THE POLITICAL ECONOMY OF DRONES

by

Abigail R. Hall

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Committee:

_____ Director

_____

_____

_____ Department Chairperson

_____ Program Director

_____ Dean, College of Humanities and Social Sciences

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Master of Arts
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Director: Christopher J. Coyne, Professor
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DEDICATION

For my sister Betsy, I miss you every day.

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ABSTRACT

THE POLITICAL ECONOMY OF DRONES

Abigail R. Hall, Ph.D.

George Mason University, 2015

Dissertation Chair: Dr. Christopher J. Coyne

This dissertation consists of three essays that examine the interplay between private and public actors in the evolution, development, and implementation of this technology. My work provides a political economy analysis of the drone industry through public choice economics. This serves as a clear demonstration of how the incentives faced by various private and public actors and the interactions between these groups work to influence decisions regarding the evolution of national defense and policies surrounding military technologies.

THE POLITICAL ECONOMY OF DRONES

1 Introduction

World governments spent more than $6.6 billion on Unmanned Aerial Vehicle and Unmanned Aerial System (UAV, UAS), or "drone," technology in 2012. This number is expected to increase to $11.4 billion a year over the next decade for a worldwide UAV market worth more than $89 billion (PR Newswire 2012). While the number of drones currently in operation is unknown, the International Institute for Strategic Studies has identified 56 different types of UAVs in use in eleven different countries (Guardian 2012). Present estimates place the number of drones in use by the U.S. government above 7,000, compared to fewer than fifty in 2000 (Tomiuc 2012). Although the U.S. presently dominates the world in terms of drone use, China, France, Germany, India, Israel, India, and Russia among others, are either known or suspected to have stocks of UAVs and still other nations have expressed interest in purchasing the technology (Defense Industry Daily 2013).

Drones are a core component of U.S. military operations and their use has controversial implications both domestically and abroad (see Miller 2012, Boyle 2013). The rise of UAV technology has effectively lowered the cost of military engagements and allowed the U.S. to undertake significant military action in Pakistan, Yemen, and Somalia without declaring war or deploying a significant number of troops. However, controversy has emerged regarding the accuracy of this technology as means of targeted

warfare, as well as their efficacy, and ethical ramifications (Strawser 2010, Singer 2009). Questions regarding the identity of drone targets and the unknown number of civilian causalities have sparked further debate. Estimates of civilian casualties range from 150 to thousands (Roggio and Mayer 2013, New America Foundation 2013). According to one estimate, for every one target killed by a U.S. drone strike, fifty innocent people are also killed (Kilcullen and Exum 2009).

Further, there has been a strong push by domestic manufacturers of UAV technology for the U.S. government to relax many of the rules currently prohibiting drone sales abroad and preventing the use of drones in domestic airspace. Numerous government organizations have also pushed to expand drone use. The U.S. Air Force, Army, Navy, and Special Forces all use drone technology and have worked with private contractors to research, develop and test new drones for use domestically and abroad. The Department of Homeland Security (DHS) and the U.S. Customs and Border Protection agency (CBP) have sought to expand the use of drones along the U.S.-Mexico border (Costantini 2012). State and local police have also taken an interest in the technology. By July 20, 2012, the FAA had authorized 106 state and local government entities to fly drones in U.S. airspace (Jeffrey 2012). The push for expanded use has raised concerns over safety, privacy, and government abuse, prompting immense scrutiny from both sides of the political aisle with many state lawmakers introducing legislation that attempts to restrict or ban the use of drone technology domestically (Goodale 2013, Crump and Stanley 2013).

This chapter provides the first political economy analysis of drones through the lens of public choice economics. Ideally, decisions regarding the use of drones (and national defense more generally) would be made to protect the U.S. and to promote the general interests of U.S. citizens. However, in contrast to this "public interest" view, the "public choice" model predicts that decisions made by politicians regarding UAV technology will be driven by the incentives created by political institutions rather than by some higher ideal (see Buchanan 2003). The public choice perspective emphasizes that the payoffs attached to various courses of action result from the nature of political rules, and those acting within that system will respond accordingly to these payoffs (Brennan and Buchanan 1985). This means that an array of political influences, and not some higher ideal of the "public interest," will drive how the use of drones evolves.

When studying issues of defense, particular attention must be paid to the role of actors in both the polity and in private industry. In developed countries, such as the U.S., the government maintains a monopoly on defense but relies heavily on private industry for defense-related production. These public-private linkages influence each other and, in doing so, influence the trajectory of defense policy and production. Within this context, the goal of our analysis is twofold. First, we identify the initial formation of these entanglements, or network relationships, as they relate to UAV technology. Second, we trace how these linkages increase, strengthen and expand during times of crises to generate benefits for (both public and private) Big Players—actors whose decisions and exercise of power (monetary, political, etc.) are able to influence and shape the course of events (see Koppl and Yeager 1996 and Butos and Koppl 1993). Higgs (1987) and Smith,

Wagner, and Yandle (2011) emphasize that moments of crisis (real or perceived) encourage new interactions and expand previously existing linkages between Big Players in the polity and the market as the demand for political action breaks down traditional separations.

Our analysis contributes to three strands of literature. First, we extend the literature in public choice and political economy as it relates to entanglements between public and private actors (Higgs 1987; Wagner 2009a,b, 2013; Smith, Wagner, and Yandle 2011). Acemoglu and Robinson (2013) have recently emphasized the importance of appreciating political economy issues when designing policies. Given the current, and foreseeable, controversies over drones, a public choice analysis of the topic is important for informing policy discussions. Second, and related, we contribute to the literature on the "military-industrial complex." Research in this area focuses on the connection between the military, political, and private sectors (see Melman 1970, 1971; Adams 1981; Pursell 1972; Hossein-Zadeh 2006; Duncan and Coyne 2013a,b). We extend this literature by analyzing the intricacy, breadth, and strength of the relationships between the Big Players in the UAV industry. Understanding the history of this technology, as well as the major players in the industry today, is of central importance to designing effective policies. Third, we contribute to the literature on the military history of the U.S. (Weigley 1960; Millett, Maslowski, and Feis 2012, Williams 2013) by tracing how the emergence and evolution of UAV technology by the U.S. military.

The subsequent sections analyze the drone industry in the U.S. from its origins to the present and examine three distinct time periods. We use the terms "drone" and

"UAV" broadly to refer to any aircraft without a human pilot controlled either by remote control or autonomously via computer. Section 2 discusses the origins of the linkages between private and public actors in the UAV industry from 1900-1948. Its purpose is to provide context of the initial emergence of drone technology and early entanglements in the drone industry. Section 3 examines the Cold War through the pre-9/11 period. It was during this time that earlier linkages matured and modern drone technology emerged. Section 4 analyzes the post-9/11 period with particular focus on how this crisis created an opening for the expansion of the drone industry. Established entanglements worked to drive this progression and, in the process, subsumed other private and public actors. Section 5 concludes.

2 The Origins of Entanglement: 1900-1948

Unmanned aerial vehicle (UAV) technology evolved along with the aviation industry in the U.S. Indeed, the first attempt at creating an UAV occurred soon after the invention of the airplane in 1903. As early as 1913, the U.S. Navy provided funds for the development of a radio-controlled aircraft (Hunsaker 1954). By 1915, inventors Elmer Sperry and Peter Cooper Hewitt were working to develop a pilotless aerial torpedo—the first drone (Newcome 2004: 16).

In 1915, the U.S. Navy created the Naval Consulting Board (NCB), an organization dedicated to the creation of new technologies, organizing the process of receiving inventions from the public, and increasing the Navy's technological capabilities (Scott 1920: 3-4). Consisting of approximately two dozen private citizens in various industries, including Sperry and Cooper, the NCB had the effect of entangling the

military with the private sector (including the infant drone industry). Through their connection, Sperry and Cooper obtained an audience with the Secretary of the Navy and were ultimately allocated $200,000 (more than $4.2 million in 2012 dollars) to further develop their unmanned aerial torpedo (Pearson 1969: 71).

It is at this juncture one finds the foundations of the mutually beneficial relationship between the government and private military contractors and observes the emergence of future Big Players in the drone industry. William E. Boeing, founder of the Boeing Airplane Company, for example, worked throughout the period to design and build aircraft. In 1917, having heard of the Navy's desire for planes, Boeing had one of his planes deconstructed, sent to naval offices in Florida, and reassembled for military testing. The company quickly received an order for fifty planes (PBS 2013a). Glenn L. Martin, (founder of the Glenn L. Martin Company, now Lockheed Martin), organized his own firm in 1918 building specialty aircraft—including a design for a military bomber (National Aviation 2013a). Leroy Grumman (Grumman Aeronautical Engineering Company, now Northrop Grumman), served as a pilot in WWI and through the military had obtained a degree in aeronautical engineering (Fetherston 1998). After completing his education, the Navy stationed Grumman at Loening Aeronautical Engineering Corporation to oversee the construction of Navy aircraft (Thruelsen 1976: 21). Seeing the potential profits from military contracts, Grumman resigned his Navy commission in 1920 to work for Loening. His military ties would remain important, however, as Grumman started his own company (Thruelsen 1976: 36). It was also during the interwar period that John Northrop (founder of Northrop Aircraft, later Northrop Grumman) and

Allan and Malcolm Loughead (Lockheed Aircraft Company, later Lockheed Martin) began to develop their products which would later be used by the military.

Although the military produced many of its own weapons during the period, the private defense industry took active steps to influence and shape the trajectory of military production. In 1919, the American Defense Preparedness Association (ADPA) was created by the industry with the goal of "increas[ing] weapons technology, improv[ing] defense management, and maintain[ing] a strong science-industry defense team [which would be] continually responsive to all needs of the development, production, logistics, and management phase of national preparedness" (National Defense Industrial Association 2013). The ADPA and other organizations would become immensely important in the development of the UAV industry as private industry sought to strengthen its ties with the military.

A renewed emphasis on UAV technology emerged in 1935. Following a visit to the British Royal Navy and observing the British advancements in creating target drones, Admiral William Standley returned to the States and ordered the development of similar technologies for the American fleets (Newcome 2004: 63). The Army Air Corps Act of 1926 (AACA), which had created a set of rules for negotiating contracts between the military and the private sector, allowed the Navy to utilize private contracts in order to engineer the drones. In the mid-1930s, a division of Northrop Aircraft was contracted to complete the task of creating the UAVs. Although other companies were simultaneously contracted, it was Northrop's Radioplane Co. that would ultimately obtain success and create the OQ-2A target drone. The Navy then contracted the firm to produce an

additional 1,000 of the drones for use in antiaircraft gunnery training (National Museum 2011).

At the start of WWII in 1939, both the Navy and Army used the enhanced contracting abilities granted by the ACCA to develop and use unmanned aerial technology. These abilities were expanded again after President Franklin D. Roosevelt declared a state of emergency on December 8, 1939. Following the declaration, Congress passed the Navy Reconstruction Act, allowing the Secretary of the Navy to "negotiate contracts for the acquisition, construction, repair, or alteration of complete naval vessels or aircraft, or any portion thereof...with or without competitive bidding" (quoted in Brown 2005: 7). The War Powers Acts issued in the early 1940s were particularly important from the public choice perspective. These Acts altered the rules under which the government could contract with private firms making it easier for the military to bypass much of the formal acquisition process (Brown 2005: 8). Instead of contracting with companies that offered the lowest price, the military could now contract more freely with those companies with whom it had already established a relationship. It followed that as the military looked to develop more drones for reconnaissance, anti-aircraft training, and attack drones, that those companies which had preexisting relationships with the military, like Northrop's Radioplane Co., were awarded contracts.

The passage of these acts, combined with the demands of WWII worked to expand the defense and aviation industries and further solidified the relationship between the U.S. military and private defense contractors. In 1943, for example, the U.S. Army's Air Tactical Service Command (ATSC) initiated a deal with Lockheed Aircraft

Corporation to develop and produce a new string of jet fighters (Lockheed Martin 2013c). Boeing had used its own funds beginning in 1938 to develop a new bomber. When the Air Corp announced its formal request and design specifications for bombers to manufacturers at the start of the war, Boeing responded quickly, obtained the contract, and, by 1942, had received an order for 500 aircraft (Bowers 1989: 319). Northrop would be commissioned by the Army to build more than 700 "Black Widows," aircraft which could find and destroy enemy targets in the dark and inclement weather (Smithsonian 2013b).

Not only did these exchanges provide the U.S. military with a cadre of advanced war machines, but they also worked to expand the defense companies immensely. To give but one example of how these government contracts impacted private contractors, consider that by 1945, Grumman had seen such an increase in business that it added thousands of people to its payroll. At its peak during the war, the company employed more than 20,500 individuals and produced more than 650 aircraft monthly (Thruelsen 1976: 218). This expansion matters because as the private defense industry grew, so too did its influence on lawmakers in Washington, D.C.

The war effort also expanded the demand for drones as evidenced by the number of UAV-related contracts the military granted to private firms during the war. The Army contracted with Radioplane Co. again in 1939 to manufacture what would become the OQ target drone series. The Navy would also contract the company for the technology and more than 15,000 of the drones were used to train American anti-aircraft gunners throughout the war (Newcome 2004: 58). McDonnell Aircraft (later a part of Boeing)

was contracted to build an unspecified number of "Katydid Drones" in an effort to compete with the German V-1 rockets (Smithsonian 2013a). Boeing was commissioned to convert "war-weary" B-17 "Flying Fortress" bombers into radio-controlled assault drones (Parsch 2003). Ryan Aeronautical (now part of Northrop Grumman), Lockheed Aircraft Corporation, Glenn L. Martin Company, and Vought (now part of Northrop Grumman) all contracted with the U.S. Army Air Force, U.S. Air Force, or Navy during the war to design and manufacture various types of drones (Parsch 2010).

For our analysis, World War II was significant in that it ushered in what has been called a "permanent war economy"—a situation characterized by constant funding for military equipment and supplies in order to develop and amass enhanced military capabilities during times of both war and peace (see Melman 1985 and Duncan and Coyne 2013a,b). Whereas the previous concept of war was one of responding to immediate and actual threats and aggression (e.g. an attack on American ships, etc.), the new military ideal was to maintain a state of constant preparation for future potential conflict. One consequence of this constant preparation was the establishment of a more permanent relationship between government and the private defense industry. Duncan and Coyne (2013a: 2) describe how such an economy "set in motion a process...whereby private actors respond[ed] to the opportunities presented by a state of permanent war and adjust[ed] their behaviors to take advantage of new profit opportunities....[T]he private economy [became] increasingly intertwined with the state."

The rise of the permanent war economy had important implications for the entanglement between the private defense industry and the government. While the

experiences of the World Wars had allowed for many defense firms to further specialize their products (e.g. Grumman's continued production of naval technology), the emergence of the permanent war economy worked to increase the importance of networking and social relationships between contractors and the military for the acquisition of contracts. Higgs (2007: 308) argues that following the end of WWII, military contracts "came to turn not on price, but on technical and scientific capabilities, size, experience, and established reputation as a military supplier—vaguer attributes that are easier to fudge for one's friends." This implies that those firms who had received contracts and built political relationships with the government before the war were more likely to be the recipients of contracts after the war. Indeed, following the conclusion of WWII, we see how the entanglements established during WWI, the interwar years, and WWII increased, strengthened, and generated further benefits for the Big Players in the market and the polity. For example, Lockheed's services were retained by the military for the continued production of military aircraft after WWII. The Glenn L. Martin Company began ventures in commercial aircraft, but received contracts to produce missiles and rockets for the U.S. military (Lockheed Martin 2013c). Grumman, in keeping with its past connection to the U.S. Navy, obtained long-term contracts with naval forces to design and manufacture new combat aircraft (Treadwell 1990: 90, 99, 120).

Efforts were made by actors both in the U.S. military and in private firms to maintain and strengthen the relationships which had been forged during the war. In 1948, the ADPA changed its name to the American Ordnance Association in order to reflect the changes brought about by the creation of the Department of Defense and expanded its

activities to include all branches of the military. The National Security Industrial Organization (NSIO) was formed from the Navy Industrial Association during the period in an effort to "establish and foster a close working relationship and effective two-way communication between government, primary defense, and the industry which supports it" (NDIA 2013). The Association looked to influence relationships between the military and weapons manufacturers in areas of research and development, procurement, and many other areas (*Ibid*). Brown (2005: 8) describes the push from both the market and the polity to continue the contracting which had taken place in wartime.

