (6.054)	-1.827 (1.434)	15.630*** (4.827)	-2.562 (1.820)	11.078*** (3.840)
Observations	3,481		3,305		3,308	
Alpha	1.420 (0.213)		1.615 (0.479)		1.622 (0.1888)	
lnalpha	0.484*** (0.096)		0.479*** (0.110)		0.351** (0.150)	

Robust standard errors clustered on country in parentheses. Reference region is the West.

*** p<0.01, ** p<0.05, * p<0.1

Table 3.10: ZINB Regression of Anti-US Political Violence, 1970-2007: With No LDVs

	Model A19: Baseline		Model A20: Non-US Aid		Model A21: Multilateral Aid	
	Count	Inflate	Count	Inflate	Count	Inflate
US aid/GDP (%)	-0.038 (0.030)	-1.766*** (0.634)	-0.042 (0.031)	-1.788*** (0.588)	-0.041 (0.032)	-1.763*** (0.582)
Institutional autocracy	-0.696*** (0.225)	-4.537** (2.302)	-0.712*** (0.218)	-4.391** (1.720)	-0.677*** (0.220)	-4.450** (1.999)
Democracy	-0.007 (0.247)	-1.673 (1.033)	-0.107 (0.256)	-1.723* (1.042)	0.046 (0.251)	-1.400 (0.993)
Institutional autocracy x US aid/GDP (%)	0.295*** (0.051)	2.441*** (0.918)	0.306*** (0.057)	2.449*** (0.749)	0.307*** (0.051)	2.514*** (0.795)
Democracy x US aid/GDP (%)	0.009 (0.025)	0.465 (1.307)	0.016 (0.025)	0.382 (1.190)	0.010 (0.027)	0.455 (1.251)
Non-US aid/GDP (%)			-0.010 (0.026)	-0.0009 (0.076)		
Multilateral aid/GDP (%)					-0.032 (0.0225)	-0.413* (0.234)
Regime duration	0.006 (0.007)	0.059** (0.029)	0.008 (0.008)	0.059* (0.032)	0.007 (0.007)	0.067** (0.034)
Trade openness with US	0.188* (0.100)	0.353 (0.344)	0.138 (0.105)	0.356 (0.285)	0.171 (0.105)	0.155 (0.433)
US defense alliance	2.135*** (0.267)	3.247 (2.458)	1.959*** (0.291)	2.538 (2.320)	2.045*** (0.289)	2.919 (2.896)
US sanctions	0.311 (0.222)	-1.675 (1.349)	0.269 (0.218)	-1.701 (1.274)	0.341 (0.223)	-1.573 (1.252)
Political violence	0.114** (0.046)	-5.497* (3.239)	0.113** (0.047)	-5.526** (2.715)	0.119*** (0.046)	-5.949** (2.924)
GDP per capita (log)	-0.026 (0.135)	-0.971* (0.520)	0.083 (0.151)	-1.062* (0.641)	0.010 (0.140)	-0.778 (0.528)
Population (log)	0.117 (0.114)	-1.884*** (0.521)	0.135 (0.131)	-1.936*** (0.530)	0.116 (0.115)	-1.753*** (0.515)
Cold war	0.474*** (0.177)	-1.123* (0.622)	0.423** (0.178)	-1.115* (0.592)	0.466*** (0.176)	-1.124* (0.594)
Latin American & Caribbean	0.673 (0.517)	-1.854 (1.634)	0.898* (0.526)	-1.032 (2.513)	0.819 (0.515)	-0.486 (2.234)
Sub-Saharan Africa	0.701 (0.433)	3.958** (1.832)	0.732* (0.420)	3.922* (2.161)	0.775* (0.428)	4.812** (2.016)
Middle East & North Africa	0.558 (0.468)	-21.593*** (4.890)	0.504 (0.512)	-20.491*** (3.951)	0.637 (0.468)	-28.086*** (5.219)
Asia	0.046 (0.511)	1.645 (1.429)	0.265 (0.521)	2.190 (2.326)	0.182 (0.514)	3.036 (2.100)
Constant	-4.645*** (1.604)	22.352*** (7.044)	-5.234*** (1.915)	23.432*** (8.419)	-4.895*** (1.700)	19.776*** (7.128)
Observations		3,472		3,333		3,365
Alpha		1.420 (0.213)		1.615 (0.479)		1.622 (0.1888)
Inalpha		0.865*** (0.157)		0.895*** (0.150)		0.847*** (0.156)

Robust standard errors clustered on country in parentheses. Reference region is the West.

*** p<0.01, ** p<0.05, * p<0.1

Chapter 4

Making Dictators' Pockets Empty: How U.S. Sanctions Influence Social Policies in Autocratic Countries?

Abstract. This work examines how U.S. economic sanctions affect social welfare spending in authoritarian countries. U.S. economic sanctions play a role of inducing autocratic targets to change social policy through two theoretical channels. First, U.S. economic sanctions may reduce autocrats' resources to buy off supports from ruling elite groups and so force autocrats to reallocate government expenditure in favor of their supporting groups. Consequently, autocrats facing longer U.S. sanctions are likely to cut spending on public goods and services, especially on education and health care spending. Second, the impacts of U.S. sanction duration on social spending varies according to political variables such as autocrats' pseudo-democratic institutions. The empirical findings show that, even when U.S. sanctions last a long time, autocrats under nominal democratic institutions cut spending on education and health to a lesser degree than do autocrats with no such institutions.

4.1 Introduction

Do U.S. economic sanctions have substantial effects on social welfare policies in authoritarian targets? The conventional wisdom demonstrates that “sanctions often produce unintended and undesirable consequences” for the society of sanctioned countries (Haass 1997). According to the literature on sanctions, economic sanctions reduce a targeted state’s available resources for public goods and services (Wood 2008). Especially, authoritarian countries seem to be worse off after sanctions than before (Brooks 2002; Haass 1997). Are all autocracies equally bad at maintaining social welfare policies when they face sanctions? This study offers a new theoretical and empirical study on the impact of U.S. economic sanctions on social welfare spending by looking into the variations among targeted autocratic states. The existing literature on sanction studies pays attention to the counterproductive effects of sanctions on target states. Scholars find that economic sanctions fail to extract policy concessions from a target country while producing unwanted negative externalities (Allen and Lektzian 2013; Brooks 2002; Escribà-Folch and Wright 2010; Peksen 2009, 2011; Peksen and Drury 2009, 2010; Wood 2008). For instance, Brooks (2002) demonstrated that sanctions retain “distributional implications” for the social welfare of different political actors within a target nation while they have “adverse macroeconomic effects” on its entire population. Sanction costs hurt the general population, who tend to feel deprived of basic needs (e.g., consumption goods including food, water, etc.) and consequently, are more likely to act out against the government (Allen 2008b). Scholars also place an emphasis on the conditional effects of political institutions on the costs of sanctions. Democratic targets are easily affected by the counterproductive costs of sanctions due to their high sensitivity to “domestic audience costs” (Allen 2008a). So, democratic leaders are more likely than authoritarian rulers to concede the

demands of a sender, as sanctions aggravate the macroeconomy and thus hurt the general population. As a result, a democratic target may be less likely to suffer economic sanctions while experiencing shorter duration of sanctions (Lektzian and Souva 45; McGillivray and Stam 2004). In contrast, autocrats often resist economic sanctions because of their relative lack of political constraints. Making concessions to sanctioning states may not only weaken authoritarian leadership but threaten their political survival as well. Therefore, autocrats' resistance to economic sanctions forces the ordinary citizens to suffer sanction costs (Allen 2008a; Lektzian and Souva 2007).

A growing number of sanction studies seek to evaluate the negative externality of sanctions against a target country, mostly looking into its variation according to regime type—democracy versus autocracy. However, scholars of international politics have recently focused on authoritarian countries adopting a variety of research topics including international trade, foreign direct investment, and public policies. They find that autocratic regimes show significant variation in their political and economic performances. By the same token, we might expect that not all autocracies implement equally well social welfare policies as they respond to U.S. economic sanctions. Second, the majority of sanction targets are non-democratic countries. According to Escribà-Folch and Wright (2010, 336) and Kaempfer, Lowenberg and Mertens (2004), 85% of U.S. sanctions targets are “not-fully-democratized” countries. One reason for this pattern is that democratic leaders are more likely “to accommodate the sender’s demands” because they are more vulnerable than their authoritarian counterparts to economic costs (Hufbauer et al. 2007, 166-167). In this sense, democratic regimes are more likely to make concessions to the demands of the senders after sanction imposition or even under sanction threats to prevent and/or lower the negative economic and political consequences of sanctions.¹

¹For a democratic leader, continuous sanctions can threaten her political survival. Democratic audiences or constituencies punish their leaders through (re-) election in the sense that voters in democracies judge governments'

As noted above, autocrats tend to experience and resist economic sanctions for a longer time. Authoritarian rulers can make use of foreign sanctions for a longer tenure by scapegoating the sender. In this respect, autocrats rely heavily on the use of nationalistic sentiments and “rally-round-the-flag” events. They also have a strong incentive to reallocate their government resources in favor of satisfying their core supporting groups and/or repressing the domestic public who may have grievances over lower living standards that are a result of economic sanctions. In the end, economic sanctions can considerably affect autocrats’ social welfare policies. The effect is varied, however, according to political institutions.

This study shows that a dictatorship’s expenditure on social welfare goods and services depends on U.S. sanction duration and its political institutions. When dictators suffer economic sanctions that are sustained for a long time, the rulers have no choice but to reallocate their government revenues in public expenditure to ameliorate the negative impacts on their political survival. For example, a trade embargo imposed by the U.S. may worsen a national economy in a non-democracy. The economic devastation results in huge socioeconomic problems such as skyrocketing unemployment and higher costs for basic needs. Thus, an authoritarian government will face political pressure to reallocate its spending on social security, education, and public health. Dictators may lose their free sources because of a specific sanction (i.e., the suspension of foreign aid). Authoritarian regimes in the third world produce weak economies and inefficient governance. In those conditions, losing free income from abroad makes it difficult for autocrats to provide enough private goods to members of their ruling coalition. Dictators cut their expenditures on public goods to compensate for the huge losses of private goods to their ruling elites. It may thus be expected

commitments to public goods and services that may be aggravated by foreign economic sanctions (Bueno de Mesquita et al. 2003; Fearon 1994) Thus, democratic regimes become the sanction targets during a shorter time compared to autocracies.

that an autocrat under U.S. economic coercion will reduce spending on social welfare goods and services, expecting and/or experiencing economic hardships from sanctions.

