A SOCIAL CONTROL THEORY:

BRIDGING THE INFORMATION-VIOLENCE GAP:

HOW CAN INFORMATION PROVISION AFFECT STATES' TENDENCY TOWARD VIOLENCE AGAINST CIVILIANS?

by

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To Feyza, my love!

Abstract

Whether the initiators are government states or rebel groups, sustained and systematic violence against civilians is a regular feature of intrastate warfare. However, especially in recent years, the barbaric atrocities of rebel groups such as ISIS, Al Shabaab, Boko Haram, Al Qaeda, and the Al Nusra Front have largely overshadowed the ruthless massacres initiated by so-called "legitimate" states. Even though such actors may at times find independent sources of revenue from external patrons, trans-border outlets, or ethnic kin, civilian support (e.g., food, shelter, weapons, refuge, and recruits) is often necessary to sustain a military effort in a civil war. The question, then, is if civilian support is important, why would states – seemingly irrationally – kill the goose that lays the golden egg?

This study seeks to answer this question. In this research, I argue that "social control" over the population offers the potential to dramatically change the environment in which all of the actors (the government, rebel groups, and civilians) live, facilitating an end to the civil war, or at least alleviating some of its negative consequences. Ever-growing surveillance and dataveillance practices make this social control possible. When civilians believe that they are being closely watched by their government (and might be punished for real or perceived disobedience), they instinctively refrain from behaviors they believe might incite the government to use violence, which in turn leads states to perpetrate less violence against civilians. For the state, this environment of constant surveillance and the information it yields substantially affect the level of virtual control that can be exerted, thereby reducing the amount of violence the state needs to initiate.

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"Governmental surveillance is not about the government collecting the information you're sharing publicly and willingly; it's about collecting the information you don't think you're sharing at all, such as the online searches you do on search engines... or private emails or text messages... or the location of your mobile phone at any time".

"It's so cheap to store all data. It's cheaper to keep it than to delete it. And that means people will change their behavior because they know anything they say online can be used against them in the future.

— Mikko Hyppönen, a computer security expert and columnist, known for the Hyppönen's law: *"Whenever an appliance is described as being "smart", it's vulnerable".*

CHAPTER 1. INTRODUCTION

This dissertation seeks to answer the question of why states target civilians during intrastate conflicts. Especially in recent years, the barbaric atrocities of rebel groups such as ISIS, Al Shabaab, Boko Haram, and Al Qaeda have largely overshadowed the ruthless massacres initiated by so-called "legitimate" states. The Syrian Network for Human Rights (SNHR), for example, documented at least 1,232 civilian deaths in December of 2014 in Syria, with 1,049 killed by regime forces, or more than 85 percent; by this count ISIS would only be responsible for just over 5 percent of the civilian deaths (SNHR, 2015, 14). Another example is the Yemen conflict where government forces, together with the Arab coalition, were responsible for approximately 8,100 civilian casualties by airstrike and shelling in 2015 alone (United Nations Report, 2016). Whether or not the initiators are government states, sustained and systematic violence against civilians seems to be a regular feature of intrastate warfare.

Although a primary target for disputants (state and non-state actors alike) is their opponent's military force, they frequently launch deliberate attacks on civilians as well. Media and human rights organizations such as Human Rights Watch (HRW), Amnesty International (AI), and Human Rights Without Frontiers (HRWF) report all too frequently on the ruthless massacre of civilians. This is puzzling, since these actors kill civilians whose support they are likely to need in future conflicts. This is a well-known puzzle in the social sciences. Even though actors may sometimes find independent sources of revenue through external patrons, trans-border outlets, or ethnic kin groups (Cederman et al., 2013), civilian support is quite often necessary to sustain a "military effort" (Zahar, 2000) in a civil war. The question, then, is if both actors require civilians for support such as food, shelter, weapons, refuge, and recruits, why – seemingly irrationally – would they kill the goose that lays the golden egg?