> *[T]hese relationships had...produced some of the most important weapons of the war....In the years that followed...Congress and the president, at the behest of the armed forces and representatives of the industry, drafted new laws to improve military procurement and encourage further cooperation between private industry and the government, with the understanding that such collaboration would strengthen the armed forces and yield even more impressive and powerful weapons.*

At this point, the entanglements underpinning the current drone industry were well established. These relationships would further mature during the Cold War period.

3 Modern Drones and the Maturation of Entanglement: Cold War—pre-9/11

The sustained threat of the Soviet Union further worked to expand the relationship between the military and private defense industry and increased interest in more advanced UAV technology. Although drones in the past were used almost solely for target practice and training purposes, the military also saw UAV technology as a potential tool for reconnaissance missions. Throughout the Cold War period, "radioplanes" were manufactured for the U.S. military by numerous corporations including Northrop, Lockheed, Beechcraft (now Raytheon), and the Globe Company (Goebel 2012). In 1955, Radioplane modified an early drone model to include a series of film cameras. The U.S.

Army introduced these drones in 1959 and would utilize the technology throughout the Cold War for reconnaissance (Newcome 2004: 59). Although no open conflict ever occurred between the United States and the Soviet Union, reconnaissance flights were a fairly common, but dangerous mission. From 1946-1990, 23 aircraft and 179 servicemen were lost during reconnaissance flights related to Cold War operations (Newcome 2004: 71). Although most losses from such missions were kept quiet by both the U.S. and the U.S.S.R., the danger of the missions combined with the political turmoil experienced when airmen were captured prompted the U.S. Air Force to embark on a number of "surveillance drone" programs with companies like Radioplane, Northrop and others to produce nearly 1,500 drones. (Newcome 2004: 72-73).

The Cold War led to further developments in drone technology due to the "Space Race" between the U.S. and the Soviet Union and the nuclear arms race. Both of these events further increased the U.S. military's demand for new technology. Drones were seen as potentially useful in weapons testing after nuclear tests by pilots resulted in radiation-related illness and fatalities. The increased desire for UAV technology can again be seen in the number of private companies contracted by the military to produce UAVs. From 1946 through the 1960s, the Navy, Army, and Air Force contracted with Ryan Aeronautical, Beech, Curtiss, McDonnell, Globe, Martin, Radioplane, Northrop, Vought, and Lockheed to produce UAVs (Pasch 2010).

These investments contributed to even more advanced UAV technologies in the 1980s and 1990s. As a result of increased defense spending during the Reagan Administration, "microelectromechanical" system sensors (MEMS), mini global

positioning systems (GPS), and micro electronics became well developed, allowing for more advanced UAVs. Military operations abroad in Grenada, Lebanon, and Libya increased demand for inexpensive, unmanned, reconnaissance, and battle damage assessment (BDA) capabilities for field commanders. This demand, combined with the enhanced technology of the period led to further contracting between the U.S. military and drone manufacturers and yielded drones still in use today. In 1985, for example, the Secretary of the Navy ordered an expedited acquisition of UAVs for fleet operations. The RQ-2A Pioneer was introduced during this period and would operate in the Persian Gulf, Bosnia, Yugoslavia, and Somalia (U.S. Navy 2009).

Following the end of the Cold War and the collapse of the Soviet Union in the early 1990s, many of the existing Big Players in the private defense industry consolidated. Lockheed and Martin merged to become Lockheed Martin. Northrop and Grumman also merged. Lockheed Martin acquired British Aerospace and other smaller firms. Northrop Grumman and Boeing also made a series of acquisitions during the period. Mergers and acquisitions allowed the players in the defense industry to enhance their production capabilities while also increasing their political influence. A larger corporation with multiple locations meant that multiple agents in Congress would have a vested interest in growing the industry so as to bring money and employment to their districts. Hartung (2011: 20-21) describes how the acquisitions of British Aerospace and McDonnell Douglas by Lockheed Martin and Boeing were able to garner important political support for the companies:

Boeing was able to beef up [political ties by acquiring] McDonnell Douglas....British Aerospace came to join the Lockheed Martin Team. This gave Lockheed Martin a leg up

in persuading Britain to weigh in on its behalf. It is one thing to have a given state or senator in one's corner. It is quite another to have a sovereign state and longtime U.S. ally like the United Kingdom ready to go to bat for you.

The first Gulf War would prove a critical point in the development of the UAV industry. According to a May 1991 report from the Navy, "at least one UAV was airborne at all times during Desert Storm" (quoted in Frontline 2013). The conflict saw 522 separate drone launches and over 1,600 hours of flying time. During operations in Iraq, the military, seeing the effectiveness of the UAVs, contracted familiar companies in the industry to create and manufacture new drones. A report from the Oversight and Investigations Subcommittee and Committee on Armed Services in 1993 stated the impact of the technologies in the field:

[U]nmanned aerial vehicles (UAVs) provided substantial imagery support to Marine, Army, and Navy units during Operation Desert Storm. They were so good many more could have been used....These systems were employed for battlefield damage assessment...targeting...and surveillance missions, particularly in high-threat airspace....We could have used three times as many as we had. The Army took its solitary set of UAVs into the war and is now looking for many more. In one instance, Iraqi troops actually attempted to surrender to a UAV loitering over their position (quoted in Frontline 2013).

The performance of drones in Desert Storm was sufficient to once again increase the demand for the technology. This general increase in demand was compounded, however, by two broader changes in the military.

First, following the collapse of the Soviet Union, the U.S. military began to "transform itself in response to new threats" (Lyons 2004: 27). In prior decades, from before WWI through the Cold War, the U.S. had built up its arsenal to defend against the increases in its adversaries' weapon stocks. With the collapse of the Soviet Union in the early 1990s, however, the military lacked a clear antagonist and instead began to engage a "collection of asymmetric threats" (*Ibid*). While amassing weapons systems like

bombers and tanks may have served to defeat the enemies of previous wars, such technology became impractical to build and deploy against multiple, smaller threats. Second, it was during this period that the U.S. Armed Forces sought to transform their role from one of traditional war fighters to one of "peacekeepers" (*Ibid*). Throughout the 1990s, the military undertook humanitarian operations in Somalia, Bosnia and Herzegovina, Rwanda, Kosovo, and elsewhere. Unlike previous military engagements, the goal was often not to force surrender of an enemy of the state, but to bring an end to conflict and provide humanitarian assistance (Seybolt 2008). Again, the use of traditional full-scale military operations and equipment proved difficult and often impractical with modern drone technologies seen as the main alternative.

It was this changing landscape of international politics and U.S. military operations which laid the final groundwork for the widespread use of drones in the new millennium. The shift from full-scale military operations to smaller engagements, combined with the success of prior drone use and new technological achievements would set the stage for drones to be used on a never before seen scale.

4 The Post-9/11 Expansion of Drones and Entanglement

The increased demand for drone technology following the Gulf conflict was augmented substantially by the post-9/11 conflicts in Afghanistan and Iraq. These conflicts, coupled with the broader Global War on Terror, created an opening for the expanded use of drones on an unprecedented scale. This is evident in the Department of Defense spending on Unmanned Aerial Systems (UAS) shown in Figure 1.

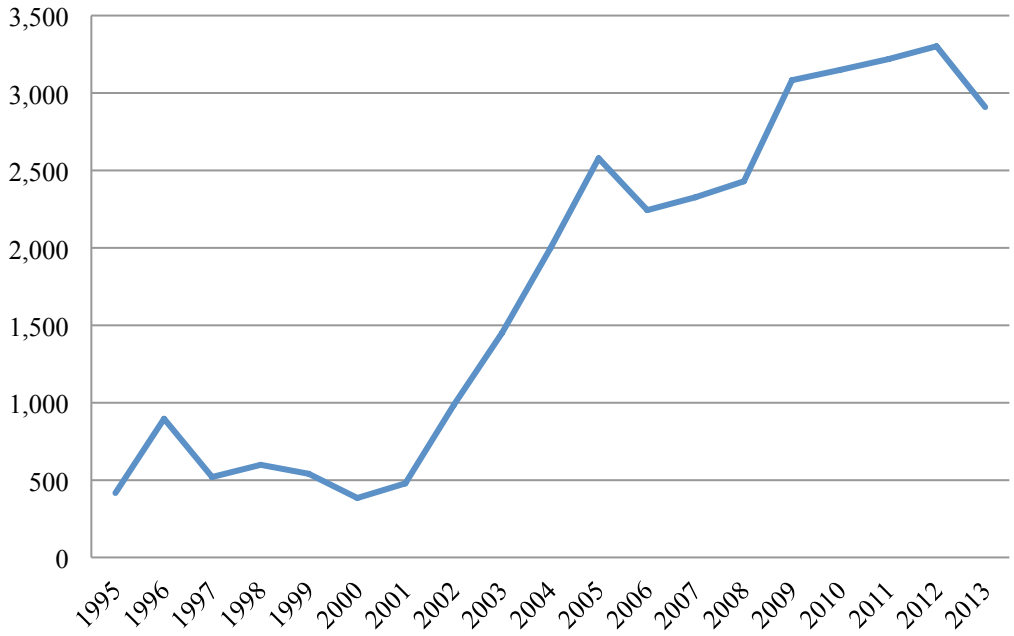

Figure 1: DOD Spending on UA: 1995–2013 (in millions)[1]

As illustrated by Figure 1, spending on drones increased significantly in the post-9/11 period from $363 million in 2001 ($4.77 million in 2013 dollars) to $2.9 billion in 2013. Further, between 2002 and 2010, the DOD's UAS inventory increased fortyfold (Gertler 2012: i). While only five percent of military aircraft were unmanned in 2005, by 2012 UAVs accounted for one third of *all* military aircraft (Gertler 2012: 9). An inventory of the DOD's unmanned aerial systems in 2003 counted only 163 UAS in use. The 2012 inventory, meanwhile, reported the DOD maintained a total of 7,454 unmanned

[1] Source: DOD, UAS Roadmap 2005-2030 (p.37) and DOD FY2009-2034 Unmanned Systems Integrated Roadmap (p. 4). All figured adjusted to 2013 dollars.

aerial systems—an increase of over 4,400 percent in less than a decade (Gertler 2012: 8).[2] The political economy framework can shed light on how this dramatic increase in drones came about.

One key driver was increased demand for drones by the military for combat purposes. Just as humanitarian missions in the 1990s had shown the expense and ineffectiveness of traditional military engagements, the multiple post-9/11 conflicts provided further evidence that "traditional" combat operations were no longer suitable. David H. Lyon (2004: pp. 27-28), chief of Advanced Munitions Concepts with the U.S. Army Research Laboratory, described the changing demands of military engagements in response to the threats posed by the U.S.'s new enemies and suggested a trajectory for military equipment and engagements.

[T]he U.S. Army can no longer afford the time and resources required to mass heavy vehicles prior to execution of an attack, as past doctrine dictated. Instead, the U.S. Army will consist of a collection of smaller, rapidly transportable units with the ultimate goal of deploying anywhere on the globe within 72 hours....Even with highly advanced technologies...the only way to achieve success...is to possess an unprecedented level of battlefield situational awareness. This will allow the U.S. Army systems to locate and engage targets at distances that far exceed enemy capabilities, such that significant attrition will cripple the enemy's ability to fight effectively, long before closing within traditional engagement ranges.

Drones provided all these modern features. They were smaller, well-equipped, and easier to deploy than traditional equipment. The data-gathering abilities of UAVs allowed for enhanced situational awareness. Their attack capabilities provided the military a chance to engage targets much faster than mobilizing ground units. Further, drones were able to enter and remain in environments which were not conducive to

[2] These inventories do not include small UAVs, micro UAVs (small enough to be "man-portable"), or "lighter-than-air" (inflatable) platforms.

manned aircraft and remain in flight for over 24 hours. They are also able to perform additional functions such as surveying land and measuring cellular, radio, and other technological coverage over a variety of terrains (Unmanned Aerial Vehicle Systems Association 2013).

In addition to the changing organization of military engagements, the type of conflict in Iraq and Afghanistan gave the UAV technology additional appeal. While previous conflicts (e.g. WWI, WWII, and Vietnam) were often fought out in the open or on the battlefield, these military operations engaged enemies across a variety of terrains. As opposed to fighting an organized unit of enemy troops, the U.S. military was often seeking a particular individual or small group without precise knowledge of their location. Given the geographic realities of these battles, UAVs, some able to remain in flight for forty hours or more, could track and attack targets more effectively than traditional combat methods.

Drones also provided a mechanism for engaging in conflict while limiting U.S. soldier fatalities. Soldier deaths in post-9/11 conflicts, particularly in Iraq, were met with sharp criticism from citizens, the popular press, and both sides of the political aisle (Kuhnhenn 2008, NBC News 2007). By using drones, many missions would no longer require as many U.S. soldiers in the field, decreasing the number of casualties.

Although the military demand created by Afghanistan, Iraq and the broader War on Terror was central to the expansion of the drone industry, it was not the sole driver of the industry's growth. Established Big Players in the defense industry, like Lockheed Martin, Northrop Grumman, Boeing, General Dynamics, and General Atomics saw U.S.

military engagements as opportunities to earn significant profits. It is not difficult to see why. These engagements would mean more defense spending, including on UAV technologies. Consider that by 2012, world governments were spending more than $6.6 billion on UAVs annually. Profits are expected to increase to $11.4 billion annually over the next decade for a world market to more than $89 billion a year (PR Newswire 2012). According to the GAO, the 2012 DOD acquisition plan for UAVs will require extensive payments to drone manufacturers. More than $34.9 billion will be needed to purchase the desired number of drones from manufacturers (Gertler 2012: 33). In addition to the profits from the manufacture of new drones, the industry may expect additional revenues from drone repairs and modifications. Given these potential profits, coupled with the increased demand from the military, the result, as predicted by the political economy model, was intense rent-seeking by those in the defense industry.

Consider that top drone manufacturers have spent millions on lobbying expenditures since the Global War on Terror began in 2001. For example, leading up to and in the year following the U.S. invasion of Afghanistan, General Atomics, the maker of the Reaper, Warrior, Avenger, and Predator drones, significantly increased its lobbying expenditures. Between 2000 and 2002, General Atomics' lobbying increased by a compound rate of over 49 percent per year. During the same period, Northrop Grumman increased their expenditures at a compound rate of nearly 27 percent per year (CRP 2013).

Lobbying by the Big Players in the drone industry—Lockheed Martin, Northrop, Boeing, General Dynamics, and General Atomics—increased again over the 2008

election cycle. Between 2006 and 2008, the Big Players in the drone industry increased their lobbying at a compound rate of 17.41 percent per year compared to nine percent for total lobbying in the U.S. (CRP 2013). Lockheed, General Dynamics and Boeing increased their lobbying expenditures at a compound rate of 22, 12, and 35 percent, respectively, between 2006 and 2008 (CRP 2013). While overall lobbying in the U.S. decreased at a compound rate of 4 percent per year between 2010 and 2012, lobbying for the drone industry fell less than one percent (CRP 2013). Northrop Grumman, Lockheed Martin, and General Atomics, however, continued to *increase* their lobbying expenditures. Between 2010 and 2012, Northrop, Lockheed, and General Atomics increased their lobbying expenditures at compound rates of three, six, and eight percent, respectively, per year (CRP 2013).

In addition to increasing the overall level of lobbying spending Lockheed Martin, Northrop Grumman, Boeing, General Dynamics and General Atomics each retained multiple lobbying firms, many of which employed former government workers. In 2012, for example, 72.8 percent of lobbyists employed by Lockheed had formerly held a government job. Similarly, 67.3 percent of Northrop lobbyists, 71.9 percent of those retained by General Dynamics, 76.5 percent of Boeing's, and 72.2 percent of General Atomics' lobbyists were former government employees (CRP 2013). This "revolving door" between government and lobbying firms lowered the cost of traversing the Congressional landscape to have maximum influence on key decision makers.

Several of the lobbying firms retained by the top drone manufacturers were connected directly to former Congressmen. Former Congressman David Hobson, for

example, was a House representative from 1991-2009 and a member of the House Appropriations Committee and Subcommittee on Defense. Following his political tenure, Hobson founded his own lobbying firm, now retained by Lockheed Martin (CRP 2013). Jack Edwards, a long time member of the House, began working as a consultant for a D.C. lobbyist following his term. In 2012 alone, the firm received more than half a million dollars for its services from Lockheed, Northrop, and General Dynamics (CRP 2013). Former Congressman Sonny Callahan likewise began working as a lobbyist following his stint at the Capitol and also started his own firm. The two firms collectively received more than $1.33 million in funds from drone makers during Callahan's tenure (CRP 2013). Former House member John Breaux and former Senate majority leader Trent Lott began their own bipartisan lobbying firm, Breaux Lott Leadership Group in 2008 and are also retained by the industry's Big Players, like Lockheed Martin (CRP 2013).