However, the diversity of a political system within authoritarian countries leads to diverse policies of social welfare. Autocrats ruling with “some degree of (political) institutional constraints” and autocrats free of such constraints will implement quite different policies. Some dictators may strategically create political institutions to mimic ones in democracies. Those quasi-democratic institutions (e.g., political party and legislature) enable autocrats to survive longer in power. The institutions do this by providing the society relatively higher levels of public goods and by strengthening regime stability through the institutionalization of leadership change. Even under economic hardship, autocrats having institutions may expand the proportion of social welfare spending over government expenditure, comparing with autocrats having no such institutions. At the least, pseudo-democratic regimes refrain from sharply decreasing social spending, in part because they care about the public discontent and support for the revolutionary movement. It is thus hypothesized that U.S. sanction duration is positively associated with the changes in social expenditure when autocracies are constrained by pseudo-democratic institutions.

To test this argument, a series of econometric estimations are conducted to evaluate the impacts of U.S. sanction duration on changes in social welfare spending of autocratic governments. This study collects social spending data of 95 countries under dictatorial rule from 1970 to 2007. As concrete evidence and to minimize missing value problems, the study fills gaps in the data by using multiple imputations. A matching estimation is also conducted to improve the causal inference of the model by incorporating the potential outcomes in quasi-experimental settings. The empirical evidence confirms the diverse impacts of U.S. economic sanction duration on considerable variation in social spending among autocracies even with several controls.

This essay is divided into four sections. The first section briefly reviews of the negative externalities of economic sanctions against a target country. The second section discusses theoretical arguments regarding the impacts of sanctions on social welfare policies in autocratic targets. It also puts forward testable hypotheses. The third section lays out the research design and explains the measurement and the methodological techniques. As a statistical model, the study employs a panel error-correction regression with fixed effects using a multiple imputation to avoid inference problems from a large proportion of missing values. The section presents the regression results and their substantive interpretation using a matched dataset. Finally, I conclude this paper with a discussion of policy implications of the analysis and recommendations for the future research.

4.2 Literature Review

A growing number of quantitative studies have paid attention to the negative externalities of economic sanctions against target nations. Previous scholarship on economic sanctions has mainly focused on sanction effectiveness or sanction outcomes, asking whether economic sanctions extract targets' policy concessions. In contrast, recent studies on the political-economic consequences of economic sanctions have found that sanctions negatively influence the subjects outside winning coalitions in authoritarian countries. Existing studies on sanction initiation show that "democratic targets are more likely to be held responsible for economic failings and are more likely to view the threatened costs of sanctions as sufficiently severe. So, while democracies use sanctions more frequently, they tend not to use them against other democracies as often as they use them against autocracies" (Lektzian and Souva 2007, 856).

Recent studies has maintained that economic sanctions inadvertently harm the socioeconomic

and political conditions of a target nation. Such studies may be divided into two broad topics of interest: (1) sanction effects on social welfare conditions in targeted countries; and (2) sanction effects on political environments of targeted countries. On one hand, scholars have found that economic sanctions worsen public health conditions-such as infant or child mortality, and immunization (Peksen 2011)- and government commitments to public goods in the sanctioned states (Allen and Lektzian 2013). The second group of scholars have attempted to test the impacts of sanctions on political freedom (Peksen 2009; Peksen and Drury 2009), political repression/terrorism (Choi and Luo 2013; Escribà-Folch 2012; Wood 2008), and democratization (Peksen and Drury 2010). Most such studies have found that with regard to the aforementioned socio-political outcomes, economic sanctions have brought devastating consequences to the public in sanctioned states.

Arguments on sanctions' devastating effects demonstrate that economic sanctions worsen the social welfare environment for the public, weakening a target state's public goods and services. Peksen (2011) evaluated how economic sanctions affected the health conditions of civilians using the child mortality rate as an indicator. Economic hardships resulting from sanctions increase unemployment, inflation and poverty. Those unhealthy conditions of a target's economy "reduce people's ability to afford health-care services to maintain a healthy life and standard of living" and force "the government to cut health-care services" (Peksen 2011, 240). Peksen (2011) found that U.S. sanctions and sanction costs significantly and consistently increase child mortality rates, confirming his hypothesis of sanctions' detrimental effect on public health conditions. Another study attempted to analyze more indicators of public health conditions including several immunization rates, life expectancy, and food availability (Allen and Lektzian 2013). Allen and Lektzian (2013, 123) maintained that reduced resources caused by economic sanctions inevitably led to "allocation decisions" that negatively and indirectly influenced health outcomes in targeted countries. How-

ever, their study produced relatively mixed findings in different model specifications, which can neither confirm nor disconfirm the negative impacts of sanctions on public health.

Other scholars have focused on the reallocation of government expenditures on social welfare responding to economic sanctions. For example, [Allen and Lektzian \(2013\)](#) estimated the impact of sanctions on government spending on public health, finding a negative externality of sanctions. Interestingly, they took a sample of year-cases under military conflict and evaluated whether sanctions reduced government spending on public health. The result showed that high-cost and low-cost sanctions both significantly led governments to decrease their health expenditures. They also found that democracy has a positive effect on government health spending across several model specifications. Focusing mainly on authoritarian responses to economic sanctions, [Escribà-Folch \(2012\)](#) suggested that economic sanctions might affect autocratic governments' decisions to redistribute their public goods as they confront a sanctions-induced scarcity of resources. [Escribà-Folch \(2012\)](#) found that in all autocratic types the total government expenditure decreased under sanction imposition while single-party regimes increased government spending even under economic sanctions to a greater degree than did personalist regimes (the reference-regime in the model). He interpreted the result as single-party and military regimes "benefit[ing] their main support groups and thus negate(ing) the destabilizing effect of an increase in the price of loyalty brought on by sanctions" ([Escribà-Folch 2012](#), 699). Despite his findings, the analysis with many missing values lost a considerable amount of information in the dataset, increasing the risk of inefficient and biased estimation ([King et al. 2001](#); [Honaker and King 2010](#)).²

²[Escribà-Folch \(2012\)](#) analyzes the impact of economic sanctions on government expenditure using the data with 70 countries from 1970-2000. The number of observations in his dataset is around 800-1000. Almost half of his original data are missing. Alternatively, increasing number of scholars in international relations and comparative politics employ the multiple imputation technique to avoid missing data problems (e.g., [Ross \(2006\)](#)).

Sanction studies also have an interest in the effect of economic sanctions on political environments in a target nation. Those works primarily focus on political freedom, democratization and political repression. Scholars of sanctions have evaluated whether and how economic sanctions worsen political freedom and increase state repression within the targeted countries (Peksen 2009; Peksen and Drury 2009; Wood 2008). Wood (2008) estimated, for the first time, the relationship between economic sanctions and state repression, suggesting that economic sanctions tended to increase incentives for target incumbents to repress potential challengers and public discontents. In other words, incumbent leaders in a sanctioned country take advantage of using sticks against opposition groups and civilians so as to stabilize the country and set their core supporters at ease under gloomy effect of sanctions. He finds that “the results of the interaction terms for sanctions imposed on democracies provide partial support for (the hypothesis) on the mitigating effect of democratic institutions” in part because “democratic and autocratic states respond differently to sanctions events” (Wood 2008, 504). In addition, democracies tend to decrease, compared with autocratic regimes, their use of political repression even under economic sanctions imposed by the U.N. In a similar study, Peksen (2009) found that sanctions led to an increase in human rights abuses represented by physical integrity rights including disappearances, extrajudicial killings, political imprisonment, and torture. The difference between Wood (2008) and Peksen (2009) is the fact that the latter makes use of disaggregated indicators of human rights abuses in addition to two composite indicators such as physical integrity index and political terror scale; the former uses only political terror scale as his outcome variable. Peksen (2009) found that economic sanctions increased the human rights abuses in targeted nations across various model specifications. Unlike Wood (2008), however, he does not look into the conditional effect of economic sanctions on human rights given the variation in states’ political systems.

Despite numerous studies on the negative externalities of sanctions, relatively few have paid attention to variation in autocrats' commitments to public goods under economic sanctions. Most studies focus on variation in government policies between democracy and autocracy. Previous findings have shown that democracies tend to improve public goods for the ordinary population and increase expenditures for them and a high portion of economic sanctions have been imposed against non-democratic regimes. Thus, existing empirical results do little to provide new and interesting policy implications (King, Keohane and Verba 1994). For these reasons, the project focuses on the cases of non-democratic countries and their policy commitments under the influence of economic sanctions.

4.3 Theory: U.S. Sanction Duration and Social Welfare In Autocratic Targets

Under what conditions does U.S. sanction duration influence variation in social welfare policy within autocratic countries? As found in the literature, autocratic regimes provide ordinary civilians with relatively lower levels of public goods and services. Regarding social services, non-democracies seem to lack the capacity to reduce poverty, infant mortality, and illiteracy. When the sender imposes economic sanctions to a target state, target leaders should decide whether to make a concession to the sender's demands. If conceding to the sender's demands, a target leader can get more rewards from the sender through the direct assistance or the withdrawal of trade sanctions. If not, sanction costs will be influential. Sanctions aggravate the social-economic conditions of ordinary people rather than political elites in targeted countries (Allen 2008b; Lektzian and Souva 2007). For example, economic sanctions may lead some authoritarian rulers to bring hardship to their people by raising taxes and more repression (Escribà-Folch and Wright 2010).

Marinov (2005, 571-572) found that democratic leaders were more likely to be susceptible to economic sanctions than autocratic leaders. After all, “domestic publics if they could, replace their leaders” if sanction were more costly to the target state. It should be noted that a large proportion of sanctioned states are in fact non-democracies and less developed countries. It is said that autocratic countries tend to spend less on social welfare services and public goods than democratic ones. When targeted with sanctions, authoritarian rulers can, with a relatively small winning coalition, change social policies easier than can their democratic counterparts (Bueno de Mesquita et al. 2003). When economic sanctions are imposed against targeted autocracies, those autocracies are supposed to decide how to allocate governments’ resources in order to decrease both political and economic costs caused by sanctions. Those kinds of sanction costs are closely associated with dictators’ political calculation in regard to political survival. This section presents the theoretical mechanisms by disaggregating the effects of economic sanctions on social policies in autocracies.

Economic sanctions play a devastating role, through a variety of channels, in hurting economic wealth and changing political environments. First, a foreign embargo on import and export generate a negative externality to national economy. That is, a trade embargo on export reduces the export of industries in authoritarian states. Bans on exports tend to give rise to skyrocketing unemployment rates and lead to the bankruptcy of whole industries. The negative impacts of a trade embargo would be worse to economies containing less competitive industries. The subsequent increase in unemployment leads to a reduction in household income, which gives rise to growing poverty and the consequent malnutrition of children in poor households. In particular, the bankruptcy of domestic industries and the consequent high unemployment carry a heavy impact for many unskilled workers (specially women) who work mostly in labor-intensive industries in developing countries. For example, the U.S. trade embargo on Myanmar worsened the economic

conditions of garment workers, who “earn as little as 30 cents a day” and forced many girls and young women to “turn to prostitution or other marginal means to make a living” (Welsh 2003). In response to those kinds of economic difficulties, governments must decide whether to increase social spending to minimize the disastrous impacts on the public of a trade embargo on the public.