A widely accepted international norm is also that states, as primary legal actors, have the responsibility to protect their population (Heyman, 1991, Hultman, 2008). Thus, rather than kill, states must protect their citizens against violence. Obviously, to properly *govern* its population, states should strive to earn their support. However, state-sponsored killings are all too common. Logically, then, there must be specific situations in which the killing of civilians makes strategic sense. This puzzle has already attracted a good deal of attention, especially from political scientists. In this research, I will address this conundrum and attempt to provide possible core explanations. I believe that violence is largely a function of changes in the level of information that a state possesses regarding its population. As information fluctuates over the course of a conflict, so does the level of violence adopted. I define "information" here as any kind of knowledge that helps political actors sort through civilians to identify who is loyal and who might assist their adversary; their subsequent targeting of specific individuals is almost always based upon such information. In this research, I will not address why rebel groups use violence; rather, I will focus on answering the

question of why states resort to violence against civilians and how increasing/decreasing the level of information available affects that behavior.

My foundation for this inquiry is the assumption that technological advances and the expansion of digital infrastructures should have an effect on violence. The world is becoming ever-more advanced, digital, and mobile. States, still the most important actors on the global stage, possess high-tech equipment for gathering information about civilian populations through monitoring and surveillance. Technological surveillance is omnipresent and ever-expanding. For example, "a survey of surveillance cameras in Manhattan found that it is impossible to walk around the city without being recorded nearly every step of the way" (Stanley and Steinhardt, 2003, 2). State surveillance has also been adapted to encompass other forms such as "dataveillance" (the collection, organization, and storage of information about persons), "sousveillance" (physically mounting cameras on people rather than buildings, or situations in which hierarchically-ordinary people do the watching, rather than higher authorities) (Mann et al., 2003) and biometrics (the use of the body as a marker of identity), which are now becoming a regular feature of our everyday lives (Simon, 2005). States no longer depend solely upon locals or other conventional means of surveillance because they are now able to monitor, collect, and store their citizens' personal information through constantly-evolving forms of technology; my assumption is that all of these ever-growing practices (e.g. surveillance, dataveillance etc.) make 'social control' possible. At first blush, this assumption may appear as something that may only be applicable to advanced states and less so to less developed states where the civil wars tend to happen. However, recent arms and technology acquisition records clearly indicate the opposite. The most recent reports (Wezeman, 2011, GAO, 2012 , Dobbing and Chris, 2014) show that the governments of those civil war-ridden countries [those generally less developed ones] have been very interested in buying high tech information-gathering equipment such as drones in recent decades. Actually, this may be understandable since these governments very well know that these technological means

dramatically change their fight against the rebel groups. For example, many African countries currently experiencing civil wars have started to procure significant amounts of surveillance technologies in recent decades. Israel, the US, Russia and China are big sellers. For example, Algeria invests many funds into surveillance technologies both for domestic production and import. She first started to import the medium-range Seeker II tactical drones from South Africa in 1998. Nigeria, Chad, Rwanda, Uganda, Guiena are some other buyers (Wezeman, 2011). In sum, it seems like that the world is experiencing its "newest arms race, for cyber weapons and surveillance" (Kuo, 2015).

The more a government increases its virtual control, the more its people are encouraged not to break the law and the less likely for the government to require the use of violence to maintain control. More information about the civilians' behavior makes the civilians "more accountable" because transparency improves accountability (Holmström, 1999).

The main motives for civilian violence identified in the literature can be simply divided into two key categories: instrumental and organizational (Wood and Kathman, 2014, 686), or in Hultman's terms, "strategic vs. non-strategic" (2008 ,19). I will elaborate upon this classification in later chapters. My views herein fit much more into the former, which supports instrumental or strategic explanations for violence. In this view, political actors, drawing upon a cost-benefit framework, are regarded as utility maximizers who use violence when the expected gains minus the expected costs outweigh the net expected benefits of alternative courses of action.