The attempt by the major players in the drone market to influence the activities of the government may also be seen in campaign contributions. While lobbying is generally conducted in an attempt to advance or hinder particular legislation, by contributing to a campaign, drone manufacturers look to curry the favor of politicians and influence the politics surrounding their industry more generally. Just as lobbying expenditures for the industry increased around elections and other major events like the invasions of Iraq and Afghanistan, so too did campaign contributions from the top drone manufacturers.

Between 2000 and 2002, total campaign contributions from Lockheed, Northrop, Boeing, General Atomics, and General Dynamics increased by over 13 percent to more

than $10 million (CRP 2013). The elections of 2008 saw an increase in contributions of over 28 percent from 2006. In the elections of November, 2012, Lockheed, Northrop, Boeing, General Dynamics, and General Atomics increased their campaign spending to over $11.9 million—an increase of more than 104 percent from the year before—while Northrop Grumman increased its contributions at a much faster rate—nearly 200 percent between 2010 and 2012 (CRP 2013). These campaign funds provided monetary incentives for members of Congress to be favorable toward spending on defense, including on expanding spending on UAV technologies.

In 2007, Congress passed the Fiscal 2007 Authorization Act, legislation that would all but guarantee the mass expansion of the industry. Among other requirements, the Act required the Secretary of Defense to

[d]evelop a policy to be applicable throughout the Department of Defense, on research, development, test and evaluation, procurement and operation of unmanned systems....[The policy must include] a preference for unmanned systems in acquisition programs for new systems, including a requirement under any such program for the development of a manned system for a certification that an unmanned system is incapable of meeting program requirements (John Warner National Defense Authorization Act for 2007, section 941, emphasis added).

Thus, Congress drastically altered the way in which new systems were to be designed. Instead of looking to develop unmanned systems to serve the same tasks as existing manned systems, unmanned systems would now be the assumed *starting point* for new technologies. Unmanned systems were to be developed for tasks unless some other need required new systems to be manned. The impact on the drone industry was drastic and rapid. By 2010, spending on drones increased to $3.3 billion (Gertler 2012: i). By 2011, the DOD had increased their spending on drones to $4 billion annually

(Brinkerhoff 2011, Waldman 2013). As a result of the expansion, all the major players—drone manufactures, the military, and Congress—reaped substantial benefits.

Perhaps the best demonstration of the impact the drone industry has had on Congress occurred in 2009 with the formation of the Congressional Unmanned Systems Caucus (CUSC). The CUSC is a group of approximately fifty members of the House of Representatives dedicated to expanding the drone industry:[3]

[The Unmanned Systems Caucus seeks to] educate members of the Congress and public on the strategic, tactical, and scientific value of unmanned systems; actively support further development and acquisition of more systems, and to more effectively engage the civilian aviation community....We acknowledge the overwhelming value of these systems to defense, intelligence, homeland security, law enforcement, and the scientific communities....We recognize the urgent need to rapidly deploy more Unmanned Systems in support of ongoing civil, military, and law enforcement operations....We work with the military...and other stakeholders...[to] support our world-class industrial base that engineers, develops, manufactures, and tests unmanned systems creating thousands of American jobs....We support policies and budgets that promote a larger, more robust national security unmanned system capability (CUSC 2013).

It is not difficult to understand why the representatives in the CUSC desire to expand the industry. *All* members of the caucus come from a state with some connection to drone manufacturers, meaning they have a vested interest in expanding the industry to generate benefits for their constituents.

[3] A similar caucus was created in the Senate in 2012 with a mission to "educate Senators and staff on the capabilities and concerns of UAS and to work closely together to best shape the UAS policymaking process (Harder and Heisten 2012). Just as the House UAS caucus contains members with vested interests in the continued expansion of the drone industry, so too does the Senate caucus. Also like the House caucus, the group in the Senate maintains close ties to the AUVSI and drone manufacturers. Michael Toscano, President of the AUVSI stated the Senate caucus would "enable AUVSI to work with the Senate and stakeholders on the important issues that face the unmanned systems community as the expanded use of the technology transitions to the civil and commercial markets....It is our hope to establish the same open dialogue with the Senate caucus as we have for the past three years with the House Unmanned Systems Caucus" (quoted in Aero News Network 2012).

Congressman Buck McKeon, one of the caucus' co-chairs, for example, represents the district in which Northrop Grumman manufactures its Global Hawk drones. His representative state, California, is poised to gain immensely from increased drone production. A 2013 report by the Association for Unmanned Aerial Vehicle Systems International (AUVSI), the industry's largest lobbyist, found that enhanced drone production would bring more revenue to California than any other state (AUVSI 2013: 3). Henry Cuellar, the caucus' second co-chair, represents a district just outside of San Antonio, the home of branches of Lockheed Martin, Northrop Grumman, and Boeing. The same AUVSI report found that Texas is poised to reap some of the most extensive benefits from the expansion of the drone industry and is third in potential revenue behind California and Washington state (AUVSI 2013: 3). Other members of the caucus have similar connections and hail from states which will also gain significantly from further drone production. More than half the members of the CUSC represent the ten states which the drone industry projects will see the most gains in terms of jobs and additional revenue with the increase in UAV production (AUVSI 2013: 3).

These relationships illustrate the logic of public choice, that the policies surrounding drones (like policy in general) are driven by the incentives facing policymakers. The Big Players in the market and the polity (i.e. the military, elected officials, and drone manufacturers) utilize a variety of means, including lobbying, campaign finance, political clout, and other pressures to influence the other groups and reap various benefits for their members. The central issue is whether these narrow interests align with broader notions of the public interest as it relates to defense.

5 Conclusion

The public controversy surrounding the use of drones by the U.S. government is a recent phenomenon. But as our analysis shows, the UAV technology itself is anything but new. Instead, there is long history of linkages between the U.S. government and private producers of these technologies. Our central purpose has been to document this history. In itself, this has value purely as an exercise in U.S. military history and political economy. But beyond this, the political economy of drones has important implications for current policy debates.

The current controversy over drones is multifaceted. On the one hand there is debate about the international use of drones. These controversies focus on the effectiveness of drones in targeted killings, the legality of drone use in the context of state sovereignty, and the ethics of drone use due to the possibility of collateral damage. At the same time, there is ongoing debate about the domestic use of drones related to privacy and civil liberties. Regardless of how these debates ultimately unfold, the creation of new policies surrounding the use and manufacture of UAVs is certain. It is in this policy arena where our analysis has the potential to illuminate and inform.

One of the central insights from public choice is that policy is not designed in a vacuum. Instead, public choice scholars emphasize that policy is the outcome of a process influenced by several key categories of actors: individual voters, interest groups, bureaucrats, and elected officials. Further, this policy process unfolds in the context of existing relationships, networks, and power distributions between the players based on past interactions and policies. Our analysis sheds light on both the historical context and current key parties relevant to UAV technologies. This is particularly relevant for policy

regarding drones. Given the existing entanglements and ability of Big Players to influence outcomes, first-best policies may be impossible or at best exceedingly difficult to obtain. While Big Players don't have complete influence over policy, they do have the ability to significantly alter outcomes, calling into question whether drone-related policies align with the interests of U.S. citizens more broadly.

Ignoring the political realities highlighted in our analysis may result in ineffective, or, worse, damaging policies. For example, given the current controversies over the domestic use of drones, several states have passed bans on the use of UAV technology in their airspace. While this might contribute to the protection of privacy and civil liberties on some margins, such blanket laws also run the risk of undermining private innovation that might yield widespread economic benefits for U.S. citizens (see Dourado 2013).

Lastly, our work sets forth a significant challenge to those undertaking the construction of drone policy. How does one design policies which constrain the narrow interests of those involved in the drone industry while maintaining the potential benefits offered by UAV technologies? Given the entrenched entanglements discussed throughout this chapter, this is no easy task. Such issues, however, must occupy the foreground of any policy discussion if we are to avoid perverse outcomes and obtain the best possible policies.

DRONES: PUBLIC INTEREST, PUBLIC CHOICE, AND THE EXPANSION OF UNMANNED AERIAL VEHICLES

1 Introduction

Unmanned aerial vehicles (UAVs), or "drones" have been described as the future of modern warfare. Observing one UAV on an aircraft carrier in 2013, Navy Secretary Ray Mabus stated, "It's not often that you get to see into the future, but that's what we got to see today" (quoted in Lubold and Reed 2013). Air Force Col. Eric Mathewson described drones as, "a revolution of military affairs" (quoted in Pappalardo 2010). In 2013, former Defense Secretary Donald Rumsfeld stated he expects drones to play a substantial role in the continued War on Terror stating, "there is clearly going to be a use for drones; there has been in the past and there will be in the future" (quoted in Sherfinksi 2013).

Although drone use is evolving on a daily basis, it is clear that UAVs are a core component in U.S. military operations. Indeed, drones have been used by the U.S. military in some capacity since WWII and UAVs were used extensively for surveillance missions abroad throughout the Cold War.[4] But the start of the War on Terror in 2001 launched drone use to new levels. In addition to reconnaissance, drones are now used as a means of conducting offensive strikes (Sifton 2012). Since 2008, the U.S. has conducted more than 1,000 strikes in Afghanistan. Between 2008 and 2012, 48 strikes occurred in

[4] See Hall and Coyne 2014, for a more complete analysis of the emergence of drones and their historical use by the U.S. military.

Iraq. As the U.S. prepares to redeploy some kind of force to the country in 2014, drones have reportedly been providing intelligence (see Entous and Barnes 2014). Over 140 strikes were launched in Libya. Four hundred drone attacks have occurred in Pakistan, more than 100 in Yemen, and at least one in the Philippines (Kreps and Zenko 2014: 71). As many as nine strikes have occurred in Somalia (Rogers 2012).

The expanded use of UAV technology is also reflected in the number of drones and UAV platforms employed by the U.S. military. In 2000, for example, the DOD employed approximately 50 drones and supported five distinct UAV platforms. By 2012, 15 unique platforms and over 7,000 drones were supported—a 140-fold increase in twelve years (Bone and Bolkcom 2003: i, Gertler 2012: 8, Tomiuc 2012). UAVs comprised a mere five percent of U.S. military aircraft in 2005; by 2012, they accounted for 41 percent (Gertler 2012: 9). Plans to further expand the U.S. drone arsenal are scheduled through 2038 (U.S. DOD 2013: 72).

Academic scholars and policy makers have assumed, often implicitly, that the increased use of UAV technology and decisions regarding drones have been, and will be, made in the "public interest." That is, it is assumed that those who design and implement drone policy set aside private incentives and construct policies to maximize the production of national defense and security. The purpose of this chapter is to explore a number of conjectures that follow from this assumed public interest and to examine the robustness of these predictions. To the extent these claims are not supported empirically, this work seeks to offer an alternative explanation to reconcile observed policy outcomes and the public interest ideal.

This chapter contributes to two strands of literature. The first is the small, but growing body of work on UAVs. Existing scholarship on UAVs tends to focus on the legal or ethical implications of drone use (American Civil Liberties Union 2011, Arkin 2010, Dipert 2010, Jenks 2010, Sharkey 2010, Singer 2009, Strawser 2010). Others provide a historical account of UAV use, examine various technical aspects of drones, or look to provide a cost and benefit analysis of the technology's use in combat or other missions (M. Boyle 2013, Byman 2013, Cronin 2013, Kreps and Zenko 2014, Lyon 2004, Miller 2012, Newcome 2004). Throughout this literature, it is largely assumed that those influencing the research, development, acquisition, and other policies surrounding drones, make their decisions in the public interest. This chapter contributes to this literature by offering the first examination of the robustness of the assumption of publically interested drone policy. My analysis focuses specifically on the period following September 11, 2001, since this is when one observes the most dramatic increase in the use of drones (see Hall and Coyne 2014). I limit my focus to the use of UAVs by the U.S., as the various agencies of the U.S. government maintain and employ more UAVs than any other group.

Second, this work contributes to the larger literature on defense and peace economics (see Anderson and Carter 2007, 2009, Arrrow 1995, Boulding 1945, 1978, Brauer and Caruso 2012, Brauer and Dunne 2012, Coyne 2008, 2005, Coyne and Cowen 2005, Coyne and Pellillo 2011, Hartley and Sandler 1995, Hirshleifer 2001, Isard 1992, Poast 2006, Sandler and Hartley 1995, Smith 2009). In particular, this work contributes to the scholarship on the defense industrial base. This literature explores the relationship

between the government's demand for, and expenditures on, military goods and services, and the private producers of those goods and services (see Dunne 1995, Hartley and Sandler 1995, O'Hanlon 2011, Watts 2008). Particular focus is placed on the interplay between the two categories of actors to understand how government influences the members of the defense industrial base and vice versa.

My analysis contributes to this literature by offering an analysis of UAVs in the Global War on Terror with a particular focus on and the broader institutional structure under which drone policy is formed. I offer insight into the interplay between the relevant actors in government and in private industry and how their interaction generates outcomes that are often at odds with what the public interest would predict.

The rest of this chapter proceeds as follows. Section 2 lays out the public interest framework as assumed by the existing scholarship on UAVs. This section identifies what one would expect to observe with respect to drone policy given this assumption. Section 3 provides empirical evidence related to the conjectures derived in section 2 in order to examine their accuracy and robustness. Section 4 offers a discussion of the alignment of expected and observed policy and provides and alternative analytical structure for examining drone policy. Section 4.1 discusses the incentives facing private interests in the drone industry. Section 4.2 describes the incentives facing political actors and their means for influencing others. Taken together, these sections provide an in-depth analysis of UAV policy. Section 5 concludes with implications.

2 Public Interest and Implications for Drone Policy

When discussing the construction of defense policy in general, it is assumed by the literature that those involved set aside their own goals and work to serve the greater "public good." Benevolent agents are assumed to be motivated by some larger social welfare function which includes the provision of national defense. UAVs represent a component of this national defense variable. Policymakers, acting as a collective unit, allocate resources so as to maximize the value of national defense (i.e. provide the best protection for the U.S. citizenry) and the larger social welfare function. These actions are supposedly reinforced by appropriate feedback mechanisms. Namely, these public actors are motivated to please their "employers"—the general public (see Tullock 2008). It follows that the creation or alteration of UAV policy benefits society as a whole rather than a subset of particular actors and directs resources to their highest-valued use.

In the literature on UAVs, this framework of public interest is, at least implicitly, taken as given. Even in works where the ultimate use of drones is criticized, it is assumed that political actors look to provide the best possible defense for U.S. citizens and have chosen drones as the means to achieve these goals. Abizaid and Brooks (2013), for example, while offering a number of suggestions to improve drone policy, ultimately assume policymakers will look to fulfill the public's goals. Discussing future UAV developments, they state (15), "[policy should be] geared toward advancing US national security interests in a manner consistent with [the public's] values." Similar assumptions of public interest are observed elsewhere, "[P]rotecting vital public interests and promoting innovations that stand to substantially benefit society requires…laws, policies, and regulatory frameworks" (Drones and Aerial Robotics Conference: 1). From this

assumption of public interest, one may derive two general conjectures, each with several subsidiary conjecture, regarding what drone policy should look like in practice.

Conjecture 1: Defense expenditures on the production of UAV technology are allocated to maximize defense and security for U.S. citizens

According to the public interest view, policies are constructed to serve the interests of the broader public. With regard to drones, this implies that UAVs are produced because they provide the best possible defense and security for U.S. citizens. This conjecture yields two sub-conjectures regarding the costs of drone production.

Conjecture 1.1: Producing drones is the most cost effective means, relative to known alternatives, of achieving U.S. security objectives.

If drones are produced in the public interest, this implies that drones provide the same, or more, "security output" at a lower price. This indicates that, as the U.S. has shifted operations from manned aircraft to drones, we would expect drones to provide the same, or greater, outputs as manned aircraft (surveillance, targeted strikes, etc.) for a lower price. This assumption of drones' cost efficacy is observed throughout the existing literature on UAVs. For example, one author notes that, "Drones reduce the dollar cost of using lethal force…[they] are a bargain compared with the available alternatives" (Brooks 2012), while another indicates that, "Drones are substantially cheaper than traditional ground forces" (Francis 2013), and yet another author argues for the desirability of UAV technology because, "They're cheap" compared to alternative technologies (Ratnesar 2013).