However, autocrats are more concerned about maintaining power than responding to the costs of sanctions that influence the life of the general population. As the duration of economic sanctions persists, dictators have a strong incentive to reallocate limited resources at least to compensate-by reducing government expenditure on public goods-for the loss of private goods for their coalition members. In addition, autocrats manipulate information and propaganda as they appease a discontented public, by diverting sanction costs to sanctioning states and at the same time boosting nationalism (Brooks 2002; Byman and Lind 2010).

Another theoretical rationale comes from aid reduction or suspension. Since the end of the World War II, U.S. foreign assistance has been ranked number one in foreign aid. Cutting off U.S. economic/military aid robs dictators of their “free resources” that mostly flow into sources of private goods for winning coalition groups (Escribà-Folch and Wright 2010). To compensate for the loss of foreign assistance, dictators have a strong incentive to reallocate sources of public goods to private goods by reducing education and health expenditures of government consumption. Without free resources, dictators can no longer offer enough financial sources to allow their supporting groups to buy and enjoy imported products including luxury commodities. In this context, ruling elites give much weight to potential losses to their existing benefits from economic sanctions. So to buy their support for the regime, they are likely to force incumbent autocrats to reallocate government resources to compensate for the lack of free resources. The above logic outlines the general allocation decision autocrats make when they face foreign economic sanctions, suggesting

the following hypothesis.

Hypothesis 4.1 *Main effect of U.S. sanction duration: An increase of U.S. sanction duration will be negatively associated with a change in social spending (social security/protection, education, and health).*

I expect that there might be some diversity in social welfare policy changes as reactions to foreign economic sanctions. Policy changes vary in terms of the political system of sanctioned governments. The allocation of social spending in autocracies may be influenced to the extent to which they rely on institutions. Institutions in authoritarian governments are created for the purpose of political survival. In other words, autocrats' political institutions play a role in preventing potential revolutionary threats from the inside and/or even outside the winning coalition. For doing so, autocratic rulers sometimes co-opt their potential challengers or repress them. Autocrats with institutional constraints tend to increase public goods that benefit a much broader size of the winning coalition to deter revolutionary or opposition movements.

When an autocrat becomes a target of U.S. sanctions, the commitment(s) to social welfare policy depends on the autocrat's political institutions. As sanctions persist, autocrats may face both economic costs and political risks. Economic sanctions result in economic hardships and poor economic performance in targeted countries. Worsened economic circumstances may increase public discontent with and grievances against the incumbent autocracy. The mass public will have a strong incentive to support opposition groups that used to be relatively weak (Wood 2008, 494). Potential challengers or the opposition represent imminent threats to a dictatorship because they can mobilize a protest on behalf of regime change or revolution through the public's economic grievances (Haggard and Kaufman 1995). Those groups prefer revolution or rebellion against

autocracies. To deter this revolutionary threat, autocrats need to handle public grievances and prevent the opposition from becoming stronger. Thus, some autocrats have strong incentives to favor more public goods than do some other autocrats. When dictators have nominal-democratic institutions including political parties and a legislature, they tend to adopt a more inclusive policy on public goods when economic sanctions may threaten their political survival by way of triggering a potential revolution or a mass movement.

When facing economic difficulties from sanctions, autocrats with institutions implement a more extensive policy on public goods than those without institutions. Existing literature on power-sharing argument provides some theoretical backgrounds to solve this puzzle. According to the power-sharing argument, autocracies with pseudo-democratic institutions tend to be less sensitive to regime breakdown than non-institutionalized autocracies. For instance, [Boix and Svolik \(2013, 301\)](#) argued that quasi-democratic dictatorships have relative transparency in power because of “regular interaction between the dictator and his allies” within the party and legislature. Even if the political process within institutionalized autocracies is still less transparent than in democracies, it is relatively transparent comparing to autocracies without institutions. Autocratic regimes with seemingly-democratic institutions are advantageous in terms of regime resilience due to their transparency and commitment problem solutions. Hence, the institutional dictator, once established, is less likely to experience the threat of a coup ([Svolik 2009](#)). In addition, power-sharing institutionalization between autocrats and ruling elites can make a ruling coalition more stable, even under unfavorable conditions ([Boix and Svolik 2013, 301](#)). Co-optation through nominal-democratic institutions is closely associated with the long-term political careers within political system because members of the winning coalition care about more than just the immediate material benefits such as cash and subsidies ([Svolik 2012](#)).

When economic sanctions last longer and devastate the economy, ruling elites calculate the cost-benefits of defecting from the incumbent autocrats. Deciding to defect relies on the equation of the probability of success and the guarantee of privileges/benefits that at least reach the level of the old regime. Such uncertainty may lead ruling elites to prefer the status quo to defection. At the same time, public spending on education and health play a signaling role of caring about the broader segment of the population and improving the long-term prospects of them because those public goods are closely associated with promoting human capital (Tenorio 2014). As sanctions are imposed for a longer time, autocrats with institutional constraints seek to deter potential mass movement connected with the opposition. They do so by showing their costly signals to the public- i.e, providing at least moderate social welfare.

Hypothesis 4.2 *Interaction effect of U.S. sanction duration:* *An increase of in the duration of U.S. sanctions duration will be positively associated with a change in social spending (social security/protection, education, and health) when an autocrat has pseudo-democratic institutions.*

4.4 Data and Methodology

This examines whether U.S. economic sanctions affect social welfare spending based on a country-year panel data with 95 authoritarian countries between 1970 and 2007. To measure social welfare expenditures, the study uses data of “expenses by function of government” in Government Finance Statistics (GFS) yearbook (1977-2011) published by the International Monetary Fund (IMF). Public spending on social security/protection, education and health is calculated as

percentage of total government expenditure.³

4.4.1 Dependent Variable

The outcome variables in this essay are the amount of social welfare expenditures as the percentage of total government spending. The social security/protection expenditure represents public spending on social security and welfare/services including labor interventions, pensions, and unemployment assistance. The education expenditure is used, as it indicates a government's expenses on education that include spending for "pre-primary and primary education, secondary education" and so on, for instance. The health expenditure includes spending on "services provided to individual persons and services provided on a collective basis" referring to "hospital services and public health services" (IMF 2001, 97-101).⁴

This study covers 95 authoritarian countries from 1970 to 2007, thus including both the Cold War and post-Cold War.⁵ I adopt [Przeworski and Limongi \(2000, 28-29\)](#)'s definition of dictatorship. They classified a country as a dictatorship, which does not satisfy all the following conditions: (1) the government should be elected; (2) the legislature should be elected; (3) there should be more than two parties; and (4) there should be alternation which provides a real chance of opposition's taking power in the future.

³There are two reasons to use each social spending as percentage of total government spending. On the one hand, social expenditure as "a share of total government spending" reflects government policy priorities better than "as a share of GDP" even if many studies employ the latter measure ([Rudra and Haggard 2005, 1022-1023](#)). GFS yearbooks, on the other hand, do not consistently provide information of government expenditures on social spending as a share of GDP across time-periods. GFS yearbooks are more useful than the World Development Indicators in the sense of data availability for specific sectors of social spending - social protection, education and health.

⁴In addition, I try to include social welfare spending in aggregating all three expenditures on social security, education and health. However, I do not analyze whether the U.S. sanctions influence this aggregated social spending due to missing data across three expenditures in an irregular way.

⁵I exclude authoritarian countries that have no data in each social spending. A large portion of those excluded countries have a very small size in population.

4.4.2 Independent Variables

The main explanatory variable for the analysis is the duration of the U.S. sanctions. The U.S. sanction duration is measured as the cumulative years of sanctions imposed by the U.S. This indicates that as economic sanctions are imposed, their effect on political leaders and civilians in each state is in the long term rather than the short term.

Secondly, in measuring the institutionalization of autocratic regimes, this study makes use of an indicator taken from Cheibub, Gandhi and Vreeland (2010)'s the Democracy and Dictatorship (DD) dataset. The institution variable is measured as a dichotomous indicator, which is coded as 1 if a dictatorship allows for nominal-democratic institutions such as legislatures and at least one political party, and 0 otherwise (Kim and Gandhi 2010).

4.4.3 Control Variables

Previous literature provides alternative explanations for social welfare spending. To include additional determinants to social spending is likely to reduce the risk of a spurious relationship between the outcome and explanatory variables. So several alternative variables are included for control: GDP per capita, trade openness, aid/GDP, oil income, government consumption, population, and civil war.

First, I include some economic variables as controls. The income variable (*GDP per capita*), indicating economic development, is measured as the natural log of GDP per capita.⁶ The GDP per capita comes from the Penn World Tables (PWT). Trade openness is logged and measured as a percentage of exports plus imports divided by GDP at 2005 constant prices. It also comes

⁶This variable is logged to make positively skewed distribution of data more normalized.

from the PWT. *Trade openness* is logged and measured as a percentage of exports plus imports divided by GDP at 2005 constant prices. It also comes from the PWT. It is widely used as a driving force to increase government revenues that “collected at the border are among the least difficult to obtain. Because they have to pass through a few checkpoints to leave or enter a territory legally, imports and exports form a base upon which governments may impose a tax with relative ease. For this reason, foreign trade taxes have tended to represent the main source of government income” (Cheibub 1998; Escribà-Folch and Wright 2010).

To measure free resources for dictators, both foreign aid and oil-revenues are used. Aid indicator refers to foreign aid as a percentage of GDP (Aid/GDP). The foreign assistance data come from World Bank’s World Development Indicator (WDI). Another free resource is generated from oil production. This variable (*Oil income*) is measured as the total oil income per capita provided by (Haber and Menaldo 2011).⁷ Government spending is measured with the percent share of GDP and the data come from PWT. The increase in government expenditure might flow into social spending. Population, which also comes from PWT, is logged.

Lastly, civil war, a dichotomous variable, is coded as 1 if a country has experienced an intra-state conflict with at least 1,000 battle deaths in a given country-year and coded as 0 otherwise. The data come from Version 4 - 2012 of the UCDP/PRIO Armed Conflict Dataset (Gleditsch 2002).⁸

⁷Haber and Menaldo (2011, 14) describe in their supplementary appendix that total oil income per capita is calculated as “crude oil production times the price of crude oil in 2007 dollars, divided by population.”