There have been, many, mostly overlapping, uses of violence that have been cataloged, including "the terrorization, intimidation, demoralization, polarization, the punishment for cooperation with the enemy,…" (Kalyvas, 2004). States use violence in order to clearly signal "the fate of opponents or traitors" (Downes, 2007, 421), and thus deter possible civilian defections and maintain support. Using a "rationalist" baseline, this actually makes "rebellion costlier" for civilians

than another alternatives (Zhukov, 2014). Besides, states also use violence "to [indirectly] undercut rebels' fighting capacity" by deterring people who might consider switching sides and by directly depriving the adversary of needed recruits, supplies, and intelligence (Downes, 2007). Put another way, governments target civilians in order to weaken rebel groups. States can also use violence to displace from and quarantine people in areas where rebels have support. This is a clear message to civilians to stop aiding and abetting rebels. For rebel groups, such actions increase "the costs of fighting" because they reduce their ability to hide and receive support (Azam and Hoeffler, 2002).

Other than those reasons for violence, Kalyvas (2006, 111) links particularly "territorial control" to "violence". He argues that "enormous [but typically lacking] military resources" are required for the imposition of "full and permanent control" in a country torn by civil war. I argue that this kind of control should be seen more as a *physical* control. In this research, I rather focus on another kind of control, namely a *social* control, that is accomplished via surveillance, dataveillance, sousveillance, biometrics, etc.; it can be employed to achieve a similar aim – to control the population – but ultimately it may be more efficient than physical control. The corollary to this assumption is that information substantially affects the level of social control a state can exert, and thereby the level of violence it might seek to initiate.

Now let me also emphasize the relationship between civil war conditions and information. Because civil wars (in this research, irregular wars *per se*) are full of uncertainties; they do not regularly involve face-to-face confrontations between traditional armies across clear frontlines. Insurgent groups generally operate clandestinely. Most of the time they "lack clear military targets such as bases and expensive equipment, and can often blend into a host population" (Cunningham et al., 2009, 575). Due to those "blurred and uncertain" conditions, Cunningham et al. (2009, 575) have eloquently argued that defeating an insurgency requires "careful *policing* rather than decisive military battles" (emphasis added). What makes this "policing" possible? It is indeed needed to deter civilians from defecting. In general, the civilians who tend to support the insurgents benefit

from the presence of an informational asymmetry between themselves and the governments. They, thus, have the ability to keep their actions hidden from the governments (Prat, 2006). In other words, this said informational asymmetry works in favor of the civilians and thus prevents governments from detecting the opponents among the civilians and ultimately motivates them to use violence against civilians, which means the loss of civilian support. Thus, it should be the number one aim for governments to decrease this information asymmetry in order not to lose this significant source of aid in their fight against the rebels. Obviously, increasing the level of information by more advanced and technological means would help the governments perform this "*policing"*, which deters the population from joining a civil rebellion, more effectively.

According to much of the extant literature, the core objective of violence in a civil war is "the alteration of the behaviors of civilians" (Reed, Morrison, & Wood, 2010, 7); and in my view, information is what makes that alteration possible. First, the more information states have about their citizens, the more those citizens will distance themselves from defection; information increases their chances of being caught and facing state retribution. In other words, when a state knows more about its civilian population, it is harder for civilians to turn against the state. Secondly, information provision to states will cause civilians to self-censor. The more closely people are watched, the better they behave (i.e., they closely follow the state's rules and distance themselves from defection) (Prat, 2006). One can ask here whether civilians could be angered by being surveilled all the time which could change their behavior towards the states? Against such points, I would provide two responses. First, in those countries where most ongoing civil wars take place, there is a gross power asymmetry in favor of states. Thus, the fact that civilians are very weak vs. state authority naturally minimizes the impact that an aroused mass public can have on states' high-handed surveillance policies. Second, public disclosure about state surveillance should have a limit. People should know that they are being surveilled but should also not be led to a constant paranoia about it. Therefore, it is very important for states to adjust the optimum level of public

perception on this issue. When this is done properly, there will be less lawlessness and fewer defections, then the state is less likely to use violence. Put another way, the increase in civilian support via information should allow states to reduce their reliance on violence because they are able to effectively substitute non-violent tools for coercive violence.