The assumption of public interest in the context of cost reduction has further implications. In the event the cost to using UAVs was greater than that of an equally effective alternative, or the cost of UAVs was unclear, benevolent government actors would reallocate resources toward producing alternatives so as to provide the best possible defense at the lowest price.

Conjecture 1.2 Drones provide a technically and operationally superior means of defense relative to alternative technologies.

If drones are produced within the public interest, this implies that drones are not only the most cost-effective option, but are also generally technologically superior to the alternatives for providing defense. This assumption is seen throughout the literature. Zuckerman (2013), for example, demonstrates this assumption stating, "the drone is an incredibly effective tactical instrument."

Within this context of technological superiority, the public interest assumption has further implications. Specifically, if UAVs are operationally suspect, or generally less technologically effective than other forms of defense given their relative prices, than resources would be reallocated to other forms of defense as UAVs would not be providing the best possible defense for U.S. citizens.

Conjecture 2: Ineffective or counterproductive drone policies would be eliminated or modified

The public interest view implies that drones are the best tool for conducting U.S. foreign policy and carrying out U.S. objectives—most notably, goals related to the War on Terror and other issues of national security. From this three sub-conjectures emerge.

Conjecture 2.1 Drones are superior at detecting, targeting, and dismantling terrorists and other enemies better than manned aircraft or other means.

It is argued that drones have a superior ability to eliminate high-value terror targets, thus crippling the leadership of terrorist groups which look to harm the interests of U.S. citizens. These ideas are captured clearly in President Obama's (2013) speech on drone policy which, among other things, noted that,

[Drones] are effective….Dozens of highly skilled al Qaeda commanders, trainers, bomb makers and operatives have been taken off the battlefield….[T]he primary alternative to [drones] would be the use of conventional military options….Conventional airpower or missiles are far less precise than drones.

Byman (2013: 33) echoes these statements arguing that, "Drones…undercut terrorists' abilit[ies]….[T]raining on a large scale is nearly impossible when a drone strike could wipe out an entire group of new recruits….[T]he alternatives [other technology] are either too risky or unrealistic." The assumption of public interest within this context implies that if UAVs do not provide superior means of eliminating terrorist targets, we would expect to see a substitution away from drones toward other means of combating terrorism.

Conjecture 2.2 Drones are more effective at reducing collateral damage, minimizing civilian casualties, and at reducing potential harms to troops relative to alternative technologies.

If drone policy is constructed within the public interest, this implies that, along with possessing a superior ability to dismantle terrorist groups, UAVs are better able to reduce the number of civilian casualties and other damage compared to the alternatives. The minimization of collateral damage is important in this context for two reasons. First, casualty reduction is proposed to reduce instances of "blowback" (the unintended negative results of military action) which may harm U.S. citizens both domestically and

abroad. Second, casualty reduction works to follow international laws which require governments to minimize civilian deaths. Failure to do so may result in sanctions which adversely impact the U.S. citizenry.

The idea that drones reduce casualties is readily observed. CIA Director John Brennan, for example, stated that drones maintain "surgical precision—the ability with laser-like focus to eliminate the cancerous tumor called an al Qa'ida, while limiting damage to the tissue around it" (Brennan 2012). Others have made similar claims stating that, "drones kill fewer civilians…than any other weapon" (Saletan 2013) and, "[drones are] actually the most human form of warfare" (Lewis 2013).

Though distinct from the issue of civilian casualties, the public interest assumption likewise implies drones are superior at reducing harm to military personnel. Placing fewer troops on the ground implies lower deployment costs, as well as lower costs on ex-post medical and other care, thus reducing the cost to U.S. citizens. Burris (2013) captures this idea plainly, "Drones spare American soldiers." If UAVs do not in fact reduce civilian and military casualties, we would expect to see other methods employed and a reevaluation of drone policy in order to fulfill the public interest.

Conjecture 2.3 Government officials responsible for constructing UAV policy will utilize the best information available to create, evaluate, and alter drone policies to maximize social welfare.

If drone policy is constructed within the public interest, we would expect those responsible for designing and implementing UAV programs to utilize the best information available. If those with a comparative advantage in defense and security activities offer information or advice suggesting an alternative or modification to UAV

policy, we would expect to see these suggestions integrated into UAV policy. In this case, we would expect policymakers to pay particular attention to reports and opinions from the U.S. military and other counterterrorism experts. These individuals have a comparative advantage in defense and security issues and, therefore, are most qualified to offer information regarding the aforementioned issues of casualties, technical efficiency, and operational effectiveness.

3 Data and Evaluation of the Public Interest Conjectures

Whether the conjectures associated with the public interest assumption hold is an empirical question. Unfortunately, given that drone use has only recently increased, and that many key aspects are classified, "large-n data" is unavailable for standard statistical tests. In the absence of appropriate quantitative data I draw on data from a variety of sources to empirically analyze the public interest conjectures. These data sources include: official statements and documentation from the U.S. government, works from reputable media outlets, and academic papers. While this approach is less formal than standard statistical analysis, it is appropriate given the importance of the topic and the limited quantitative data. Moreover, the goal is not to make specific point predictions regarding UAVs, but rather to draw on available sources to discern broad patterns in the context of the conjectures established above. If drone policy is constructed solely to serve the public interest, we should expect to see strong evidence supporting each of the above conjectures, as well as general agreement among experts on their implications. Evidence contrary to these conjectures, or substantial disagreement regarding these claims would

indicate that motivations outside the public interest are impacting the creation, implementation, and ultimate use of drones.

Conjecture 1: Defense expenditures on the production of UAV technology are allocated to maximize defense and security for U.S. citizens

Conjecture 1.1: Producing drones is the most cost effective means, relative to known alternatives, of achieving U.S. security objectives.

The available evidence casts doubt on the suggested cost efficacy of drones. At best, drones appear to provide a minimal cost advantage to comparable manned aircraft. At worst, UAVs provide no more security than manned aircraft and are significantly more expensive. Taken together, this suggests the public interest framework may be insufficient in explaining the current utilization of drones by the U.S. government. Using declassified reports from the DOD, A. Boyle (2012) found that UAVs provided only a *slight* cost advantage over manned systems. Abizaid and Brooks (2014: 22) state that, "UAVs are not inherently cheaper than manned aircraft." Bone and Bolkom (2003: i) caution that the differences between the projected and actual price of many UAVs is substantial. The accident rate for drones is in some cases 100 times higher than those of comparable manned aircraft. As of July 2010, the Air Force had identified 79 drone accidents costing at least $1 million each (Zucchino 2010). When taking these higher fail rates into account, the overall cost-effectiveness of UAVs is far less clear. Others note the "savings" created by UAVs may be partially or completely offset by the need for multiple "ground pilots" and that while per unit costs may appear smaller, in the aggregate, total acquisition costs rival those of other weapon systems (Bone and Bolkcom.: 12).

These doubts regarding cost minimization are illustrated by examining cases of two UAV platforms—the Block 30 Global Hawk and the Fire Scout. The Global Hawk, for example, was initially priced at $35 million a unit, well below the cost of a comparable manned aircraft. The actual cost to manufacture the UAV, however, was more than $200 million per unit, significantly higher than comparable alternatives (Roston 2013). The Fire Scout, another UAS, likewise saw costs increases so significant, law required Congress to be notified (Gertler 2012: 10). As of December, 2013, the average procurement cost of the Fire Scout had risen some 71.5 percent (Carey 2014).

Conjecture 1.2 Drones provide a technically and operationally superior means of defense relative to alternative technologies.

Just as the available evidence regarding the cost efficacy of drones is conflicted and may contradict the implications of publically interested policy, so too does the evidence regarding the operational aspects of UAVs. A variety of reports, including those by top military officials, indicate drones are operationally suspect. Gen. Mike Hostage, chief of the air service's Air Combat Command, for example, described the drones most frequently used in Iraq and Afghanistan, "useless in [many] environment[s]….[Drone are] not the force structure the nation needs or can afford" (quoted in Reed 2013). Dyke Weatherington, head of the DOD's UAS planning taskforce stated that issues with drones had complicated missions to the point that the technical effectiveness of UAVs had been greatly reduced (see Gertler 2012: 16).

These questions of operational efficacy are further illustrated by specific cases. For example, discussing the aforementioned Fire Scout UAV, a top Pentagon official stated the Fire Scouts performed poorly during tests and that they drones were "were not

operationally realistic" (quoted in Friess 2011). In discussing the Global Hawk, another Pentagon official said bluntly, "the Block 30 is not operationally effective" (Sia and Cohen 2013). Incidents regarding the UAVs becoming disconnected from their human operators, straying into restricted airspace, and crashes have been reported, raising additional concerns regarding the UAVs operations (Pringle 2012).

While the data above demonstrates operational issues with UAVs, determining whether or not drones provide the "best possible defense" requires a comparison to the alternatives—namely, manned aircraft. Again, it is unclear UAVs are generally superior to their manned counterparts. Discussing the ISR (intelligence, surveillance, and reconnaissance) capabilities of manned and unmanned aircraft, Army Lt. Col. James Cutting, the service's unmanned air systems division chief stated, "manned platforms are more effective than unmanned platforms" (quoted in Moorman 2009).

These questions of technical differences between manned and unmanned aircraft is again well-illustrated with a specific case. Consider, for example, the Global Hawk UAV. In 2012, when faced with the choice between the U-2 or the Global Hawk, the Air Force decided the manned U-2 was better suited for its future needs given forecasted budgets, the respective payloads of the two vehicles, technological abilities, and the difference between their mission success rates. This was in spite of the fact that the Global Hawk had been created in an effort to replace the U-2 (see Thompson 2014).

Taken together, this disagreement regarding the effectiveness of UAVs and evidence suggesting manned aircraft may be generally preferable than drones,

demonstrates that current drone procedures do not appear to completely align with the implications of the public interest assumption.

Conjecture 2: Ineffective or counterproductive drone policies would be eliminated or modified

Conjecture 2.1 Drones are superior at detecting, targeting, and dismantling terrorists and other enemies better than manned aircraft or other means.

Evidence suggests that, at a minimum, drone strikes are not intrinsically better than other means at targeting and eliminating terror threats. In the worst case, current UAV policy has led to an increase in terrorist group membership and an expansion of terror activity.

One study of over 250 terrorist groups found that most terrorist groups cease operations when group members decide to join in the political process (43 percent) or *local* law enforcement dismantle key members of the group (40 percent). Only seven percent of terrorist groups ended through military force, suggesting that drones, and military strikes in general, are not the best method for eliminating terrorists (Jones and Libicki 2008: 18-19).

When drone strikes are used, it is unclear that drones are superior to other methods at eliminating the desired "high level" fighters. Since 2008, government sources show that drone strikes have killed approximately twelve times more low-level fighters than mid-to-high level al Qa'ida and Taliban leaders (Entous 2010). Another study found that the number of high-level targets killed as a percentage of total casualties was a mere two percent (International Human Rights and Conflict Resolution Clinic at Stanford Law School and Global Justice Clinic at NYU School of Law 2012: vii).

Counter to the publically interested idea of decreasing the threat of terrorism, there is strong evidence that drone strikes are contributing to an *increase* in recruitment to terrorist organizations and terrorist activity. One study found that not only had the number of terrorist attacks increased between 2007 and 2013, but the number of al Qa'ida affiliated jihadist groups increased by 58 percent between 2010 and 2013 (Jones 2014: x). Reporting on drone strikes and the reduction of terrorist groups, Jones (2014: 60) found, "there is mixed evidence, at best, that drone strikes…are effective in defeating terrorist groups." Similarly, Smith and Walsh (2013) found that drone strikes were ineffective at degrading al Qa'ida and led to an increase in propaganda output. Kilcullen and Exum (2009) describe how drone strikes become a recruitment tool for terror organizations, "Every one [killed in a strike] represents an alienated family, a new desire for revenge, and more recruits for a militant movement that has grown exponentially even as drone strikes have increased."

Conjecture 2.2 Drones are more effective at reducing collateral damage, minimizing civilian casualties, and reducing harm to troops than other means.

It is unclear that drones reduce civilian casualties or place fewer U.S. soldiers in harm's way. One study of civilian casualties from drone strikes stated that, "[T]he dominant narrative about the use of drones…[that they are] surgically precise and effective…is false" (International Human Rights and Conflict Resolution Center 2012: v). Using classified military data on drone strikes and the civilian casualties they caused from 2010-2011, researchers with the Center for Naval Analyses found that drone strikes were *ten times more deadly* to Afghan civilians than strikes performed by manned aircraft. "When pilots flying jets were given clear directives…on civilian protection,"

they stated, "[manned fighters] were able to lower civilian casualty rates [compared to UAVs]" (quoted in Ackerman 2013). Moreover, the current official definitions of "militant" and "civilian" may bias official casualty estimates. A "militant" is officially defined as "all military-age males in a strike zone," meaning that the true identities and affiliations of many targets are never properly recorded (Wolverton 2013).

It is also unclear that drones provide a superior means of protecting U.S. military personnel from potential harms. In fact, using UAV technology may require *more* of a military presence in a given area as opposed to less. Zenko (2012), states that "drones require more boots on the ground" as the UAVs require a "ground pilot," a large number of surveillance analysts, maintenance personnel, and sensor operators. Further, it is unclear that drones spare soldiers from the psychological costs of combat. Studies from the Defense Department found that drone operators experience mental health issues at the same rate as conventional pilots (Dao 2013). An Air Force study of UAV operators found that nearly half reported "high operational stress." Nearly 25 percent displayed "clinical distress," anxiety, depression, or stress severe enough to impact job performance and family life. (Bumiller 2011).

The above analysis indicates the narrative regarding casualty reduction is at best unclear and raises doubts regarding the proposal that drones protect civilians or soldiers. At worst, drones not only increase the number of civilian casualties, but also increase the number of U.S. personnel in the field. In this case, current policy would be in direct conflict with the assumption of publically interested policy.

Conjecture 2.3 Government officials responsible for constructing UAV policy will utilize the best information available to create, evaluate, and alter drone policies to maximize social welfare.

In the case of drones and defense policies, we should expect policymakers seek out those with a comparative advantage in military and counterterrorism experience and to incorporate this feedback into their decision making. While it is impossible to know of all the correspondence between the military and policymakers, there is evidence to suggest that the advice of experts with regard to drones is being ignored. A variety of former military and counterterrorism experts have pointed out a number of issues regarding technical and allocative issues, and called for radical policy changes (see Friess 2011, Gertler 2012, Reed 2013, Zenko 2012, Zucchino 2010).

In 2013, Retired Gen. Stanley McChrystal, former Commander of U.S. Forces in Afghanistan and former Director of the Joint Special Operations Command, offered the following precaution regarding UAVs,

[Drones] didn't solve the problems [in Afghanistan]. The tactics that we developed…don't produce decisive effects.…If we were to use our technological capabilities [drones] carelessly…then we should not be upset when someone responds with their equivalent, which is a suicide bomb in Central Park, because that's what they can respond with (quoted in Byers 2013).

Other experts have called for serious changes to drone policy. In 2014, a panel of defense experts, led by Gen. John Abizaid, former commander of U.S. Central Command, and Rosa Brooks, former counselor to the Undersecretary of Defense expressed concern over using drones stating that reliance on drones, "rests on questionable assumptions, and risks increasing instability," (28) and that "[drone] strikes are [in]consistent with core rule of law norms" (36).

Despite these concerns, it does not appear that policymakers are heeding the advice of experts. In 2013, for example, the Air Force attempted to retire one line of UAVs, citing numerous reports of operational issues and extreme cost overruns. As opposed to discontinuing the UAV however, lawmakers instead *required* the Air Force to continue to use the drone and purchase two additional units despite the military's express desire to eliminate the program (see Sia and Cohen 2013). Drones continue to be used widely for surveillance and offensive operations and despite some efforts to increase transparency and make other changes to the way UAVs are used, these changes have either been blocked, or stagnated during the political process.[5]

4 Public Choice as an Alternative Framework

The above suggests that an alternative framework is required to resolve the discrepancies between the public interest ideal and the empirical evidence. How may one explain the continued expansion of UAVs despite evidence their use may not align with, or even contradict, the public interest?