⁸See, http://www.pcr.uu.se/research/ucdp/datasets/ucdp_prio_armed_conflict_dataset/

4.5 Estimation & Results

4.5.1 Methodology

Since the data are characterized as the pooled time-series, I takes into account the methodological issues of both time-series and cross-sectional features. In other words, the study needs to control for the possibility of autocorrelation and heteroskedsticity. First, to control for autocorrelation, it is recommended to include a lagged dependent variable (LDV) an independent variable (Beck and Katz 2011). Some political scientists raise questions about the effectiveness of using LDVs in the model because the inclusion of LDVs might increase the risk of making inaccurate inference leading other independent variables to lose their explanatory power (Achen 2000). However, Keele and Kelly (2006, 17-18) suggested some criteria for applied researchers to use LDVs: (1) under the dynamic situation, without LDVs, linear regression can lead to a biased estimation, (2) an Autoregressive-Moving-Average (ARMA) model is recommendable even under the ‘weakly dynamic’ the data generating process, and (3) under the dynamic process, regression with LDVs produces a better model than the alternatives. For deciding whether to use LDVs and/or to take into account the dynamic situation in this research question, the study employs an appropriate method to estimate the impact of U.S. sanctions on the ‘change’ of social welfare spending in autocratic countries. It is expected that U.S. economic sanctions have dynamic effects on social spending. For this, I use error-correction model (ECM) to account for dynamic processes, which is modeled in the following way (De Boef and Keele 2008).

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \beta_1 \Delta X_t + \beta_2 X_{t-1} + \varepsilon_i$$

This model becomes popular among political scientists who primarily focus on the dynamic

change of their dependent variables that are affected by independent variables. ECM is recommendable for both non-stationary and stationary data to primarily analyze the dynamic change of the outcome variables (De Boef and Keele 2008; Keele and Webb 2016).

Another issue to be considered in data analysis here is missing values in the data. There is some degree of missing values in this data.⁹ In particular, missing values in social spending data of authoritarian countries may cause serious problems in the analysis (Honaker and King 2010). The study estimated the regressions using the imputed dataset. To increase the validity of the statistical inference from the multiple imputation, the study generated five imputed dataset (as the default of Amelia II). The imputation procedure was set up to deal with time-series cross-sectional datasets (Honaker and Blackwell 2011). The imputation includes all variables used in the main analysis along with some relevant economic indicators. It is recommended that analysts should add more information to make imputation more plausible (Honaker and Blackwell 2011). After doing the imputation, post-imputation diagnostics were carried out using plots to compare observed with imputed values (See Appendix). Then, I estimated five regression analyses using five imputed datasets to obtain the mean value of the coefficients and standard errors with significance levels. The Stata automatically calculated them based on Rubin's rule (Honaker and Blackwell 2011). Table 4.1 shows the results of the error-correction model using the imputed datasets. Many explanatory variables for the immediate effects are not significant except for a few variables with statistical significance. But, with regard to the long-term effects, the interaction effects of U.S. sanction duration and autocratic institutions are statistically significant, consistent with the main findings except for the health spending model. Alternatively, the study ran each separate regression

⁹I generate missing map to detect how many data are missing. Among variables, social spending variables are missing for more than 40 percent. I make plots to show how similar imputed data are to observed data (see Appendix). Overall, imputed data closely fit the distribution of observed values.

using all the imputed data. The finding of each model is more consistent with the study's main results and supports the hypothesis.

A third methodological concern is the causality of the empirical findings. Unlike experimental methods, quantitative analysis using observational data is assumed to be weak in the sense of controlling extraneous variables (Lijphart 1971). The important concern in the analysis is whether sanctioned states will tend to reduce spending on social welfare policies compared with 'similar' countries without U.S. sanctions. To improve the effect of cause, empirical studies need to consider the counterfactual or 'potential outcomes' of the model (Morgan and Harding 2006). In other words, empirical studies should take into account both observed and unobserved outcomes.¹⁰ For a quasi-experimental setting, I use propensity score matching to compare authoritarian countries that were targets of U.S. economic sanctions to very similar autocracies that experience no U.S. sanction impositions.¹¹ To make appropriate cases, I matched autocratic countries on GDP per capita, governmental expenditure, trade openness, oil income, population, foreign aid over GDP, and civil war. This allows for a comparison of closely matched pairs without additional controls for variables represented as alternative explanations of the level of social spending in autocratic regimes. In the analysis, the study treated an autocratic country with U.S. sanction imposition as a treated group and the most similar country except the sanction treatment is included in the control group to estimate the causal effect of U.S. economic sanctions. For conducting matching, the study

¹⁰For instance, let us estimate the effect of democracy on economic development using the case of Chile in 1985 (Kohli et al. 1995). We actually observed 1985 Chile as an authoritarian regime and know the GDP per capita income of 1985. To estimate the impact of democracy on development, we also need to observe 1985 Chile as a democracy at the same time. Unfortunately, we can seldom find democratic Chile in 1985 in observed data. Thus, we need to rely on a quasi-experimental method "to look for a case that is exactly like Chile in all aspects other than its regime" (Kohli et al. 1995, 16-17).

¹¹There is a variety of matching techniques. Among them, I employ 'genetic matching' because it is nonparametric and so does not predefine the distribution. In addition, genetic matching "automatically finds the set of matches that minimizes the discrepancy between the distribution of potential confounders (extraneous variables) in the treated and control groups" (Sekhon 2009, 499).

employs Matchit program using R (Ho et al. 2011).

Lastly, I used a matching algorithm to construct a sample for both treatment groups (i.e., sanction-targeted countries) and control groups (i.e., non-sanctioned countries) that are similar in several characteristics (see Appendix for balance statistics). For the matching procedure, the study applied a genetic algorithm (as mentioned above). First, I estimate the analysis combining all five matched datasets and then produce the point estimates using Rubin's rule. At the sample, I attempt to calculate the average values of all five imputed data and then collect the matched data. After this, I find which country is included in the matched dataset. Based on the selected sample, I get the matched data using only selected countries from the previous procedure.

4.5.2 Results

In this section, I present the main findings of estimating the impacts of U.S. sanction duration on social security/protection, education, and health spending, by looking into both the short-term and the long-run effects. Using the ECM method, I can identify changes in the outcome variable by looking into both the immediate effect of and a long-run effect of regressors on the dependent variables.

$$\begin{aligned} \Delta \text{Social Spending}_t = & a_0 + a_1 \text{Social Spending}_{i,t-1} + b_1 \text{US Sanction Duration}_{i,t-1} \\ & + b_2 \Delta \text{US Sanction Duration} + b_3 \text{Institutions}_{i,t-1} + b_4 \text{US Sanction Duration} \times \text{Institutions}_{i,t-1} \\ & + b_5 \Delta \text{US sanction duration} \times \text{Institutions}_{i,t-1} + b_6 \text{Controls}_{i,t-1} + b_7 \Delta \text{Controls} \end{aligned}$$

The analysis begins in Table 4.1 with six models of social security, education, and health spending, using five imputed datasets. The estimation results are based on the Driscoll and Kraay robust standard errors estimation that controls for heteroskedasticity, autocorrelation, and cross-sectional

dependence (Driscoll and Kraay 1998; Hoechle 2007). The first model specification in each outcome variable (Models 1, 3 and 5) in Table 4.1 simply conducts a baseline estimation (the main effects of U.S. sanction duration) with no interaction variables. In regard to the short-term effects, the study finds that the analysis does not support for my hypothesis that the impacts of U.S. sanction duration on change in social welfare spending (social security, education, and health). For instance, the result in Model 1 shows that the changes in U.S. sanction duration have a positive but insignificant impact on changes in social security spending. Regarding education and health spending, the changes in U.S. sanction duration also have negative, though not statistically significant, impacts.

In the interaction models (Models 2, 4 and 6), the effects of U.S. sanction duration on social spending depend on autocracies' political institutions. For example, the outcome in Model 2 shows that the changes in U.S. sanction duration are negatively associated with the changes in social security expenditure when autocracies have institutional constraints. But, the coefficient for the variable is not statistically significant. Regarding spending on education and health, interaction effects of changes in U.S. sanction duration and institutions are also not significant even though the causal direction is positive.

With regard to the long-term effects, the level of U.S. sanction duration have a positive and significant influence on the change in social security expenditure (Model 1). The result indicates that autocratic leaders tend to increase government spending on social security/protection in order to compensate for the loss of income for their coalition members in part due to economic sanctions. This result is consistent with some literature on social security policy that tends to be restricted to the small segment of population in the developing world. When autocrats experience U.S. sanctions, they co-opt regime supporting groups including the military, civil servants, and privileged

Table 4.1: Panel Regression of US Sanction Duration and Social Spending in Autocracies, 1970-2007 (Imputed Data)