When civilians believe they are being closely watched by their government (and thus might be punished for real or perceived disobedience), to protect themselves, they instinctively refrain from behaviors they believe might incite their government to use violence. I call this the "big brother effect," because it is similar to that which is described in George Orwell's famous novel *1984*. In this fictional work, "Big Brother" is always watching the populace and controlling their every move. Constant monitoring constrains their way of life and daily actions. Conversely, when the civilians believe their activities and motivations are likely to go unnoticed by their government, they feel more at liberty to rebel. Thus, the government has concrete reasons to use violence (e.g. seeing civilians taking advantage of shadowy and hard-to-control conditions), she may seek to reclaim her power. This simple reasoning is what led me to argue that the level of information a state has about its citizens and the level of state violence exerted onto those civilians should be closely associated. Violence is the product of a lack of information, or in other words, it is a "substitute for information" (Zhukov, 2014).

To reiterate, civilians defect when they believe the risk of getting caught is low, and information increases this level of risk. The more information that a state can accumulate via monitoring, surveillance, dataveillance, etc., the higher the risk of getting caught and the less likely civilians are to defect. Put another way, defection is implausible when the risk of getting caught, and thus the fear of retribution, is high; thus, the level of support enjoyed by state increases.

On the other hand, in an environment in which information is scarce, people may feel free to support rebel groups. Fear of state retribution is less when civilians believe their actions to be

unseen by the state. In this sense, information makes government retribution more likely and effective, and thus reduces the uncertainties that might make the populace feel free to rebel. When states know whom to punish, ordinary people adapt themselves to this high transparency setting and behave loyally. Such an environment undercuts rebels' fighting capacity by deterring people from switching sides and depriving the insurrectionists of recruits, supplies, and intelligence. Thus, more information suppresses the state's need to use violence against civilians because the rebels' fighting capacity has already been undercut. Conversely, when states have too little or no information about what the civilian people do and/or intend, the populace is more likely to take advantage of the state's weakness and cooperate with the rebels. Logically, these conditions may cause a state to use violence as a coercive tool.

When civilians are isolated from the rebels by state violence, fighting is now much costlier for rebel groups. From that time on, the rebels will be having hard times to get the civilian support they desperately need. I argue that information is more efficient at accomplishing this isolation than is violence, and by itself it can render isolation by violence unnecessary. State-held information can be used to signal to civilians the possibility and level of severity of retribution, and thus dissuade them from disobedience and defection. When they feel that the state is watching, civilians are less likely to behave in ways in which the state might disapprove. In this setting, civilian fear and forced loyalty creates a kind of "virtual isolation" from rebels that makes physical isolation unnecessary.

Whether the motives for violence are strategic or not, combatants use it in two ways: selectively or indiscriminately. Violence is selective when people are targeted "on the basis of their actions" (Downes, 2007) and indiscriminate when targeting is "solely on the basis of their membership in a group perceived to be connected with the opposition and irrespective of their individual actions (groups may be based on ties of kinship, location, class, ethnicity, etc.)" (Kalyvas, 2004, 101). It is commonly believed in the literature that violence against noncombatants must be selective to be effective (Downes, 2007, Kalyvas, 2006, Koc-Menard, 2006, Kalyvas, 2004). Doing it

selectively will deter people because "selective violence personalizes threats and endows them with credibility, for if people are targeted on the basis of their actions, then refraining from such actions guarantees safety" (Kalyvas, 2006, 144).

Yet cases exist where states have defeated rebels by using indiscriminate violence. If the core objective of violence in a civil war is "the alteration of the behaviors of civilians" (Wood, 2010a, 7), then, the indiscriminate violence can also be productive and plausible to use where it is the only viable alternative at hand. Thus, violence, discriminate or not, might be a good candidate to properly achieve this aim. Now, let me turn to how information affects the environment in which both states and civilians live.

When possessed with much information, states may not need violence at all, or only need to use it selectively. However, in a low or no information environment, states may not have any other alternatives of influencing civilian behaviors other than violence. Thus, we can claim that informational circumstances can necessitate different levels of violence.

For civilians, under the conditions where states know more about the population, it would be hard for civilians to defect. Conversely, in a low or no information environment, civilians would be more likely to collaborate with the rebels where they can easily free ride. There are two mechanisms that affect directly civilians (and indirectly states) and thereby cause less violence: fear of state retribution and self-censorship. Due to the substantial effects of these two mechanisms, civilians select to remain on states' side, and states, therefore, do not need to use violence.