The answer to this question requires an appreciation of the incentives facing a variety of actors within the UAV industry and an understanding of the broader institutional context in which these actors operate. As Buchanan (2003), Brennan and Buchanan (1985), Buchanan and Tullock (1962), Tullock (2005), Niskanen (1971), Olson (1965) and others have noted, the alternative to the public interest assumption is the "public choice" framework which emphasizes a symmetry of behavioral assumptions across contexts. The framework does not deny that individuals in politics may value the

[5] For a discussion of these proposed changes, see Miller 2014.

wellbeing of others or, in the case of this chapter, the provision of "national defense" to some degree. However, they argue that individuals in positions to influence the trajectory of policy do not, as the public interest framework suggests, look solely to maximize some larger social welfare function. Instead, they posit that policymakers, just like private actors, respond to incentives created by political institutions in which they interact (see Buchanan 2003). Institutions, as the "rules of the game," determine the incentives faced by policymakers (North 1990). According to their model, public actors will pursue the public will only if their private interests overlap with the public interest. This insight leads to a critical observation—if the existing political structure through which drone policy is constructed does not appropriately align private and public interests, then one would expect to observe a wedge between witnessed policy outcomes and the outcomes one would expect in the case of pure public interest.

To explain the discrepancies and questions raised in section 3, I examine two core groups from the public choice model—special interest groups (namely, defense contractors) and politicians (Congress and other elected officials). As per the public choice model, it is assumed each group maximizes their respective payoffs subject to the constraint they face. In so doing, the groups look to influence the trajectory of, in this case, defense policy. It is further assumed that each groups possesses something the other group finds desirable (e.g. ability to make laws, access to monetary funds, etc.). Responding to their own incentives regarding UAVs, these groups look to influence one another. The individual goals of each group, combined with the desire to influence one

another, results in exchanges between the groups. Through these trades, the private interests of each group are enhanced.

4.1 Private Industry

Special interest groups, in this case private defense contractors, face a strong incentive to obtain government contracts. As profit maximizing entities, the firms responsible for designing and manufacturing UAVs face strong incentives to pursue policies which increase their revenues, even if these pursuits do not align with the public interest. In order to further their interests, defense contractors have two distinct means of influencing drone policy—lobbying and campaign contributions.

The industry has undertaken substantial lobbying efforts in the post 9/11 period, as well as contributed millions in campaign contributions to Congress. Taken together, these methods have been effective in influencing the trajectory of drone use by U.S. forces. The five greatest-contributing drone manufacturers (Lockheed Martin, Northrop Grumman, General Dynamics, General Atomics, and Boeing) expanded their lobbying efforts substantially with the start of the War on Terror in 2001. Between 2000 and 2002, for example, General Atomics and Northrop Grumman increased their lobbying expenditures by compound rates of over 49 and 27 percent, respectively, per year. As a point of comparison, total lobbying expenditures in the U.S. rose at a compound rate of six percent per year over the same period (Center for Responsive Politics (CRP) 2013). During the 2008 elections, these five firms increased their lobbying at a compound rate of 17 percent per year on average compared to a nine percent increase in total U.S. lobbying (*Ibid*). Figure 2 illustrates the combined lobbying expenditures of these firms between

2000 and 2012. Within this period, these five firms spent over $600 million in lobbying efforts.

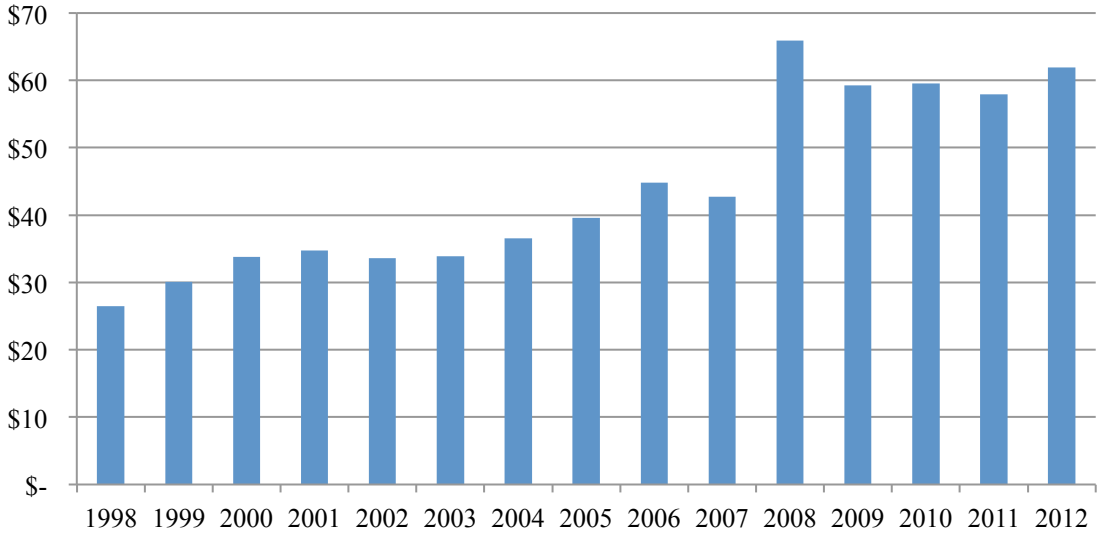

Figure 2: Lobbying Expenditures by the Top Five Drone Manufacturers, in Millions, 2000–2012[6]

In addition to lobbying efforts, these five players contribute to a variety of political campaigns of *both* political parties. Between 2000 and 2002, for example, total campaign contributions from Lockheed, Northrop, Boeing, General Atomics and General Dynamics increased by over 13 percent to more than $10 million (*Ibid*). Comparatively, the five industries which contribute the most to political campaigns decreased their total campaign contributions by 0.6 percent.[7] By the elections of November, 2012, campaign

[6] Source: Center for Responsive Politics 2013. All figures have been adjusted for inflation.

[7] These industries comprise those firms involved in pharmaceuticals, insurance, electricity, business associations, and computers.

contributions from the top UAV manufacturers increased to over $11.9 million—an increase of more than 104 percent from 2010. Firms like Northrop Grumman increased spending at a faster rate, upping contributions more than 200 percent between 2010 and 2012 (*Ibid*).

Though it is always difficult to make a direct causal link between lobbying expenditures and political outcomes, there is evidence that contractors have had substantial impact on the trajectory of drone policy, including those policies which the above evidence suggests do not align with pure public interest. One report by the Association for Unmanned Vehicle Systems International (AUVSI), the main lobbying organization for the industry, stated, "[We're the] go-to advocacy group for staffers and Members on Capitol Hill" (Toscano 2011). One example of the success of these efforts regards the reauthorization legislation for the Federal Aviation Administration (FAA). In a presentation by AUVSI, CEO Michael Toscano reported that, "The only changes made to the UAS sections of the House FAA bill were made at the request of AUVSI. *Our suggestions were often taken word-for-word*" (*Ibid,* emphasis added). This legislative change is one clear example of policy which may not align with the public interest. The passage of the act requires the FAA to integrate drones into domestic airspace by 2015, even though such an integration has raised significant concerns over issues of privacy, abuse by domestic law enforcement, and lack of appropriate legal frameworks. Each of these issues may undermine the safety and liberty of the citizenry.[8,9]

[8] See Murray 2012 regarding public opinion on domestic drone use.
[9]The specific debate surround the FAA Reauthorization Act are beyond the scope of this essay. For a detailed discussion of domestic drone use see ACLU 2011.

These policies have resulted in substantial profits for the UAV industry. While drones comprise only a part of a larger portfolio of items produced by these firms, UAV contracts have grown immensely since 9/11. Between 2001 and 2011, more than 2,000 contracts, specifically designated for the research, development, or manufacture of drones have been awarded to 21 separate companies by the DOD and other government agencies (USA Spending 2013). In 2001, approximately $116 million in contracts were awarded for drone production. By 2011, that figure had increased to some $1.8 billion (*Ibid*). Figure 3 provides a breakdown of the dollar amount of known UAV contracts issued by the DOD between 2001 and 2011.

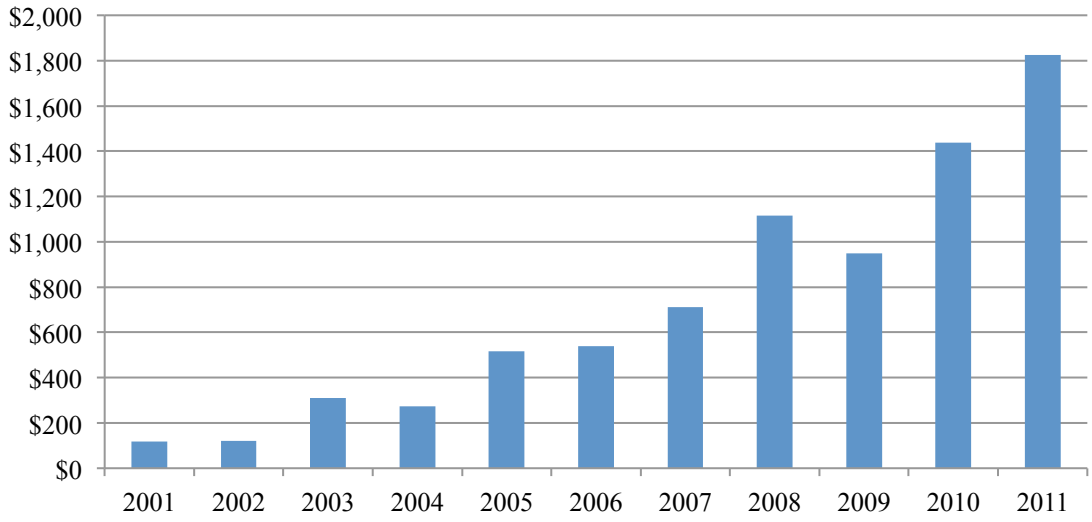

Figure 3: Drone/UAV Contracts (in millions of dollars) by Year[10,11]

[10] Source: USA Spending 2013

[11] These numbers are likely understated. Contracts included in this figure include those which *specifically* reference "drones" or "unmanned aerial vehicles." Other contracts for complementary factors, like robotics systems, are not reported in the above figure. While these are necessary inputs into the manufacturing of UAVs, the reporting system for such

Though already substantial, profits related to the development and manufacture of UAVs industry are anticipated to increase to over $89 billion per year (Teal Group 2012). One report from the Government Accounting Office (GAO) found that the DOD's acquisition plan for UAVs alone would require some $34.9 billion, not including the potential costs related to UAV repairs or modifications (Gertler 2012: 33). The potential revenue from additional contracts provides further incentives for those in the defense industry to engage in intense rent-seeking via the aforementioned mechanisms of lobbying and campaign contributions. By continuing to invest in relationships with Congress and advocating certain policies, UAV manufacturers are likely to observe higher profits.

Using this knowledge one may examine more specific cases where the private incentives of these special interests groups worked to create policies which fail to fulfill the public interest. Consider the case of the Block 30 Global Hawk. In response to an announced $487 billion reduction in the DOD budget, the Air Force proposed to remove the Global Hawks from their fleet to save $2.5 billion over five years (Sia and Cohen 2013).

In terms of the public interest basic cost-benefit, this decision seems to have been sound. The technical efficiency of the UAVs was questionable. Each unit cost more than $200 million to produce, nearly 300 percent more than original estimates (Roston 2013).

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contracts make it impossible to differentiate between funds used for robotics in UAVs versus other uses.

In discussing the cost of the Global Hawk compared to its main alternative, Air Force Sec. Michael Donley stated, “it's cheaper for us to continue with the [alternatives]” (quoted in Beidel 2012). In addition, the UAV was operationally suspect. In discussing the Global Hawk, a top Pentagon official bluntly stated, “the Block 30 is not operationally effective” (Sia and Cohen 2013). The UAVs encountered numerous mechanical issues and their performance consistently failed to meet efficacy guidelines (Gilmore 2011).

However, the Air Force’s plan to cut the Global Hawks was never implemented. Upon learning of the plan to cut the Global Hawk from the Air Force arsenal, Northrop Grumman, the manufacturer of the UAV, launched an intensive campaign to keep the technology in use. With the Global Hawk projected to bring more than $1 billion in revenue to Northrop Grumman, the firm faced strong incentives to keep the program despite reports the UAV did not fulfill the goals of the Air Force (Northrop Grumman 2012a: 33-34). The firm created a “Support the Global Hawk” website, urging citizens to petition their Congressional representatives (Northrop Grumman 2012b). The firm poured thousands of dollars of campaign contributions and lobbying. Following these efforts, the plan to ground the drone was blocked by Congressional directive. In late 2013, the firm announced it received a $144 million dollar contract for the three Global Hawks the military stated they no longer wished to purchase (Hennigan 2013).

4.2 Congress

Elected officials, like private contractors, face incentives to expand the use of UAVs in a manner which may not completely align with the public interest. While

providing laws and regulation, politicians seek a combination of wealth, votes, fame, and goods and services for their constituencies. In exchange for these goods, representatives can create laws and control the budget for a variety of bureaucratic organizations. The aforementioned campaign and lobbying contributions from UAV manufacturers are two of the strongest incentives facing lawmakers with regard to drone policy.

The power of these influences is pointedly illustrated by the formation of the Congressional Unmanned Systems Caucus (CUSC) in 2009.[12] The 50 member caucus seeks to,

[E]ducate members of the Congress and public on the…value of [UAVs]; [and] actively support further development and acquisition of more systems....We work with the military...and other[s]...[to] support policies and budgets that promote a larger, more robust national security unmanned system capability (CUSC 2013, emphasis added).

Members of the caucus face incentives to expand the use of UAVs, even if such extensions do not completely align with the broader public interest. First, every member of the caucus comes from a state with a connection to drone manufacturers. Each state represented in the caucus houses at least two of the largest campaign contributing UAV manufacturers. Forty-two percent of caucus members come from states in which all five companies maintain operations (Boeing 2013, General Atomics 2013, General Dynamics 2013, Lockheed Martin 2013, Northrop Grumman 2013). More than half of caucus members represent states projected to reap the largest gains from UAV use (AUVSI 2013: 3). These observable gains are important in this context, as they are one way in

[12] A similar caucus was created in the Senate in 2012 with a mission to "educate Senators and staff on the capabilities and concerns of UAS and to work closely together to best shape the UAS policymaking process (Harder and Heisten 2012). Like the House Caucus, the Senate group is also comprised of members with a particular interest in advancing the industry.

which politicians can fulfill their private goals. New employment and other opportunities demonstrate to constituents that an elected official is bringing benefits to their district and should be reelected. It follows that caucus members have a vested interest in expanding the industry, in order to generate benefits for their constituents and future campaigns.

The potential benefits to Congressional officials for expanding the use of UAVs may be illustrated by several specific examples. Congressman Buck McKeon, one of the caucus' co-chairs, and representative of the district in which Northrop Grumman manufacturers UAVs, for example received over $375,000 in contributions from the industry between 2008 and 2012 (CRP 2013). His home state of California obtained more than $4.3 billion in drone-related contracts between 2001 and 2011 and is projected to benefit more than any other state from increased UAV use (AUVSI 2013: 3, USA Spending 2013). Three other caucus members, Ken Calvert (CA), Joe Courtney (CT), and Robert Wittman (VA) each received more than $100,000 between 2008 and 2012. Other member of the caucus likewise received substantial contributions (CRP 2013).

These benefits for elected officials provides a clear window as to why they may pursue policies which do not align with the public interest. Stated simply, the incentives faced by lawmakers may not align with the broader public interest of the U.S. citizenry as a whole. Congressman McKeon illustrates this idea when discussing cuts to defense spending. Though cutting the federal defense budget may fulfill the desires of the general public, he maintained focus on his specific district.

[T]hese cuts…[threaten my district's] economy….Drastic cuts will hurt many communities in our district…which account for over $1.4 billion in defense contracts...[I]f these cuts are to take place, all of those contracts could be cut across the board by 8-12%. These institutions alone employ 25,000 people (McKeon 2013).

Caucus members and other elected officials have several means to influence drone policy. First, Congress controls a variety of discretionary budgets. Between 2001 and 2003, for example, Congress provided an additional $38 billion for costs related to the War on Terror (GAO 2003: 1). A significant proportion of these Defense Emergency Response Funds (DERFs) went to UAS projects. General Atomics, for instance received millions in DERF to advance two of its drone platforms. Congress granted some $235 million to further develop the firm's "Predator" platform (Bone and Bolkcom 2003).