	Δ Social security/protection		Δ Education		Δ Health	
	Additive Model 1	Interaction Model 2	Additive Model 3	Interaction Model 4	Additive Model 5	Interaction Model 6
Short-run effects						
Δ US sanction duration	0.112 (0.0726)	0.319* (0.167)	0.0432 (0.0634)	-0.0185 (0.195)	0.0108 (0.0305)	-0.0296 (0.0656)
Δ US sanction duration x Institutions $_{t-1}$		-0.260 (0.180)		0.0822 (0.202)		0.0514 (0.0649)
Δ GDP per capita (log)	-2.601** (1.177)	-2.561** (1.165)	-0.266 (1.171)	-0.294 (1.161)	-0.539 (0.399)	-0.547 (0.396)
Δ Government consumption (%)	-0.0170 (0.0465)	-0.0137 (0.0465)	0.0137 (0.0474)	0.0115 (0.0479)	0.0521 (0.0366)	0.0513 (0.0367)
Δ Population (log)	0.985 (0.847)	0.911 (0.862)	0.378 (0.539)	0.436 (0.550)	0.0815 (0.240)	0.0990 (0.240)
Δ Oil income (log)	0.515 (0.389)	0.503 (0.395)	0.140 (0.263)	0.147 (0.262)	0.0838 (0.122)	0.0870 (0.123)
Δ Aid/GDP(%)	0.0328 (0.0373)	0.0340 (0.0371)	-0.0825*** (0.0183)	-0.0833*** (0.0184)	-0.00574 (0.0104)	-0.00603 (0.0105)
Δ Trade openness(%)	0.00489 (0.00570)	0.00492 (0.00572)	0.00491 (0.00424)	0.00490 (0.00421)	0.00309 (0.00237)	0.00309 (0.00236)
Long-run effects						
US sanction duration $_{t-1}$	0.0789** (0.0347)	0.188** (0.0700)	-0.0396 (0.0242)	-0.124*** (0.0473)	-0.0172 (0.0175)	-0.0443** (0.0223)
Institutions $_{t-1}$	0.833** (0.361)	1.105*** (0.380)	-0.816** (0.306)	-1.013*** (0.303)	-0.127 (0.164)	-0.193 (0.170)
US sanction duration x Institutions $_{t-1}$		-0.146* (0.0780)		0.112** (0.0534)		0.0364 (0.0288)
GDP per capita (log) $_{t-1}$	-1.136** (0.519)	-1.104** (0.521)	-0.522 (0.446)	-0.551 (0.446)	-0.202 (0.163)	-0.212 (0.163)
Government consumption (%) $_{t-1}$	-0.0708** (0.0356)	-0.0685* (0.0360)	0.0161 (0.0503)	0.0139 (0.0508)	0.0241 (0.0164)	0.0235 (0.0164)
Population (log) $_{t-1}$	1.724*** (0.521)	1.601*** (0.511)	0.776*** (0.296)	0.874*** (0.298)	0.134 (0.156)	0.165 (0.155)
Oil income (log) $_{t-1}$	-0.186 (0.187)	-0.187 (0.188)	-0.210 (0.174)	-0.213 (0.174)	-0.0422 (0.0815)	-0.0423 (0.0814)
Aid/GDP (%) $_{t-1}$	0.0173 (0.0209)	0.0192 (0.0207)	-0.0651*** (0.0160)	-0.0667*** (0.0162)	-0.0105 (0.00746)	-0.0110 (0.00755)
Trade openness (%) $_{t-1}$	0.0118* (0.00600)	0.0118* (0.00603)	0.00674* (0.00352)	0.00679* (0.00355)	0.00282** (0.00137)	0.00284** (0.00137)
Civil war $_{t-1}$	-0.440 (0.480)	-0.323 (0.495)	0.768* (0.422)	0.680 (0.422)	0.413*** (0.160)	0.383** (0.163)
Lagged dependent variables	-0.688*** (0.0281)	-0.692*** (0.0279)	-0.730*** (0.0308)	-0.731*** (0.0306)	-0.728*** (0.0381)	-0.729*** (0.0380)
Constant	-0.824 (5.035)	-0.191 (4.992)	7.984* (4.056)	7.547* (4.064)	4.184** (1.694)	4.040** (1.689)
No. of obs.	2502	2502	2502	2502	2502	2502
No. of country	95	95	95	95	95	95
No. of imputation	5	5	5	5	5	5

Note: Standard errors in parentheses. Two-tailed test, using Stata 12.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

organized constituencies in the developing states (Huber and Stephens 2012; Wibbels 2006).¹² Regarding education and health spending, the level of U.S. sanction duration have negative but insignificant impacts.

The result in Model 2 shows that the interaction term with the level of U.S. sanction duration and institutions is statistically significant with negative signs for the change in social security spending. These results may be surprising regarding the interactive effects of U.S. sanction duration and autocratic institutions. Autocracies with pseudo-democratic institutions may want to implement more inclusive and extensive social welfare policies than non-institutional autocracies when U.S. sanction duration increases. But, empirical findings suggest that dictators with institutional constraints tend to reduce expenditure on social security when they experience U.S. sanction longer. In other words, as U.S. sanctions are imposed and persist, autocrats with quasi-democratic institutions may reallocate government resources to the sectors of public goods to deter public discontent and potential revolutionary threats created by economic hardships. So, they may decrease spending on social security because most beneficiaries are a part of winning coalition and may prefer regime survival to regime breakdown and/or change by sacrificing some portion of their material benefits. Regarding the estimation results of education and health spending, the interaction term with U.S. sanction duration and institutions is positive with expected signs in Models 4 and 6. However, the only statistical significant interaction term is in the education spending equation.

¹²Most public policies retain the characteristics of both private and public goods (Bueno de Mesquita and Smith 2010). But, some policies may favor a specific segment of the population as considered as a part of private goods. Here I regard social security spending in autocracies as private rather than public goods for a few reasons. Government expenditure on social security tends to be restrictive in the developing world. A number of scholars argue that social security spending or transfer is mainly associated with pensions. In particular, Kaufman and Segura-Ubiergo (2001) posit that each subtype of social welfare spending has its own “political logics.” According to Kaufman and Segura-Ubiergo (2001, 576), the general social security includes “antipoverty programs and targeted assistance to the poor” but pensions mainly target “the middle class” and “workers in the formal sector” in Latin American countries. ?) argue that pension systems in many Asian countries tend to be “skewed toward urban areas and the formal sector” and “initially covered only government workers.”

Regarding the effects of control variables, some findings should be noted particularly. First, logged GDP per capita income has both a short-term and long-term effect in the model of social security spending. It has no immediate or long-term effects on changes in education and health spending. This result is relatively consistent with previous studies' findings of the inconsistent impacts of GDP per capita on social spending (Kaufman and Segura-Ubiergo 2001).

Second, non-tax revenues such as oil income and foreign aid have mixed results, even if they have the expected direction mentioned in some of the literature. On one hand, the level of oil income has a negative sign but insignificant effect on the change in all three kinds of social spending. Foreign aid, on the other hand, has a negative and significant effect on government expenditure only on education all model specifications (Models 3 and 4). The result confirms the current argument about the effect of foreign aid; as a recipient government is more dependent on foreign assistance, it pays less attention to long-term economic development through the improvement of human capital such as education.

Third, the level of trade openness is statistically significant in explaining the changes in social spending. In models of all three social spendings, the effect of trade openness has a positive significance only in the long run.

Lastly, I used a matching algorithm to construct a sample for both treatment groups (i.e., sanction-targeted countries) and control groups (i.e., non-sanctioned countries) that are similar in several characteristics (see Appendix for balance statistics). For the matching procedure, the study applied a genetic algorithm (as mentioned above). I produce five matched data from multiple imputations and then estimate the regression using each matched data (Table 4.2). Overall, the findings support for my argument.¹³

¹³I estimate the analysis combining all five matched datasets and then produce the point estimates using Rubin's

Table 4.2: Regression using Matched Samples (Imputed Datasets)

	Δ Social security		Δ Education		Δ Health	
	Additive Model 1	Interaction Model 2	Additive Model 3	Interaction Model 4	Additive Model 5	Interaction Model 6
Imputed Dataset 1						
Δ US sanction duration	0.0693 (0.0466)	0.356*** (0.0995)	0.0560 (0.0607)	-0.0455 (0.0663)	0.0190 (0.0134)	-0.0105 (0.0415)
US sanction duration $_{t-1}$	0.206*** (0.0658)	0.344*** (0.114)	-0.0834 (0.0525)	-0.288*** (0.0876)	0.0115 (0.0157)	-0.0433 (0.0333)
Institutions $_{t-1}$	1.714** (0.824)	2.870*** (1.048)	-0.828* (0.447)	-2.534*** (0.490)	-0.249 (0.245)	-0.699** (0.329)
Δ US sanction duration x Institutions $_{t-1}$		-0.347*** (0.124)		0.127 (0.112)		0.0372 (0.0498)
US sanction duration x Institutions $_{t-1}$		-0.187* (0.0980)		0.302*** (0.0829)		0.0808** (0.0363)
No. obs.	493	493	493	493	493	493
No. of country	51	51	51	51	51	51
Imputed Dataset 2						
Δ US sanction duration	0.134* (0.0701)	0.367*** (0.104)	0.00993 (0.0603)	-0.212*** (0.0639)	0.0269 (0.0161)	-0.00618 (0.0296)
US sanction duration $_{t-1}$	0.138** (0.0636)	0.235** (0.104)	-0.0555 (0.0617)	-0.258** (0.109)	0.00522 (0.0184)	-0.0387** (0.0178)
Institutions $_{t-1}$	0.816 (1.192)	1.579 (1.029)	-0.427 (0.626)	-2.019*** (0.482)	-0.239 (0.248)	-0.584* (0.299)
Δ US sanction duration x Institutions $_{t-1}$		-0.284*** (0.0995)		0.272** (0.106)		0.0414 (0.0365)
US sanction duration x Institutions $_{t-1}$		-0.127 (0.112)		0.288*** (0.0977)		0.0639** (0.0247)
No. obs.	495	495	495	495	495	495
No. of country	51	51	51	51	51	51
Imputed Dataset 3						
Δ US sanction duration	0.140* (0.0739)	0.465** (0.181)	0.0182 (0.0486)	-0.129 (0.0844)	0.0122 (0.0107)	-0.0162 (0.0331)
US sanction duration $_{t-1}$	0.201** (0.0852)	0.294** (0.125)	-0.0469 (0.0393)	-0.234** (0.0981)	0.00722 (0.0187)	-0.0209 (0.0341)
Institutions $_{t-1}$	1.459 (0.935)	2.275* (1.337)	-0.635* (0.351)	-2.251*** (0.616)	0.132 (0.229)	-0.111 (0.368)
Δ US sanction duration x Institutions $_{t-1}$		-0.390** (0.189)		0.181* (0.105)		0.0351 (0.0338)
US sanction duration x Institutions $_{t-1}$		-0.116 (0.119)		0.273*** (0.0886)		0.0411 (0.0381)
No. obs.	483	483	483	483	483	483
No. of country	50	50	50	50	50	50
Imputed Dataset 4						
Δ US sanction duration	0.197* (0.105)	0.218 (0.148)	0.00374 (0.0505)	-0.102 (0.0712)	0.0267* (0.0133)	0.00624 (0.0408)
US sanction duration $_{t-1}$	0.180*** (0.0584)	0.224* (0.116)	-0.0462 (0.0655)	-0.163* (0.0827)	0.0305 (0.0207)	-0.00662 (0.0233)
Institutions $_{t-1}$	1.390 (0.969)	1.777 (1.186)	1.120** (0.540)	0.0964 (0.657)	-0.00128 (0.255)	-0.321 (0.296)
Δ US sanction duration x Institutions $_{t-1}$		-0.0270 (0.161)		0.133 (0.0985)		0.0265 (0.0438)
US sanction duration x Institutions $_{t-1}$		-0.0725 (0.134)		0.186*** (0.0624)		0.0604** (0.0281)
No. of obs.	490	490	490	490	490	490
No. of country	51	51	51	51	51	51
Imputed Dataset 5						
Δ US sanction duration	0.0979 (0.0713)	0.388** (0.171)	0.0357 (0.0455)	-0.0656 (0.0913)	0.0265*** (0.00947)	0.0227 (0.0341)
US sanction duration $_{t-1}$	0.0949* (0.0523)	0.226* (0.130)	0.0545 (0.0739)	-0.172 (0.127)	0.0433** (0.0184)	-0.00980 (0.0401)
Institutions $_{t-1}$	1.488* (0.813)	2.552** (1.088)	0.480 (0.342)	-1.333** (0.508)	0.329 (0.325)	-0.0904 (0.395)
Δ US sanction duration x Institutions $_{t-1}$		-0.349* (0.194)		0.123 (0.111)		0.00562 (0.0387)
US sanction duration x Institutions $_{t-1}$		-0.168 (0.144)		0.319*** (0.103)		0.0764** (0.0357)
No. of obs.	493	493	493	493	493	493
No. of country	51	51	51	51	51	51

Note: Driscoll and Kraay standard errors in parentheses.. Two-tailed test, using Stata 12.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.6 Conclusion

This paper investigates the essential features of social spending in autocratic regimes in regard to U.S. economic sanctions. It is argued that free resource reduction and economic difficulties from foreign economic sanctions make a distinctive difference in the pattern of social spending in dictatorships. States under U.S. economic sanctions invest less in public goods and services. Government expenditures on social protection, public education and health care is clearly lower (using aggregated data, 1970-2007) when an autocratic country experiences U.S. economic sanctions for longer.

The evidence showed that in authoritarian countries U.S. economic sanctions decreased the level of social spending in spite of controls for alternative explanations-the level of political development, economic conditions, and so forth. The study also improved the casual inference of sanction effects on social expenditure using matching estimation, which takes into account the counterfactual framework. The results from matching method confirmed the negative externality of economic sanctions with regard to authoritarian governments' commitments to public goods. In addition, this paper also verified the negative effects of sanctions on "changes" in social expenditure in the dynamic processes. But the counterproductive consequences of U.S. sanction duration vary according to a target autocracy's institutional constraints. More specifically, autocracies relying on pseudo-democratic institutions do not sharply cut government spending on public goods such as expenditure on education and health but reduce social security spending a little more than did non-institutional autocracies.

rule. At the sample, I attempt to calculate the average values of all five imputed data and then collect the matched data. After this, I find which country is included in the matched dataset. Based on the selected sample, I get the matched data using only selected countries from the previous procedure.

A few of the findings should receive special emphasis. First, the findings are consistent with the hypothesis that more inclusive autocracies having institutions have systematically different policy preferences over social welfare spending compared to non-institutionalized autocracies. This means that autocrats with institutions are concerned not only about their ruling coalitions in favor of regime survival but also care about the potential threats from opposition and revolutionary groups in hard times such as those involving sanctions-induced economic hardship. In order for them to remain in power, autocrats have a strong incentive to prevent the general public from supporting a revolution or a revolutionary-led regime collapse. Second, autocrats tend to provide their ruling coalition groups placated with a sufficient store of private goods. But to survive economically tough times, autocracies that rely on nominal democratic institutions do cut some government spending such as social security. In this context, the social security system in autocracies may in general have more characteristics of private goods rather than of public goods. In addition, the results suggest that not always do U.S. sanctions produce adverse effects on the general populace in autocracies. At the same, autocracies having pseudo-democratic institutions tend to survive foreign sanctions by providing the general population with more inclusive public goods and services than do autocrats without such institutions.

4.7 Appendix III

4.7.1 Summary Statistics (Table 4.3)

4.7.2 Panel ECM of US Sanction Duration and Social Spending in Autocracies, 1970-2007: Original Dataset (Table 4.4)

4.7.3 Panel ECM using Unmatched and Matched Samples: Original Dataset (4.5)

4.7.4 Balance Statistics of Genetic Matching (Table 4.6)

4.7.5 Post-imputation Diagnostics (Figure 4.1)

Table 4.3: Summary statistics (Original dataset)

Variable	Mean	Std. Dev.	Min.	Max.	N
Social security spending	8.772	10.022	0	54.23	1312
Education spending	13.619	6.089	0.17	30.45	1401
Health spending	5.402	2.832	0.03	20.93	1399
US sanction duration	2.331	6.890	0	58	3070
Institutions	0.662	0.473	0	1	3070
Polity	-4.795	4.794	-10	10	3005
Civil war	0.117	0.321	0	1	2996
Government consumption	12.098	8.936	0.732	58.641	2862
Trade openness	67.368	48.248	1.161	428.955	2862
Aid/GDP	7.596	10.682	-0.453	108.325	2470
Population (log)	8.907	1.557	4.824	14.086	2975
Oil income (log)	2.351	3.143	0	11.272	2979
GDP per capita (log)	7.679	1.148	5.081	11.514	2862

Table 4.4: Panel ECM of US Sanction Duration and Social Spending in Autocracies, 1970-2007
(Original Data)

	Δ Social security/protection		Δ Education		Δ Health	
	Additive Model 1	Interaction Model 2	Additive Model 3	Interaction Model 4	Additive Model 5	Interaction Model 6
Short-run effects						
Δ US sanction duration	0.138** (0.0575)	0.240*** (0.0562)	-0.0474* (0.0282)	-0.0423 (0.0513)	-0.0249 (0.0167)	-0.0266 (0.0221)
Δ US sanction duration x Institutions $_{t-1}$		-0.250*** (0.0903)		0.0169 (0.0619)		0.0177 (0.0192)
Δ GDP per capita (log)	-4.037** (1.741)	-4.025** (1.700)	-1.388 (1.020)	-1.390 (1.009)	-0.399 (0.602)	-0.402 (0.606)
Δ Government consumption (%)	-0.0871 (0.0619)	-0.0884 (0.0619)	-0.0523 (0.0429)	-0.0512 (0.0423)	0.00862 (0.0286)	0.00915 (0.0284)
Δ Population (log)	5.731*** (1.685)	5.837*** (1.588)	11.90*** (0.616)	11.86*** (0.620)	6.028*** (1.042)	6.006*** (1.062)
Δ Oil income (log)	0.206 (0.232)	0.184 (0.228)	-0.225 (0.301)	-0.216 (0.302)	0.104 (0.0784)	0.110 (0.0770)
Δ Aid/GDP(%)	0.0591** (0.0293)	0.0569* (0.0291)	-0.0795*** (0.0233)	-0.0797*** (0.0232)	-0.0384*** (0.0116)	-0.0384*** (0.0115)
Δ Trade openness(%)	0.00335 (0.00581)	0.00397 (0.00568)	-0.00400 (0.00685)	-0.00413 (0.00680)	-0.00189 (0.00366)	-0.00197 (0.00365)
Long-run effects						
US sanction duration $_{t-1}$	0.107** (0.0430)	0.220*** (0.0696)	-0.105*** (0.0290)	-0.135*** (0.0482)	-0.0231 (0.0161)	-0.0404* (0.0221)
Institutions $_{t-1}$	0.769** (0.352)	1.207** (0.485)	-0.346** (0.140)	-0.453*** (0.152)	-0.151 (0.136)	-0.214 (0.157)
US sanction duration x Institutions $_{t-1}$		-0.269*** (0.0919)		0.0700 (0.0578)		0.0415* (0.0217)
GDP per capita (log) $_{t-1}$	-0.477 (0.593)	-0.386 (0.545)	0.642* (0.334)	0.602* (0.341)	-0.157 (0.168)	-0.183 (0.182)
Government consumption (%) $_{t-1}$	-0.0110 (0.0297)	-0.000617 (0.0313)	-0.0392* (0.0236)	-0.0409* (0.0230)	-0.0224 (0.0195)	-0.0235 (0.0197)
Population (log) $_{t-1}$	1.213* (0.631)	1.161** (0.581)	1.259*** (0.348)	1.302*** (0.345)	1.038*** (0.206)	1.061*** (0.204)
Oil income (log) $_{t-1}$	-0.553*** (0.190)	-0.535*** (0.194)	-0.448*** (0.155)	-0.453*** (0.155)	-0.112* (0.0574)	-0.114* (0.0575)
Aid/GDP (%) $_{t-1}$	-0.0145 (0.0324)	-0.0156 (0.0316)	-0.0675*** (0.0180)	-0.0680*** (0.0181)	-0.0167* (0.00929)	-0.0169* (0.00947)
Trade openness (%) $_{t-1}$	0.00912** (0.00420)	0.00989** (0.00436)	-0.00455 (0.00348)	-0.00464 (0.00348)	-0.00265* (0.00139)	-0.00269* (0.00138)
Civil war $_{t-1}$	-1.002* (0.549)	-0.783* (0.459)	0.197 (0.294)	0.128 (0.286)	0.300 (0.252)	0.258 (0.240)
Lagged dependent variables	-0.321*** (0.0441)	-0.339*** (0.0497)	-0.330*** (0.0369)	-0.332*** (0.0367)	-0.332*** (0.0338)	-0.333*** (0.0337)
Constant	-4.133 (3.867)	-4.702 (3.844)	-9.685*** (2.475)	-9.638*** (2.396)	-5.615*** (1.984)	-5.557*** (1.976)
No. of obs.	951	951	1039	1039	1036	1036
No. of country	80	80	80	80	80	80
R^2	0.1860	0.1985	0.2295	0.2309	0.1998	0.2016

Note: Driscoll and Kraay standard errors in parentheses. Two-tailed test, using Stata 12.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4.5: Panel ECM using Unmatched and Matched Sample (Original Dataset)

	Matched Sample			Unmatched Sample		
	Δ Social security Model 1	Δ Education Model 2	Δ Health Model 3	Δ Social security Model 4	Δ Education Model 5	Δ Health Model 6
Δ US sanction duration	0.459*** (0.139)	-0.107 (0.105)	0.00329 (0.0250)	0.240*** (0.0562)	-0.0423 (0.0513)	-0.0266 (0.0221)
Δ US sanction duration x Institutions _{<i>t</i>-1}	-0.564*** (0.152)	0.0147 (0.108)	-0.0754** (0.0364)	-0.250*** (0.0903)	0.0169 (0.0619)	0.0177 (0.0192)
US sanction duration _{<i>t</i>-1}	0.0727 (0.213)	-0.452*** (0.116)	-0.141*** (0.0324)	0.220*** (0.0696)	-0.135*** (0.0482)	-0.0404* (0.0221)
Institutions _{<i>t</i>-1}	1.704* (0.935)	-2.265*** (0.770)	-0.351 (0.290)	1.207** (0.485)	-0.453*** (0.152)	-0.214 (0.157)
US sanction duration x Institutions _{<i>t</i>-1}	-0.360*** (0.119)	0.373*** (0.107)	0.0906*** (0.0319)	-0.269*** (0.0919)	0.0700 (0.0578)	0.0415* (0.0217)
No. of obs.	166	166	166	951	1039	1036
No. of country	25	25	25	80	80	80

Note: Driscoll and Kraay standard errors in parentheses.. Two-tailed test, using Stata 12.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4.6: Balance Statistics, 5 imputed data sets