In addition to DERF, the budget for the DOD is controlled by Congress through the annual National Defense Authorization Act (NDAA). The Congressional orders of the NDAA may all but force the use of some systems, even if these systems are undesirable and do not align with the interests of the public. The NDAA of 2007, for example, radically changed the process of UAV acquisition. Prior to this legislation, unmanned aerial systems were designed *after* a comparable manned system already existed. Following the NDAA for 2007, however, unmanned systems would be the assumed *starting point* for new technologies (NDAA 2007, section 941). This implies that, except under special circumstances, any new aerial systems are to be designed as unmanned aircraft, despite the reports from the DOD that UAV technology is operationally ineffective in many instances, and thus would not provide the best possible defense for U.S. citizens (see Reed 2013, Zenko 2012). Other NDAA directives likewise appear to promote drone technologies which may not provide the best defense. The NDAA for 2010, for example, required funds to be used to produce the "Sky Warrior" drone despite the UAVs high failure rates and "poor reliability" (Beckhusen 2012, NDAA 2010 §214).

One may observe still other examples of how the incentives facing lawmakers may yield policies counter to the public interest. As noted in section 4.1, the decision by the Air Force to cut the Global Hawks appeared to have looked to fulfill the public interest as resources could have been used to provide superior defense. In discussing the retirement of the Global Hawk, one Air Force officer stated, "Why…mak[e] us [the Air Force] spend money on something we don't want or need?" (quoted in Roston 2013). Air Force Chief of Staff, General Mark Welsh, stated the piloted U-2 was better suited to meet the needs of the Air Force, "We want the platform that will do the best job of accomplishing the mission assigned" (*Ibid*).

While the aforementioned activities by Northrop Grumman were integral in keeping the Global Hawk program, the incentives and actions of Congress were no less important. Upon learning of the plan to cut the Global Hawk, Congressman Buck McKeon, co-chair of the Unmanned Systems Caucus and head of the House Armed Services Committee, promptly sought to block the proposed cuts, arguing the UAV should be kept operational (Sia and Cohen 2013). McKeon, who had received an additional $10,000 from Northrop Grumman soon after the Air Force's announcement about the Block 30, had immense incentive to keep the project, even though the technology did not look to fulfill the public interest. McKeon represents the district in which Northop manufactures the Global Hawks, meaning his constituency would be directly impacted by any changes to the Global Hawk program. Working with other members of Congress, the NDAA for 2013 *required* the Air Force to continue to maintain the Global Hawks already in use and to purchase those UAVs which were

intended for production. Further, the act prohibited the use of any federal funds to retire or dismantle the drones. (NDAA 2013 §154).

5 Conclusion

This work has four main implications. First, this chapter implies that we cannot be confident that drone technology is being developed and utilized in a way which fully fulfills the public interest. The current institutional structure in which policymakers and special interest interact does not clearly align the interests of the public with the interests of policymakers. This suggests that policies regarding UAVs are subject to the private influences of a variety of actors. This work demonstrates how, even when faced with evidence of technical and allocative inefficiency and the recommendations of experts to alter policy, those involved in constructing drone policy may undertake actions which contradict public interests.

Second, this analysis has implications for drone policy. Given the incentives faced by the various private and public actors for expanding the drone industry, policy regarding drones may be subject to a type of inertia. That is, drones may continue to be developed and manufactured even when conditions (i.e. budgetary changes, differences in type of war, enemy combatant, technological changes, etc.) suggest another technology or method is preferable. Although drones may be desirable in some cases, this is not always the case. Recent reports, for example, have discussed the ineffectiveness of UAVs in situations where counter-aerial technology is available. Shooting down two UAVs frequently used in the War on Terror, has been referred to as "child's play" (Palmer 2012). Despite the fact drones may not be the best means to serve

the public interest in these and other cases, the internal and external pressures faces by policymakers indicate further development and manufacture of UAVs.

Third, this chapter has larger implications for general defense policy. Although drones have become a key component in military operations, they are but one technology in the military arsenal. This work demonstrates how one just one component of national defense may have immense impact on the incentives faced by policy makers and how these incentives may cut against the broader public interest. Given that the rules that govern drone policy are very similar to the rules which govern other defense acquisitions, this indicates that the misalignment of defense policy with the public interest may be substantial.

Fourth and finally, this work calls into question a typical assumption made within the larger literature on defense and peace economics regarding defense provision and security policy. This chapter indicates that the standard narrative of benevolent public actors looking to maximize a larger social welfare function may not be the appropriate lens for analyzing defense issues. Instead, when discussing the research, development, and ultimate use of drones or any other defense technology, this work suggests it is necessary to understand the individual incentives facing both private and public actors.

DRONES COME HOME: FOREIGN INTERVENTION AND THE USE OF DRONES IN THE U.S.

"Government, even in its best state, is but a necessary evil; in its worst state, an intolerable one." –Thomas Paine (1775-6: 69)

"If men were angels, no government would be necessary. If angels were to govern men, neither external nor internal controls on government would be necessary. In framing a government which is to be administered by men over men, the great difficulty lies in this: you must first enable the government to control the governed; and in the next place oblige it to control itself. A dependence on the people is, no doubt, the primary control on the government; but experience has taught mankind the necessity of auxiliary precautions." –James Madison ([1788] n.d.: 337)

1 Introduction

In order for a government to function, individuals must transfer some personal control to the state. The danger in granting the government these powers, however, is that the state may then engage in predatory behavior against the citizenry. The problem with government control, as Paine and Madison's words emphasize, is that a government which is empowered to conduct certain activities, must simultaneously be trusted not to abuse this power. This "paradox of government," the issue of how a government can be simultaneously empowered and yet constrained, is at the heart of constitutional political economy (see Buchanan 1975; Buchanan and Brennan 1985; Weingast 1995; Gordon 2002). While the use of force by governments can, in theory, protect citizens from threats to their person and property, force can also be used by those in power to undermine the very rights they are charged with protecting.

In the days since Paine and Madison's insights, the world has observed astounding technological progress. These technologies have the benefit of advancing civilizations in a variety of capacities. While society has profited greatly from these advancements in terms of wealth creation, these technologies have also lowered the cost of government performing its core activities, as well as expanding what constituted the scope of those activities. Technological advances allow governments to better communicate and coordinate their activities over greater geographic areas (see Cowen 2009). In principle, the existence of strong constitutional constraints, which limit abuses of government power, would ensure that technological advances would not lead to expansions in the scope and scale of government. In practice, however, this may not be the case if technological advances change how government carries out its domestic activities. The purpose of this chapter is to analyze how such a process might work by focusing on the evolution and domestic use of unmanned aerial vehicles (UAVs) or "drones" in the U.S.

We extend and apply the analysis by Coyne and Hall (2014) who consider how coercive foreign interventions can result in an expansion of domestic government powers.[13] They demonstrate how, even domestically constrained governments, face weak or altogether absent limitations when acting abroad. This allows governments to act in the unconstrained manner that Paine and Madison feared. Coyne and Hall (2014) develop the theory of the "boomerang effect" of foreign intervention, explaining how innovations in

[13] "Coercive foreign interventions" are defined by the intervening government attempting to shape outcomes—political, economic, social, legal—to achieve an end that is different from what would have emerged absent the intervention. In order to achieve this end the intervening government invests resources to control and suppress any resistance from the foreign population.

state-produced social control can be imported back to the intervening country. When this importation occurs, the result is an expansion in the scope of domestic government activities and loss of liberty for citizens. The logic of the boomerang effect helps explain how drones, originally developed for use in foreign interventions to control distant populations, have slowly been incorporated into domestic government activities.

Drones—aircraft without a human pilot controlled either by remote control or autonomously by computer—have been used for reconnaissance missions abroad since the Cold War (see Hall and Coyne 2014).[14] While first used for reconnaissance and later offensive missions abroad, the use of drones domestically by the government presents a substantial threat to civil liberties in the U.S., as the technology effectively decreases the cost of government-produced social control over U.S. citizens—e.g., surveillance, monitoring and tracking, etc. The current use of drones in the U.S., and the push to expand their domestic deployments further, highlights the potential for government agencies to abuse the technology at the expense of U.S. citizens.

The first use of drones domestically occurred during 2002 by the Customs and Border Protection (CBP). According to Jennifer Lynch, an attorney with the Electronic Frontier Foundation (EFF), not only are the advanced lenses and thermal imaging utilized by drones already in use, but the use of UAVs by government agencies is already raising seriously questions regarding civil liberties and legal issues (see Coia 2013). The activity

[14]This definition is consistent with the definitions utilized by the Department of Defense. Under the DoD definitions, a UAV is defined as a single air vehicle while a UAS consists of three to six vehicles, ground control, and support equipment. The term "drone" has become a popular term referring to both UAV and UAS, though it is not utilized by the DoD or private industry.

of drones in the U.S., however, has not been restricted to the areas along the U.S. borders. Between 2010 and 2012, for example, the CBP conducted 687 missions *for other agencies* (Fulton 2014). The CBP has reported that the use of their drones has led to more than 6,800 arrests. According to the FAA, 273 agencies had permission to fly drones as of December 1, 2011.

While the ultimate extent of drone use has yet to be realized in the U.S., the use of the technology by the CBP and other agencies has the potential to undermine domestic liberties. How is it that drones, technology once exclusively used in surveillance and offensive missions abroad, have come to be used on U.S. soil? How is it that, despite concerns regarding safety and privacy, the use of UAV technology domestically has taken root and continues to expand? To answer these questions, we turn to the logic of the "boomerang effect" developed by Coyne and Hall (2014). By applying their framework to the case of drones, we trace out the origins of drone use in the U.S. and identify the mechanism through which UAV technology was imported back into the U.S.

The contribution of this chapter can be situated at the intersection of two literatures. The first is the literature on constitutional political economy (see Buchanan 1975; Brennan and Buchanan 1985; Weingast 1995; Gordon 2002) which explores the role, design, and enforcement of rules as constraints on government and private behavior. The second is the literature on the dynamics of interventionism (Mises 1929, 1949;

Rothbard 1970; Kirzner 1985, Ikeda 1997, 2005) which focuses on how government interventions lead to a series of perverse unintended consequences.[15]

Our contribution to these literatures is to explore how foreign interventions can erode and undermine domestic political institutions and constraints on government. We argue that domestic political institutions are not invariant to interventions abroad and that interventions can have long and variable effects which are undesirable from the standpoint of the citizens living in the intervening country. Austrian economists typically focus on the dynamics of intervention within a market context. Our analysis focuses on the chain of consequences from intervention by one government in another society. Particular focus is placed on the negative unintended consequences on domestic political institutions.

We proceed as follows. Section 2 discusses the boomerang effect framework and identifies the four channels through which coercive foreign interventions may generate domestic effects. Section 3 provides a brief historical overview of the use of drones in foreign interventions. Section 4 applies this framework to the case of UAVs and is divided into three subsections. Section 4.1 examines the general implementation of UAVs domestically within the U.S. Section 4.2 examines the specific case of the Predator Drone, arguably the most well-known UAV utilized on American and foreign and soil.

[15] The dynamics of intervention framework was developed to study government intervention in the specific context of the market economy. Given this, our analysis deviates from the pure dynamics of intervention framework. Our focus is on how government interventions in other societies can lead to unintended, and often undesirable, changes in domestic government activities and institutions.

Section 4.3 analyzes how the use of drones threatens the privacy and liberties of the U.S. citizens. Section 5 concludes and offers implications.

2 The Boomerang Effect

A defining characteristic of coercive foreign interventions is that governments push to extend their power and influence to distant geographic territories to shape political, social, economic, or other outcomes. These interventions necessarily require exerting some form of control over the foreign population in order to stifle resistance and achieve the desired effect. This has important implications for the way we think about constraints on government, and the aforementioned paradox of government. In particular, the same constraints that effectively limit government behavior against its own citizens typically do not extend outside a nation's geographic boundaries. The U.S. Constitution, for example, does not extend the rights afforded to U.S. citizens to foreigners.[16] This implies that, even when a government is constrained domestically, foreign interventions allow members of a government to circumvent these constraints when dealing with foreign populations. It follows that in the absence of strong international constraints governments, which are constrained in their actions domestically, are able to intervene abroad with few limits on their power. These interventions may not only impose high costs on foreign populations, but ultimately work to change the character of government-produced social control at home. There are four related channels through which changes

[16] Although we focus on the U.S. use of drones in this chapter, the framework of the boomerang effect is not limited to the case of the U.S. The boomerang effect maintains that expansions in the scope of government may occur as a result of engaging in foreign intervention as described above. For additional examples of the boomerang effect and a more detailed discussion of the speed and magnitude of the boomerang effect, see Coyne and Hall, 2014.

state-produced social control abroad may boomerang back into the intervening country (Coyne and Hall 2014).

First, the initial move by government to engage in interventions abroad necessarily changes the composition of domestic government activities. By mobilizing forces to engage in coercive foreign interventions, the government centralizes its decision-making power and activities for the purposes of designing, implementing, and overseeing the intervention (see Jacoby 1973; Higgs 1987, 2004, 2007, 2012; Porter 1994). This initial centralization threatens the checks and balances placed on government as those agencies which were once independent of the political center, now become intertwined in its activities. For example, in the wake of the "War on Terror" many state and local agencies became linked with, and in some cases subsumed by, federal agencies. In the process, these state and local agencies became dependent on the federal government for funding and for directives. The result was that the power of the federal government grew while the separation of activities between different levels of government were weakened, if not altogether removed.

The second channel through which interventions may return to impact domestic government activities is through shaping the human capital of those involved in coercive foreign interventions. Human capital refers to the knowledge and abilities of an individual that contributes to their productivity. Simon (1997) and Merton (1940) posit that participating within an organization and working in a bureaucratic structure influences behavior and ultimately shapes an individual's skills and worldview.

Within the context of foreign interventions, this shaping of human capital has strong implications. In order for interventions to be successful, those undertaking the interventions must either possess or develop the necessary human capital or skills to achieve the desired ends of the intervention. Whether an individual already possesses these skills or acquires them, participation in the intervention provides an incentive to further develop and hone the skills required for foreign intervention. These skills range from a willingness to implement the dictates of the intervening government to more oppressive actions like surveillance, censorship, and violence. In some cases it is existing members of the intervening government that possess or develop the relevant human capital. In other cases the intervening government "imports" foreigners with an existing set of skills in social control from previous foreign interventions in which they participated. In each case the result is the same. Those involved in foreign interventions develop and refine their human capital as specialists in state-produced social control. Following the intervention some of these specialists return to domestic activities and bring with them their refined human capital. With a comparative advantage in certain types of state-produced social control, these specialists will look for opportunities to utilize their unique skills domestically.

The third channel through which the boomerang effect may occur is through changes in administrative dynamics within the intervening country. As per the second channel, those involved in implementing interventions abroad—civilian or military—eventually reallocate their skills to other tasks in the private and public sectors. These skills may be implicit—meaning that the individuals shape the organizational context in

which they operate through employing the skills they acquired abroad. In this case, activities that were previously unacceptable (e.g. the use of a particular tactic or operational method) become normalized as the way that foreign interventions were conducted abroad becomes standard procedure domestically. For example, methods used to combat terrorists abroad may also be used to combat potential terrorism at home in the name of national security.

The skills associated with state-produced social control may also be more explicit—meaning that an individual becomes renowned for being an expert in a particular type of social control (e.g. military tactics, surveillance, etc.). They are able to use, and are rewarded for, implementing their methods domestically. These specialists may be involved in the creation of new agency, or involved within an existing state entity. Regardless of whether their skills are used implicitly or explicitly, changes in administrative dynamics lower the cost of using state-produced social control techniques domestically since these activities become normalized into the operations of the agency and become a part of everyday life.

The final channel of the boomerang effect involves innovations in physical capital resulting from state-produced social control. As Cowen (2009) argues, growth in the scale of government may be, at least in part, attributed to advances in technology that lowered the cost of operating a larger government. This argument also has implications for the *scope* of government activities as well as the scale.[17] As technological innovations

[17] Scale refers to the size of government while scope refers to the range of activities that government undertakes. Scale and scope can be positively correlated, but they need not be.

allow for the government to more cheaply coerce foreign populations, it likewise lowers the cost of using similar techniques domestically. Even if technologies are created with the sole purpose of use abroad—e.g., UAV or "drones"—these technologies may end up being used within the intervening country. Just as the human capital channel allowed for individuals to utilize their skills domestically, advances in physical capital allow for these individuals to further enhance their productivity in carrying out state-produced social control over both foreign and domestic populations. For example, the use of individual agents to surveil and monitor citizens may be politically unpalatable and prohibitively costly. However, the advent of enhanced monitoring techniques like wiretapping, cameras, and drones, effectively lower the cost of engaging in these activities at home both in monetary terms and in terms of being easily observable by citizens.