	Variables	Before matching		After matching		Improvement (%)	
		Mean treated	Mean control	Mean treated	Mean control	Mean diff. (%)	eQQ mean (%)
Imputation 1	GDP per capita (log)	7.5954	7.3737	7.5954	7.5904	97.7535	62.513
Before matching	Population (log)	10.0068	9.0673	10.0068	9.9673	95.7928	51.4803
n: 1962	Government consumption (%)	11.5078	12.6331	11.5078	11.2814	79.8842	47.9449
After matching	Trade openness (%)	48.0563	59.4896	48.0563	47.7397	97.2306	65.4469
n: 633	Aid/GDP (%)	6.5494	9.2440	6.5494	5.9226	76.7396	29.5393
	Civil war	0.2349	0.1267	0.2349	0.2349	100.0000	69.9597
	Oil income (log)	2.3169	1.5924	2.3169	2.3545	94.8138	57.8344
	Propensity score	0.3079	0.2042	0.3079	0.3037	96.0186	62.9601
Imputation 2	GDP per capita (log)	7.5882	7.3734	7.5882	7.5557	84.8704	61.3718
Before matching	Population (log)	10.0092	9.0696	10.0092	9.9837	97.2891	61.2981
n: 1962	Government consumption (%)	11.6424	12.5714	11.6424	11.4822	82.7497	52.9598
After matching	Trade openness (%)	48.0701	59.4715	48.0701	47.9472	98.9217	55.5284
n: 645	Aid/GDP (%)	6.8039	9.3359	6.8039	6.5281	89.1091	44.7310
	Civil war	0.2349	0.1254	0.2349	0.2349	100.0000	90.7854
	Oil income (log)	2.3044	1.5872	2.3044	2.2875	97.6479	64.6359
	Propensity score	0.3078	0.2042	0.3078	0.3029	95.2422	63.2169
Imputation 3	GDP per capita (log)	7.5905	7.3732	7.5905	7.5927	98.9921	37.3799
Before matching	Population (log)	9.9864	9.0666	9.9864	9.9398	94.9268	54.1351
n: 1962	Government consumption (%)	11.6195	12.6331	11.6195	11.3881	77.1513	54.0200
After matching	Trade openness (%)	48.3329	59.4003	48.3329	47.3903	91.4829	70.5902
n: 646	Aid/GDP (%)	6.8499	9.4103	6.8499	6.7615	96.5491	34.3810
	Civil war	0.2327	0.1267	0.2349	0.2260	93.6643	90.4416
	Oil income (log)	2.2995	1.5965	2.2995	2.3138	97.9710	50.3288
	Propensity score	0.3042	0.2053	0.3042	0.2992	95.0250	52.5996
Imputation 4	GDP per capita (log)	7.5964	7.3748	7.5964	7.5697	87.9591	46.9223
Before matching	Population (log)	9.9824	9.0714	9.9824	11.5652	94.9882	48.4589
n: 1962	Government consumption (%)	11.7638	12.6781	11.7638	11.5652	78.2837	38.6941
After matching	Trade openness (%)	48.0429	59.5422	48.0429	46.9323	90.3426	69.8488
n: 629	Aid/GDP (%)	6.5244	9.3075	6.5244	6.1736	87.3957	24.3808
	Civil war	0.2394	0.1267	0.2394	0.2371	98.0139	85.2637
	Oil income (log)	2.2990	1.5868	2.2990	2.3233	96.5801	46.8798
	Propensity score	0.3051	0.2050	0.3051	0.3005	95.4427	54.3292
Imputation 5	GDP per capita (log)	7.5899	7.3720	7.5899	7.5703	90.9810	61.8629
Before matching	Population (log)	10.0038	9.0739	10.0038	9.9634	95.6566	53.4051
n: 1962	Government consumption (%)	11.6280	12.6331	11.6280	11.3830	74.1028	48.7665
After matching	Trade openness (%)	47.8972	59.5614	47.8972	46.7920	90.5253	70.4859
n: 633	Aid/GDP (%)	7.0383	9.3328	7.0383	6.8508	91.8309	21.8756
	Civil war	0.2371	0.1228	0.2371	0.2371	100.0000	81.1512
	Oil income (log)	2.2986	1.5821	2.2986	2.2823	97.7309	40.1189
	Propensity score	0.3091	0.2038	0.3091	0.3054	96.4679	64.3556

Figure 4.1: Plots of Observed and Imputed Values

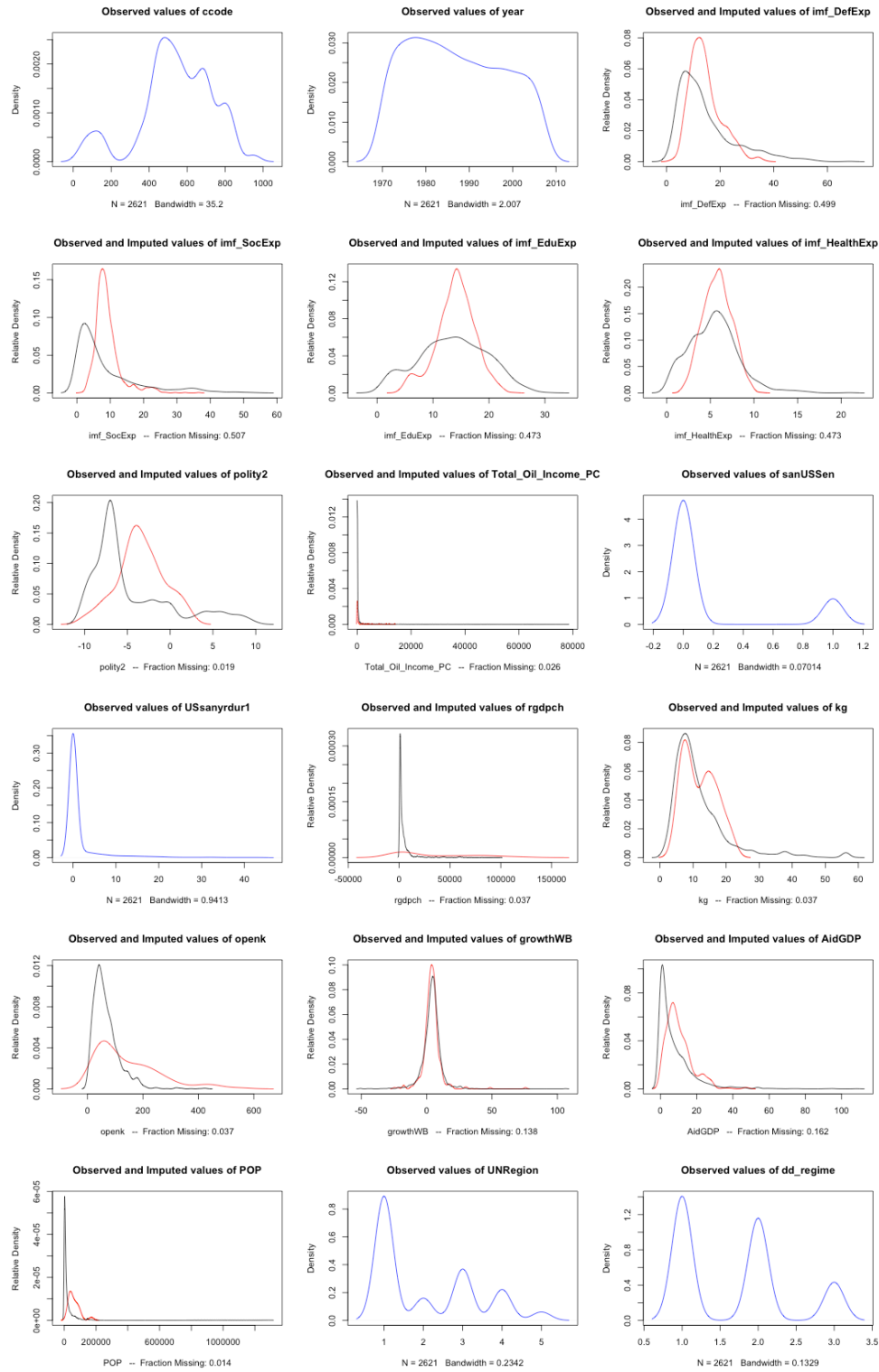
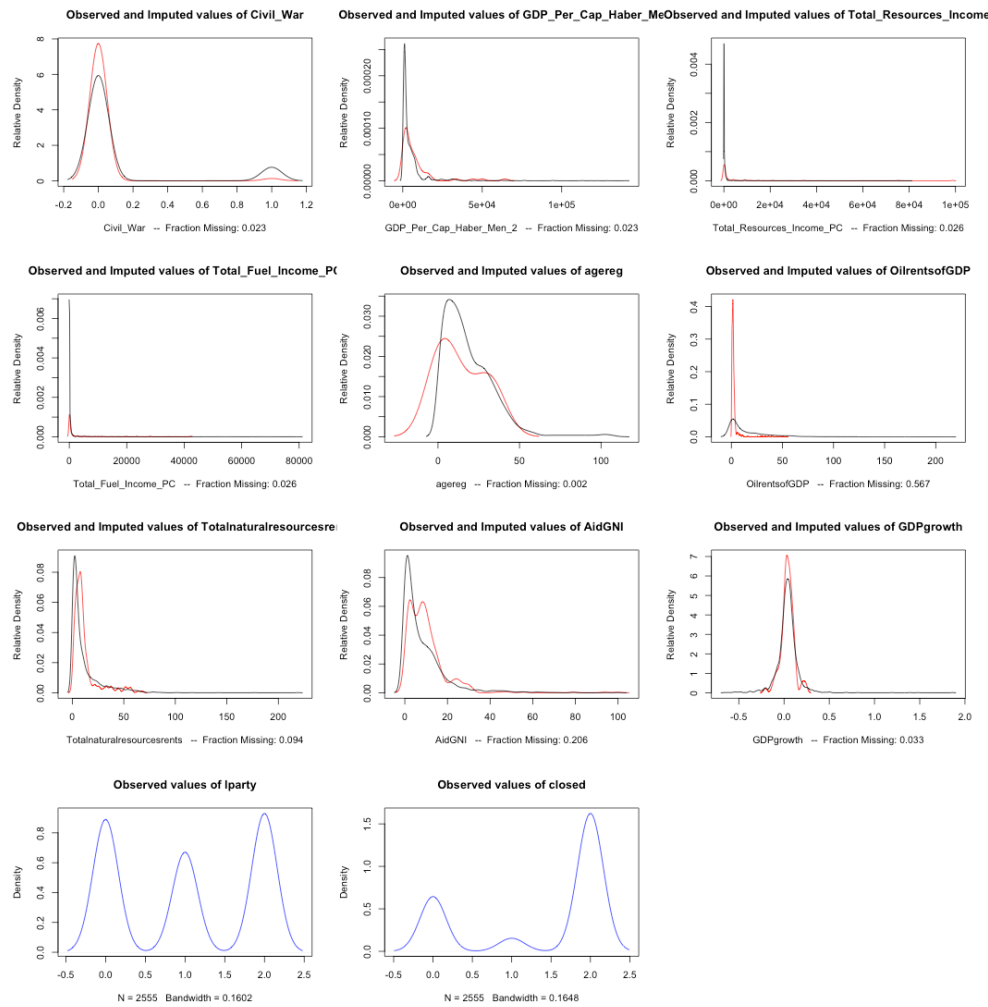


Figure 4.2: Plots of Observed and Imputed Values



Chapter 5

Conclusions

How does U.S. economic statecraft influence the politics of target countries? Studies on U.S. foreign aid and sanctions have become one of the most popular topics in international relations and comparative politics. In particular, many scholars pay attention to the adverse impacts of foreign aid on the domestic political economy of a recipient country. At the same time, sanction literature focuses on sanction effectiveness and its counterproductive consequences in a target state. Despite a large volume of research on economic statecraft, more investigation is still needed to uncover the relationship, on a variety of issues, between U.S. economic statecraft and political phenomena or policy changes of a target state. This dissertation has evaluated the effects of U.S. economic statecraft on nuclear development policy changes, social policy changes, and political violence against Americans.

In this concluding chapter, I summarize the argument and findings of each chapter including the methods used. Then, I conclude with an overall contribution of this dissertation to the existing scholarship

5.1 U.S. Economic Statecraft and Nuclear Reversal

In Chapter 2, I focused on investigating the role of U.S. economic statecraft (i.e., economic sanctions and foreign aid) in nuclear reversal of nuclear proliferating states, which had already

explored and/or pursued nuclear weapons development. Based on theoretical discussions of nuclear nonproliferation, the study produced three main hypotheses: (1) nuclear proliferating states targeted by U.S. negative sanctions have a lower likelihood of reversing their nuclear pursuit; (2) nuclear aspiring states targeted by U.S. multilateral sanctions through international organizations have a higher likelihood of reversing their nuclear pursuit; and (3) nuclear proliferants receiving U.S. foreign aid have a higher likelihood of reversing their nuclear pursuit.

To test the argument, the study disaggregated nuclear reversal outcomes into three categories: non-nuclear, nuclear latency and nuclear pursuit. These nuclear reversal stages were based on a theoretical framework in international relations-the willingness and opportunity. This study assumes that a state in the non-nuclear status has no willingness to pursue nuclear weapons development and no technical capability to build nuclear bombs. In contrast, I assume that a state has a nuclear latent capacity to construct nuclear weapons when the circumstances suggest even if it has withdrawn the intention to make nuclear weapons or to pursue nuclear weapons development but maintain some degree of nuclearness. In the dissertation's first essay, it was found that U.S. economic statecraft at least induces a nuclear-aspiring state to suspend its existing nuclear weapons program and to only maintain nuclear latent capabilities. The conventional wisdom that U.S. economic instruments are relatively ineffective at leading to the withdrawal of ongoing nuclear development results from the higher standard of nonproliferation. However, even if U.S. economic statecraft fails to extract perfect compliance of nonproliferation, it does work well at producing partial compliance-nuclear latency without nuclear weapons. U.S. economic sanctions are said to be effective at deterring non-nuclear states from pursuing nuclear weapons. In addition to its deterrence effect, U.S. economic sanctions through international organizations are powerful enough to induce a nuclear aspirant to come to the negotiating table and reach a deal with a sub-optimal outcome. As the recent Ira-

nian nuclear deal indicates, the secondary sanctions were considerably effective at pressing Iranian leaders. Thus, further work is needed to understand the role of the secondary sanctions in leading to nuclear reversal or other policy changes of a target state.

5.2 U.S. Foreign Aid and Anti-American Violence

Chapter 3 investigated the impacts of U.S. aid on anti-American violence by suggesting theoretical arguments that explained how U.S. foreign aid caused radical opposition groups outside the ruling coalition to exercise violent attacks on Americans. In particular, this essay argued that U.S. foreign aid flowing into dictators resulted in more violent incidents against the U.S. properties and Americans in a recipient country than it does when flowing to a democracy. However, such an effect varies relying on domestic political institutions in a recipient country. Following this discussion, I generated several testable hypotheses: (1) as U.S. aid flowing into a recipient country increases, autocratic recipient regimes experience more anti-American incidents than democratic counterparts; (2) as U.S. foreign aid increases, autocratic countries with quasi-democratic institutions experience fewer anti-American violent incidents than those without such institutions or democratic regimes; and (3) as U.S. foreign aid increases, autocratic countries under institutional constraints experience more anti-American incidents than do other regimes. To test these hypotheses, the analysis implemented a series of zero-inflated negative binomial regressions to deal with zero-abundant count data for 117 developing countries from 1970 to 2007.

The findings of the second essay showed that U.S. foreign aid has a detrimental effect on and unintended consequences for recipient countries. Among the counterproductive outcomes of U.S. foreign aid, that essay focused on anti-US violence in the world. Recently, a growing number of

studies have examined anti-Americanism in an attitudinal/opinion dimension, but the research is scant evaluating the impacts of U.S. foreign aid on anti-American political violence. First, the essay argued that U.S. foreign aid increased the number of anti-American incidents in autocracies compared to those in democracies. Second, the essay proposed two competing hypotheses. One contended that the effects of U.S. foreign aid were conditioned by autocracies' institutional constraints such as pseudo-democratic institutions. It was thus proposed that autocrats relying on nominal democratic institutions may either "increase" or "decrease" anti-US incidents compared to non-institutionalized autocracy and democracy when they are more dependent on U.S. foreign aid. A series of quantitative analyses showed that the impacts of U.S. foreign aid were significant, and the substantive effect decreased when a recipient country was an autocracy relying on quasi-democratic institutions.

5.3 U.S. Sanction Duration and Social Spending of Autocracies

The study in Chapter 4 estimated the dynamics of social spending in autocratic countries suffering costs from longer U.S. economic sanctions. In general, autocratic leaders tend to reallocate limited resources in favor of ruling elites when experiencing the longer U.S. sanctions. Thus, they reduce government expenditure on public goods and services. However, the diverse political system within autocratic countries lead to diverse policies of social welfare. In other words, I hypothesized that autocrats under some institutional constraints are likely to implement more inclusive policies toward a broader segment of population in a society due to their logic of political survival. Based on literature on comparative authoritarianism, it was supposed that autocrats having pseudo-democratic institutions implemented more inclusive policies compared to autocrats without those

institutions and so even when sanctioned by the U.S. they do not cut social spending sharply. To test this argument, I conducted panel error-correction models to capture the dynamic changes of social spending in autocracies. The statistical estimation was conducted with 95 country-cases under authoritarian rule from 1970 to 2007.

The findings showed that U.S. sanction duration leads autocrats to reduce their social spending but the duration has different effects on the changes in social spending varying according to political system. Autocrats having institutional constraints do not reduce much their government spending on education or health while cutting spending on social security and protection. This indicates that social security spending in authoritarian countries may be quite narrow in the sense that social security benefits specific and small segments of the population.

5.4 Contributions and Plans for Future Research

The main contribution of this dissertation is to improve our understanding of the role of U.S. economic statecraft in the policies and politics of target countries. Despite a large volume of studies on foreign aid and economic sanctions, studies on the effects of U.S. economic statecraft are still underdeveloped. This dissertation explores policy changes in the development of nuclear weapons and in social spending, as well as the counterproductive consequences.

In addition, this dissertation sheds light on the debates over the relationship between U.S. economic statecraft and policy changes of target states. The results suggest that U.S. economic statecraft is still an effective foreign policy, as it leads to policy changes in target countries. But, its counterproductive and adverse impacts vary according to the target country's political system.

The findings in this dissertation provide a basis for some possible further investigations. First,

as Iran and powerful Western countries reached a nuclear deal, we might expect Iran to be soon included as another non-proliferator. When this happens, a re-examination on nuclear nonproliferation should be conducted. Second, regarding anti-American violence, a study should investigate the effects of democratic transitions on anti-American incidents.

Based on the literature on the diversionary conflict, it may be expected that countries undergoing democratic transitions and/or political instability tend to experience anti-American violence. Third, in regard to social policy changes, a study should conduct more thorough analysis using comparative case studies to improve the causal inference (e.g., the synthetic control method). In this case, there should be an almost complete dataset with no missing values. A study could thus focus on social welfare outcomes such as infant mortality, child mortality, school enrollment and completion instead of social expenditure.

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ADDITIONAL TRAINING

Northwestern University Law School

The fourth annual workshop on Research Design for Causal Inference

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TEACHING INTERESTS

General: Introduction to Political Science, American Government

International Relations: International Conflict/Security, International Relations of East Asia, U.S. Foreign Policy, Political Economy of East Asia

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Comparative Politics: East Asian Politics (North/South Korea, Japan, and China/Taiwan), Authoritarian Regimes, Politics of Developing Countries

TEACHING EXPERIENCE

Instructor (University of Wisconsin-Milwaukee)

Introduction to Political Science

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Politics and Markets in Pacific-Rim Countries (East Asia)

Political Data Analysis (Lab Instruction)

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CONFERENCE PRESENTATIONS	<p>Wondeuk Cho. "South Korea's Economic Statecraft and North Korean Nuclear Development." Presented at the International Conference of 'South Korea's Rise in the Era of Globalization,' Milwaukee, WI, April 22-23, 2013.</p> <p>Wondeuk Cho, Uk Heo and Sung Deuk Hahm, "The US Military Deployment and Regional Economic Growth." Presented at the Annual Meetings of International Studies Association, San Francisco, CA, April 3-6, 2013.</p> <p>Wondeuk Cho, "Why Do Men Resort to Anti-American Political Violence: A Statistical Analysis, 1987-2002," Annual Meeting of Southern Political Science Association, Atlanta, to be presented in 2010.</p> <p>Wondeuk Cho, "Nuclear Proliferation and Reversals? Sequential Analysis'," Annual Meeting of International Studies Association, New York, to be presented in February 2009.</p> <p>Wondeuk Cho, "Symmetric-Asymmetric Dyadic Relations, Domestic Political Consideration, and Wars on Terrorism: A Poliheuristic Analysis," Annual Meeting of International Studies Association, San Francisco, in March 2008.</p> <p>Wondeuk Cho, "Symmetric-Asymmetric Dyadic Relations, Domestic Loss Aversion, and Foreign Policy Decision Making: A Poliheuristic Analysis," Annual Meeting of International Studies Association, San Diego, in March 2006.</p>
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