Taken together, the three aforementioned channels—the human capital channel, the physical capital channel, and the administrative dynamics channels—reinforce the initial centralization observed at the outset of the coercive foreign intervention. Coercive foreign interventions, regardless of their original motive, shift enhanced human and physical capital resources in state control toward the political center. Previously decentralized institutions and groups which served as a check on the actions of those in power now become subservient to, and dependent upon, the political center. Further, the movement of individuals with skills in social control into administrative positions alters the mentality of both public and private organizations where the expanded scope of government activities is seen, not as unacceptable or worrisome as they had been before, but instead become standard operating procedure. If citizens are deferential to the

activities of these agencies then the result is that those in the intervening country become more tolerant of expanded government activity as it becomes normalized.

Moreover, this continued movement to the political center generates a reinforcement effect through further changes in human capital and administrative dynamics. Recognizing an opportunity for potential personal gains, individuals with human capital conducive to the expanded activities of the political center—even those who were uninvolved in the initial intervention—will be drawn into positions which utilize these skills. This attraction thus reinforces the changes in human capital and administrative dynamics brought about by the initial intervention.

It is important to be clear that while this framework may work explain expansions in the scope of government activities, it does not follow that such expansions occur *solely* as a result of the boomerang effect. Other types of crises, such as domestic economic downturns, may also contribute to changes in the scale and scope of government (see Higgs 1987). It is also important to note that the framework of the boomerang effect does not imply that the changes observed are irreversible. Instead, the framework suggests that reversing changes is often highly costly due to fundamental changes in the structure of government activities. Moreover, the specific channels at work, as well as the speed and magnitude of these effects will vary across interventions. In some instances the boomerang effect may be substantial while in others it may be negligible. The extent of the boomerang effect depends on three key factors.

The first factor involves the particular methods and technologies used in the intervention. Some methods (e.g. mutilation and murder) may not be easily imported

back into an intervening country due to the observable brutality of these forms of social control. The second factor impacting the overall speed and potency of the boomerang effect involves the ideology of the domestic country. In particular, the dominant ideology of both the citizenry and the judiciary regarding state power will impact both the legality and speed at which the boomerang effect may occur. For example, if a particular government activity is unacceptable to a large segment of the voting population, this may prevent, or at least slow, the use of the particular method domestically. The third factor impacting the important of foreign social control domestically involves the nature of the group targeted by the foreign intervention. In general, if targeted groups are on domestic soil, then it is more likely that state-manufactured social control abroad will be imported back domestically. For example, during WWII, the presence of Japanese citizens in the U.S. prompted the use of internment camps because it was easy for the U.S. government to categorize Japanese-Americans as the enemy. Similarly, the British government called all of citizens of Austrian, Germany, and Italian heritage into special tribunals as these groups were assumed more likely to be spies or provide information to enemies of the British government. Thousands were placed in internment camps or deported throughout the war (BBC 2012).

Finally, it is important to note that this framework does not imply that the boomerang effect is irreversible, nor that the changes associated with the boomerang effect will occur immediately. The theory suggests that reversing the boomerang effect would be highly costly due to underlying shifts in the structure of government activities. Further, the framework does not imply a clear mapping from intervention to immediate

reductions in freedom. Although an intervention may initially appear to have no impact of domestic liberties, these effects may be subject to a substantial lag. As we discuss in the following sections, we may trace the use of drones as a means of foreign intervention back to the Vietnam War, implying that the current use of drones has been evolving for some fifty years.

3 Drones as a Tool of Foreign Social Control

In the broadest sense social control involves the use of rules to govern human behavior. As Ellickson (1987) notes, the source of these rules can come from a variety of sources—personal ethics, agreements between individuals, or from a third party. Coercive foreign interventions entail attempts by a third party, or collection of third parties, to shape the outcome in another society. This requires the intervening government(s) to employ certain tools to produce social control over the population they seek to influence. Only by creating, implementing, and enforcing rules can the intervening government achieve its desired ends. While there are a wide variety of historical tools that have been used for state-produced social control we limit our focus to the use of drones given the growing prevalence of this technology.[18]

Although drones have come into the national spotlight only recently, the U.S. military has employed drone technology in foreign interventions for decades.[19] The first U.S. drones were not used as a tool of intervention themselves, but were instead used to

[18] A wide array of methods and technologies may be used to engage in foreign social control. These interventions may be "soft" (e.g. looking to influence the outcomes of the political process, offering various types of aid, etc.) or "hard" (e.g. launching military operations abroad, occupying a foreign territory, etc.).

[19] For a more complete history of the evolution of UAVs, see Hall and Coyne 2014.

train those who would be intervening in combat missions abroad. In 1939, the military acquired what became the first target drones. Both the Army and the Navy utilized the technology as a way to train anti-aircraft gunners. More than 15,000 of these UAVs were used as a training tool throughout the war (Newcome 2004: 58).

During the late 1940s and throughout the 1950s and 1960s, UAV technologies were refined. It was during this period that UAVs were seen, not only as a way to train for intervention, but as a more direct means of carrying out foreign invention. The start of the Cold War between the U.S. and the Soviet Union prompted the U.S. government to invent new ways to spy and gather data on real and perceived enemies with the goal of stopping the spread of communism. In 1955, an earlier drone model was modified to include a series of film cameras for the purposes of reconnaissance. The U.S. Army introduced the enhanced drones in 1959 and eventually used over 1,400 of the UAVs abroad (Newcome 2004: 59). Although no open conflict ever occurred between the U.S. and the Soviet Union, the U.S. attempted to intervene in Russia and gather intelligence via UAVs. In an effort to avoid the political turmoil which would result from airmen being captured and killed by the Soviets, the U.S. embarked on a number of surveillance drone programs (Newcome 2004: 71).

Drones use for reconnaissance missions continued throughout the Cold War and also during Vietnam. However, it was the first Gulf War that would prove critical in the development of drones as a major tool involved in foreign interventions. UAVs were used substantially throughout the short conflict. According to a May 1991 report from the Navy, “at least one UAV was airborne at all times during Desert Storm” (quoted in

Frontline 2013). The conflict saw 522 separate drone launches and over 1,600 hours of flying time. It was during this conflict that U.S. first observed the ability of UAVs to intimidate and control the behavior of both the Iraqi military and civilians. Crews working in Desert Storm reported two cases of groups of Iraqis attempting to directly surrender to unmanned aircraft (Shelsby 1991).

Throughout the 1990s, the military undertook operations in Somalia, Bosnia and Herzegovina, Rwanda, Kosovo, and other places throughout the world. Again, UAVs would play a part of the interventions. Unlike previous military engagements, the motivation was not the threat of an enemy to the U.S. government. Rather, the stated goals were more humanitarian in nature with the interventions intended to end conflicts, among other concerns (see Seybolt 2008). The use of traditional full-scale military operations and equipment proved difficult and often impractical both technically and politically. Drones provided a means through which the military could engage in humanitarian intervention while not engaging in a full scale ground invasion and while keeping soldier fatalities in check. By using drones, many missions would no longer require as many soldiers in the field, if they required them at all. The idea was that drone technology could be used as a tool for shaping the outcomes in foreign societies while reducing the risk of injury and fatality to U.S. soldiers. The overall result was that drones lowered the cost of intervening abroad.

UAVs have seen their most expansive use in the Global War on Terror. Targeted killings by UAVs began in 2002 and U.S. forces have conducted drone missions in Pakistan, Yemen, and Somalia (Sifton 2012, Mazzetti 2013). In additional to the use of

drones for surveillance missions, more than 380 confirmed offensive strikes occurred in Pakistan between 2004 and 2013. As many as 71 strikes were conducted in Yemen and nearly ten in Somalia (Bureau of Investigative Journalism 2014).

Given this historical evolution, the central question is how the transition from the use of drones in foreign interventions to their use on domestic soil occurred. How is it that drones, initially used for target practice, then for surveillance, and later for offensive missions abroad, came to be used as a means of government-produced social control domestically?

4 Drones as an Illustration of the Boomerang Effect

Just as the evolution and use of drones abroad involved a variety of actors and events, so too did the importation and use of drones domestically. While no one event or individual is solely responsible for the use of drones in the U.S., one observes the logic of the boomerang effect in a variety of aspects of the use of UAV technology domestically. These instances illustrate how the four aforementioned channels work to bring foreign methods of social control home. Taken together, we observe how these smaller instances of the boomerang effect, though enacting change in their own right, together greatly alter the cost of and benefits of social control mechanisms domestically and, ultimately, threaten the liberties of U.S. citizens.

4.1 Arthur Cebrowski, Force Transformation, and Domestic Drone Use

There is perhaps no better illustration of the boomerang effect in the evolution of UAVs than the career of Vice Admiral Arthur Cebrowski. Cebrowki worked as a naval officer and president of the Naval War College. He also worked as the head of the Office of

Force Transformation within the DoD (see Singer 2009, Springer 2013). While the development and implementation of drones for international and domestic uses in the U.S. has a nuanced history (see Hall and Coyne 2014), Cebrowski has been referred to as the man, "directly responsible for the rise in the number of robots and drones within the U.S." (Springer 2013: 145). The changes observed in the use of autonomous technologies within the DoD and elsewhere may be attributed, in significant measure, to Cebrowski's time working abroad for the U.S. military and his efforts to implement his ideas.

Cebrowski graduated from Villanova in 1963 as a member of the Naval Reserve Officer Training Corps (NROTC). Following his graduation, Cebrowski was deployed in two tours of duty in the Vietnam War. He flew 154 missions, most over North Vietnam (Blaker 130). Throughout the 1970s and 1980s, Cebrowski rose through the ranks of Naval Aviation and continued to acquire significant flight skills. It was through these experiences that he became interested in large scale integrated systems—complex computer and information sharing systems—because of their potential use in combat, increased technical reliability, and their potential to decrease pilot risk. He stated that his interest in such technology, and desire to expand the use of such technological systems was a direct result of his combat experience, thus illustrating the human capital channel of the boomerang effect. Through Cebrowski's time in Vietnam, he acquired a variety of skills and ideas regarding autonomous technology and combat. Upon returning to the U.S., he brought these experiences and skills with him, and, as the changes in administrative dynamics channel would suggest, utilized his talents in his subsequent positions. He noted:

My experience had come from flying combat aircraft....It was a complex situation, and success depended on manipulating that complexity....Transistors and the large-scale integrated circuits [complex computer systems]...promised to shift some of that complexity [from the pilot] to the aircraft and the weapons it carried. [If the] military could do that on a large scale...[it] would have an edge. It could lead to a strategic advantage, an ability to shift the terrible burden of warfare complexity and the risks it carried away from you onto your opponent (quoted in Blaker 2006: 132)

In 1981, the Navy created the Strategic Studies Group at the Naval War College. The College selected a set of "war fighters," individuals whose careers had kept them employed in tactical as opposed to administrative operations, to propose possible enhancements to the U.S. Navy. During his year-long appointment, Cebrowski began to form a series of ideas regarding the future of military combat, specifically the need to incorporate more enhanced technology into aviation. It was during this period that he began to see change in military affairs as essential (Blaker 2006: 133-34).

The following year, Cebrowski returned to fleet operations. In 1990, he commanded the USS Midway during Operation Imminent Thunder in the First Gulf War. Cebrowski's experiences during Imminent Thunder and Operation Desert Storm are illustrative of how the tactics he encountered and employed would later be brought home. Over a period of six days during Imminent Thunder, the U.S. conducted a variety of drills and operations utilizing an array of techniques and new technology. In an effort to deceive and intimidate Iraqi forces into moving their efforts to the coast of Kuwait, the U.S. conducted numerous military drills and launched an intense media campaign to publicize the operations.

Cebrowski would continue to command the Midway through Operation Desert Storm. During this time, the Navy would launch 228 sorties and more than 100 Tomahawk missiles in order to drive Iraqi forces from Kuwait. It was during Desert

Storm that the military observed the potential of drone technology, not only to conduct surveillance, but to intimidate the enemy. During Desert Storm, the crew of the USS Missouri, one of the ships which had worked in conjunction with the USS Midway during Imminent Thunder, had launched surveillance drones over Iraqi territory. The crews would later report two cases of Iraqis attempting to surrender to the unmanned aircraft (Shelsby 1991). This illustrated to those in the military the ability of drone technology to serve as tool of direct social control.

This assignment and those that followed worked to solidify Cebrowski's commitment to bringing enhanced flight and other technology to U.S. forces. Discussing one of his flight assignments during the period, he stated:

Those assignments...[were] an epiphany or sorts. It was the first time aircraft I piloted that really flew itself...the information that was available in the cockpit was so much better...[it was a movement] from the physical to the information and the cognitive realms. The limit on what the pilot could do was no longer a matter of physical strength or reflexes. The real limit was the level of awareness and knowledge the pilot had....That awareness turned on information...It was no longer the airplane or its pilot that counted the most; it was...[the] networked environment (quoted in Blaker 2006: 134).

Cebrowski spent the next decade following the First Gulf War attempting to bring this idea of technological advancement to U.S. forces. By the mid-1990s, then serving as Director of Command Control, Communications, and Computers on the Joint Staff, he pushed for the expansion military technology, arguing that superior information, and not the mass of the military, was essential for success. Given changes in warfare, simply maintaining large numbers of personnel was no longer practical or effective compared to enhanced situational technologies (Blaker 2006: 136).

Through this appointment as the Director of Command Control, and the appointments that followed, one observes the intersection of the human capital,

administrative dynamics, and physical capital channels discussed in Section 3. Cebrowski reallocated the skills he acquired while engaging in the tactical operations for the Navy to administrative positions within organizations like the Naval War College and Department of Defense. These administrative positions, in conjunction with the skills Cebrowski acquired during foreign interventions, would prove critical in the implementation of enhanced drone technology abroad and at home.

Drawing from his experiences in Vietnam and the Persian Gulf, Cebrowski developed and proposed the idea of "network-centric warfare," the thought that conflict favors those groups which are able to acquire and utilize a large information network rather than brute force. This network provides nearly real-time shared imagery of a military situation, disperses this information widely, and uses it as the basis for operations. Such technology, he argued, could be used by a variety of defense and security agencies to engage in both international and domestic projects (see Freidman 2009).

Following an appointment as the President of the Naval War College, Cebrowski was selected by Defense Secretary Donald Rumsfeld to become the director of the Office of Force Transformation (OFT). It was during this period that the federal government began to conduct operations as part of the War on Terror. This "war" was unique in that it was fought on a truly global basis and included not just interventions in other countries, but also increased government interventions on domestic soil with the goal of combatting potential terrorism. Further, the War on Terror had a centralizing effect with the federal government taking the lead, both domestically and internationally, to combat terrorist

threats. The onset of the War on Terror provided the opening necessary for the expansion of drone use both internationally and domestically.

As head of the OFT, Cebrowski was to serve as the "conceptual engine" of the Office, and was tasked to assess and boost "tranformational" programs (Blaker 2006: 138). The OFT was a new agency within the DoD. The newness of the organization combined with Rumsfeld's confidence in Cebrowski and ample resources dedicated to transforming U.S. military capabilities meant that Cebrowski had significant discretion in establishing the size, location, budget, and operations of the office. Under Cebrowski the agency was dedicated to transforming military operations in the 21st century. Illustrating the centralization brought about by the start of the War on Terror, one expressed goal of the OFT was to find new ways to cooperate and coordinate with other federal, state, and local agencies so as to respond to potential threats. In addition to this goal, the OFT actively pursued changes in the physical capital used in combat. As part of this goal, the OFT was integral in the development and use of automated systems, even deploying personnel from technology companies abroad with troops to further develop and refine their products (see DoD 2002: 3, Mobbs 2014).

As a result of Cebrowski's efforts and work to implement enhanced autonomous and information technologies, the use of drones expanded immensely. It was during his time at the OFT that the use of enhanced information systems and UAVs began its greatest expansion. The first targeted killing abroad with a UAV occurred in 2002 and the U.S. Border Patrol used drones for the first time soon after (Customs and Border Patrol Today 2004). According to biographer James Blaker, Cebrowski was "surprised at the

influence his views enjoyed" during his time at the OFT (2006: 139). Specifically, Cebrowski noted that:

I was surprised by how important the press and other media were to...transformation and how much they became allies in the effort....[We used] the press to make our arguments....[Y]ou get ideas into the audiences who will ultimately determine how far the ideas will go....I worked for the most part ahead of policy, pointing out possibilities. That is appealing to the press and defense contractors....It was a synergistic relationship that turned out to be surprisingly effective (Ibid: 139-140).

This shift in mentality is yet another example of the boomerang effect at work within the case of UAVs. Drones and other autonomous technologies, once unfathomable, had become a regular part of operations. Their establishment and use internationally had been integrated into the mainstream, recognized by Cebrowski, the OFT, military, and the broader public. This mentality shift created an opportunity for drones to be used not just in an international context, but domestically as well. Drones have been used for surveillance along the U.S. borders since 2002. Not only was the technology intended to prevent and deter the crossing of illegal immigrants, but to stop the movement of individuals with potential connections to countries with known terrorist ties (see Perry 2008, Operation Border Star 2014).

Cebrowski retired from his position as head of the Office of Force Transformation in 2005 and died shortly after. Though not solely responsible for the increased use of drones in U.S., it is clear that Cebrowski played a critical role in drones and their underlying support systems. Cebrowski's time engaged in coercive foreign interventions in Vietnam and the Persian Gulf were essential to the formation of his personal human capital and his later roles in various administrative capacities.

4.2 The Rise and Return of the Predator

The General Atomics MQ-1 Predator has been used extensively throughout the Global War on Terror by the United States and "has become the Department of Defense's most recognizable UAV" (Gertler 2012: 33). The Central Intelligence Agency (CIA) has a known stock Predator drones while the DoD employs nearly 200 (*Ibid*: 8). The extensive use of the Predator has facilitated the development of closely related and well-known UAVs, including the Grey Eagle (also known as the Sky Warrior) and Reaper (Predator B) (*Ibid:* 34-36). In addition to its use abroad, the Predator has been one of the most extensively used drones within the domestic U.S. The Department of Homeland Security (DHS), for example, has modified ten Predator drones for surveillance along the nation's borders and hopes to have acquired 24 Predators by 2016 (Sengupta 2013, ACLU 2011: 6). The movement of the Predator onto U.S. soil is yet another illustration of the boomerang effect.

In order to discuss the development of the Predator, we must first turn to an intervention conducted, not by U.S., but by Israeli forces during the Yom Kippur War in 1973. Looking for a way to draw anti-aircraft fire away from their pilots, the Israeli Air Force sought to develop the physical capabilities of drones. If the military could draw fire toward an unmanned craft, they would be able to more effectively reduce pilot fatalities and damage to their manned aircraft. At the center of the development of these aircraft was Abraham Karem. Known as "the dronefather," Karem was trained as an aeronautical engineer and worked in the Israeli Air Force as an engineering officer (the Economist 2012, National Academy of Engineering 2014). During the conflict, Karem worked on a several projects, leading the development and deployment of a variety of reconnaissance

and other aerial systems, including the target UAV. It is here we see the first examples of the boomerang effect in the case of the Predator. In particular, this experience allowed Karem to develop not only the physical capabilities of UAVs, but further hone his own human capital and establish a reputation for his work on UAVs. Karem's team was not only able to produce a decoy drone, but accomplished the task in less than a month (*Ibid*).

Following his employment with the Israeli Air Force, Karem joined Israel Aircraft Industries (IAI), a government-owned aerospace and aviation manufacturer that produces aerial systems for both military and civilian uses (IAI 2014). Although he was poised to be named an Executive Vice President of the company, Karem departed IAI and immigrated to the U.S. where he, "knew opportunities for entrepreneurs were greater" (Whittle 2013). Illustrating how specialists in social control can be imported, Karem took a position with Developmental Sciences, Inc., a U.S. firm who had offered the Israeli government a drone decoy in the 1970s and was working on projects to develop new UAV technologies for government use (*ibid*).

To understand the demand for the type of human capital possessed by Karem, one must appreciate that the War on Drugs undertaken by the U.S. government meant that numerous agencies were now deeply entangled with drug interdiction policy.[20] This shift created opportunities for individuals with highly-valued skills (e.g. creating technologies which could be potentially used for surveillance of drug cartels and other groups) to reap

[20] A complete discussion of the changes in administrative dynamics brought about by the War on Drugs is beyond the scope of this essay. For a discussion of changes in government agencies as a result of the War on Drugs, see Boettke, Coyne, and Hall (2013), Drug Enforcement Administration (2013), Hall and Coyne (2013), Reuter, Crawford and Cave (1998).

substantial personal gains. It was within this context in the U.S. that Karem was able to utilize, and further develop, his human capital and the physical capabilities of UAVs while assisting the U.S. in engaging in a variety of interventions, including the international war on drugs and multiple humanitarian missions.

With funding from the Defense Advanced Research Projects Agency (DARPA), Karem made additional advancements in the technological abilities of drones and subsequently produced the Albatross, Amber, and Gnat, the precursors of the Predator. Championed by members of the U.S. Southern Command, the drones were intended to provide surveillance of the activities of South American drug cartels. Several years later, the UAVs were in further demand as the CIA looked to closely monitor the conflict situation in the Balkans. Karem met the CIA's demand by modifying the previous drones, thus creating the first Predator (*Ibid*).

Although Karem would leave General Atomics, the current producer of the Predator, before the UAV saw mass production, he played an integral part in its development. Furthermore, the production of the UAV by General Atomics after his departure is illustrative of how the human capital channel can operate. Not only had Karem's previous endeavors on UAVs worked to hone his own human capital, but Karem trained a variety of younger, talented engineers. These engineers then went on to influence the direction of research and development in other firms. For example the first team of engineers assembled by Karem in the U.S., are presently executives and technical experts at General Atomics, including President Frank Pace who Karem once described as, "the closest thing to my right hand man" (quoted in Whittle 2013).

The extensive use of the Predator began with the Global War on Terror and Operation Enduring Freedom and Operation Iraqi Freedom. In February 2001, Hellfire missiles were test-fired from the Predator. Following September 11, 2001, and the subsequent operations by the U.S. military in the Middle East, the U.S. military began to use the Predators not only for surveillance and reconnaissance, but to actively target and kill individuals in Afghanistan and Pakistan. Approximately 115 targets were hit by Predator strikes in their first year of combat operations. The CIA began using armed Predators to conduct strikes in 2002, and a Predator is credited with killing an al Qaeda operative in Yemen. Armed Predators began patrols in Iraq and destroyed Iraqi defenses prior to the U.S. invasion (Callam 2010). The Predator and two of its descendants, the Sky Warrior and the Reaper are the three armed UAVs still in use in the Global War on Terror today. They continue to see use in Pakistan, Yemen, and Somalia and saw extensive use in Libya in 2011.

The domestic use of drones began during the same period. Just as the armed Predators were eliminating international targets, unarmed versions were flying in the skies above the U.S. By 2005, the Customs and Border Protection (CBP) began launching Predators along the borders of the U.S. Although the Predators and other drones have been touted as beneficial for other missions, the CBP demanded the technology as a means to combat the War on Drugs and War on Terror on American soil. Just as there was demand for Karem's drones for use in the international War on Drugs and War on Terror, the modern Predator is now being used domestically for similar purposes. In other words the use of drones internationally has boomeranged back to the U.S. and drones are

not being utilized domestically to combat the drug trade and potential terrorist threats. Members of Congress have stated the domestic use of drones is "invaluable" to operations along the U.S. border (see Booth 2011). Arizona Governor Jan Brewer even declared the CBP Predator drones, "ideal for border security and counter-drug missions" (quoted in Booth 2011). Finally, Texas Governor Rick Perry called for a greater presence of Predators along the U.S. border as part of the state's efforts to combat illegal immigration, terrorism, and the drug trade (see Booth 2011).

We see that the Predator is a particularly pointed example of the boomerang effect. The changes in human capital and administrative dynamics illustrated by the work of Arthur Cebrowski and the OFT, as well as the changes in physical capital resulting from the construction and ultimate use of Predator drone illustrates how UAVs have evolved. Though once developed and used exclusively for missions abroad like the war on drugs and war on terror, we observe how the channels of the boomerang effect have allowed for the expansion of UAV technology domestically. However, the Predator is not the only UAV which has come to see use within the borders of the U.S. In the following section, we analyze how not only Predators, but a variety of UAVs, have been used domestically and, how the use of such technologies threatens the privacy and other liberties of U.S. citizens.

4.3 Implications of the Boomerang Effect: Domestic Drones and the Threat to Privacy and Liberty

As illustrated above, the use of drones in a variety of foreign interventions abroad have been imported back to the U.S. The importation of this technology domestically is not prima facie negative. However, an examination of the domestic uses of UAVs has

important implications for the civil liberties of U.S. citizens. Drone technologies have lowered the cost of government monitoring of U.S. citizens domestically and abroad. No longer does surveillance require personnel to directly monitor a target. Targets may now be tracked from a distance, with technology that far surpasses prior capabilities. High-powered lenses and more advanced cameras, for example, mean that UAVs are better able to observe and monitor an individual's movements from farther away. Night vision, also known as thermal imaging, and Synthetic Adaptive Radar, allows drone operators to see through dense foliage and clouds, as well as walls (ACLU 2011:5). A report on domestic drone use by the American Civil Liberties Union (ACLU), captures the potential impact of these lowered monitoring costs and the use of drone technology domestically on civil liberties.

[M]anned aircraft…has always imposed a natural limit on the government's aerial surveillance capability. Now that surveillance can be carried out by unmanned aircraft, this natural limit is eroding. The prospect of cheap, small, portable flying video surveillance machines threatens to eradicate existing practical limits on aerial monitoring and allow for pervasive surveillance, police fishing expeditions, and abusive use of these tools in a way that could eventually eliminate the privacy Americans have traditionally enjoyed in their movements and activities (ACLU 2011: 1).

These concerns are not without merit. The issues surrounding drones and civil liberties in the U.S. have already begun to manifest. As noted above, the CBP has used drones substantially along the U.S. borders since the early 2000s and plans to augment their arsenal of UAVs in the coming few years. The use of drones along the border has already raised questions regarding the legality of drones to track individuals. According to Jennifer Lynch, an attorney who specializes in issues of government transparency and privacy, "Customs and Border Protection definitely does use thermal imaging on its drones…I don't think [government agencies] are getting warrants before they are using

thermal imaging. That will be a big issue in the future if they're using it to see what's going on inside a home" (quoted in Coia 2013).

The government use of UAVs, and the subsequent concerns regarding privacy, have not been restricted to the areas along the U.S. borders. In fact, between 2010 and 2012, the CBP conducted 687 missions *for other agencies* (Fulton 2014). CBP has reported that the use of their drones has led to more than 6,800 arrests. According to the Federal Aviation Administration (FAA), 273 agencies had permission to fly drones as of December 1, 2011, including U.S. Secret Service, Federal Emergency Management Agency (FEMA), Immigration and Customs Enforcement (ICE), and the FBI, for surveillance and other purposes (Department of Homeland Security: Office of the Inspector General 2012: 6). Among these agencies were a variety of state and local police departments. For example, the police department in Miami, Florida requested permission from the FAA to fly drones with their elite special-response team (a version of SWAT). Officials stated the technology would be used to obtain real-time imagery of hostage situations or in standoffs with criminals inside buildings (Dreazen 2011). In June 2011, the Nelson County Sheriff in North Dakota, along with State Highway Patrol, a regional SWAT team, and a bomb squad, utilized a CBP drone with thermal imagining to collect information on three U.S. citizens who were eventually arrested. The CBP used the drone to fly more than two miles above the farm where the men were located in order to determine their exact location and whether or not the men were armed. One of the men involved was later convicted, further adding to the questions regarding the use of drones in police activities (see Coia 2013, Wolverton 2014). In Houston, local television crews

recorded police engaging in secret tests of a UAV. It was ultimately revealed by a police spokesperson that the UAVs could be used in the future to issue traffic citations (ACLU 2011: 7).

In June, 2013, FBI Director Robert Mueller acknowledged before Congress that the agency uses UAVs within the U.S. for surveillance. Though he did not reveal how many UAVs the FBI had at its disposal, or how frequently they had been used, an FBI representative stated that the drones, "[allow] us to learn critical information without introducing serious risk to law enforcement personnel" (quoted in Cratty 2013). When asked whether or not the Bureau had guidelines for using drones which considered individual privacy, Mueller indicated that the agency was in the initial stages of developing their guidelines. When pressed regarding the FBI's policy for obtaining and retaining images gathered from drones, Mueller stated he would have to inquire regarding the FBI's policy (*Ibid*). Since this time, the FBI has admitted to using UAVs at least 10 times since 2006. While the agency wouldn't elaborate on the cases in which drones were used, they stated the drones were "strikingly successful" (quoted in Musgrave 2014).

Perhaps the greatest illustration of the potential harm to civil liberties by drones in the U.S. comes from statements by U.S. Attorney General Eric Holder. In answering questions regarding the use of drones to target U.S. citizens, Holder stated that, "the President could conceivably have no choice but to authorize the military to use such force [targeted killings] if necessary to protect the homeland….[I]t is possible…for the president to authorize the military to use lethal force within the territory of the United States" (quoted in Swaine 2013).

Without clear legal precedent regarding the acquisition and use of UAVs domestically, the outcome for civil liberties is at best unclear. A variety of legal scholars and others have questioned how the use of drones domestically conflicts with citizens' constitutional right against unlawful search and seizure by the fourth amendment. What is clear is that the enhanced surveillance capabilities of UAVs, combined with unclear restrictions on their use, has increased the reach of the U.S. government into the lives of its citizens raising a host of issues regarding the constitutional scope of government activities (see ACLU 2011, Olvito 2013, Thompson 2013, Wolverton 2012).

5 Conclusion

Our analysis demonstrates how drones, although developed for use in interventions abroad, have created a scenario in which domestic individual liberties are threatened. This highlights a broader implication of the boomerang effect—operations conducted outside of a nation's geographic territory may have substantial domestic repercussions. As the case of drones highlights, the innovations in human and physical capital can return home and permanently alter the composition of government activities. Drones have been hailed as a means of protecting the rights and safety of U.S. citizens through their use abroad. What this analysis shows, however, is that even if drones are effective in their international operations, the technology may in fact undermine the very rights they are intended to protect.

This leads us to propose several areas of further research. First, as noted above, the speed and magnitude of the boomerang effect is determined by a variety of factors including domestic ideology, technology, and the nature of the group targeted by the

foreign intervention. One avenue of possible inquiry would be an in-depth examination of each of these factors to determine precisely how these issues play into the broader boomerang effect. A second path for future research would be to examine cases of the boomerang effect throughout different periods of time in different countries. Current illustrations of the boomerang effect (see Coyne and Hall, 2014) focus on instances of the framework as they pertain to the U.S. Though illustrative, additional studies of boomerang effect across time and place would work to further develop the theory and illustrate the prevalence of the effect across a variety of interventions.

It is important to reiterate that the presence of the boomerang effect does not immediately imply that the rights and liberties of domestic citizens are doomed. There are several mechanisms which may weaken or prevent the boomerang effect from taking hold. These include: The ideology of citizens, rulings by courts, and evolving legal structures and standards. These factors have the potential to undermine or slow the boomerang effect as it relates to the use of drones domestically.

While the impact of UAVs in the U.S. is still unfolding, it is clear that the origins of drones in the U.S. can be traced to interventions abroad. Through the channels of the boomerang effect, drones have come home. The question that remains is the one which has motivated a variety of scholars both past and present. If, as Paine said, "Government, even in its best state, is but a necessary evil; in its worst state, an intolerable one," the questions remain: How does one keep the state necessary without risking the intolerable? How may we capture the potentially positive aspects of UAVs, while preventing the erosion of liberty?

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BIOGRAPHY

Abigail R. Hall is the JIN Ph.D. Fellow in economics at the Mercatus Center at George Mason University, a Research Fellow with the Independent Institute, an Institute for Humane Studies Fellow, and PhD candidate at George Mason University in Fairfax, Virginia. She graduated with a B.A. in economics and business administration with an additional concentration in mathematics from Bellarmine University in Louisville, Kentucky.

Her broader research interests include Austrian Economics, Political Economy, Defense and Peace Economics, and Institutions and Economic Development. Her work includes topics surrounding the U.S. military and national defense, including, domestic police militarization, arm sales, weapons as foreign aid, the cost of military mobilization, and the political economy of military technology.

She enjoys running, swimming and being outside in her spare time. She likes football and loves going to hockey games with her fiancée. She cooks and can bake like nobody's business! Before starting graduate school she worked as a dance instructor teaching tap, jazz, and ballet and has 18 years experience in all three genres.