As a second element of this analysis, I will seek to answer the following question: How do states gather the amount of information necessary to substantially affect the conflict environment, as illustrated in the above settings? To update and increase their information, states depend mainly on two categories of sources: human and non-human. To date, most of the literature has examined human sources of intelligence (Kalyvas, 2006, Lyall, 2009, Zhukov, 2014, Stanton, 2015); this is the

most common because civilians tend to live in groups, and socio-culturally are likely to be close enough to rebels to witness events worthy of report. However, I emphasize non-human sources (e.g., technological means), which I will explain in detail in the following chapters.

As has been described above, in this research I explicitly link information to violence. This connection has been addressed in earlier works. For example, in his influential book, *The Logic of Violence in Civil War*, Kalyvas (2006) explains how informational asymmetries form a causal link "between civil wars and [the] barbaric and inmate dimensions of its violence" (Kalyvas and Paul, 2010); individuals supply information "at the local level" to actors via denunciations (Kalyvas, 2006, 14). In my conceptualization, though, the link between information and violence is more direct, and contrary to Kalyvas's argument, information supply is not bound solely to local people.

Another point of contrast between my work and the extant research is thus in the human vs. non-human comparison. The former is obviously vulnerable as a source because humans are biased by emotions, fears, anxiety, optimism, pessimism, and cupidity; here, I argue that non-human sources outperform humans in producing unbiased information (Margolis, 2013). This outperforming might serve as a possible cause for states' decisions on acquiring more high-tech surveillance equipment in recent decades. Obviously, technologically-based intelligence is more reliable and sensitive. Recent studies also support this claim, providing convincing arguments that modern information and communication technologies (ICT) offer good reasons for their selection over human sources. Examples of such technologies include mass media such as television and radio (Warren, 2014, Crabtree et al., 2015) and cell phones (Pierskalla and Hollenbach, 2013, Shapiro and Weidmann, 2015, Shapiro and Siegel, 2015, Weidmann, 2015a, Bailard, 2015). This research is therefore particularly different from the extant civilian victimization literature on its larger focus on non-human information gathering sources.

This study will make certain important contributions to the greater body of research on civil wars, as well as support recent work arguing that overall violence has declined (Gat, 2008, Gat, 2013, Goldstein, 2011, Mueller, 2009, Pinker, 2011). Steven Pinker has attempted to answer in his book *The Better Angels of Our Nature* (Pinker, 2011) the question of why intentional violence in the world has declined over time. Increasing levels of information available to actors (and particularly to states) due to technological advances may be one reason. Consequently, I argue that this increasing level of information may also mitigate the plight of civilian victims of civil wars.

This chapter serves as an introduction to this research as a whole, providing context for my subsequent arguments. The next chapter introduces certain concepts important to this research. Chapter Three discusses previous works and explains how they relate to this project. It also addresses how the notion of information has been underemphasized in the research to date. The fourth chapter returns to this under-emphasis and presents a new theory and associated evidence for why state violence against civilians follows a predictable logic that depends upon the level of information possessed by a state. The next three chapters qualitatively and quantitatively test this theory. The final chapter draws some general conclusions and suggests paths for future research.

"I am disturbed by how states abuse laws on Internet access. I am concerned that surveillance programs are becoming too aggressive. I understand that national security and criminal activity may justify some exceptional and narrowly-tailored use of surveillance. But that is all the more reason to safeguard human rights and fundamental freedoms."

Ban Ki-moon, the eighth Secretary General

of the United Nations.

CHAPTER 2. CONCEPTS

This chapter reviews the four interrelated concepts used in this research: civil war (irregular war), violence, civilian support, and information.

2.1 Civil War

Civil war has attracted a good deal of scholarly attention from disciplines such as sociology, political science, psychology, economics, and so on. This is understandable, considering that civil wars have affected more than "a third of all nations" (Blattman and Miguel, 2010). The recent blossoming of civil war studies has been "fueled by the global shift from interstate to intrastate conflict: of the 118 armed conflicts that have taken place between 1989 and 2004, only 7 have been interstate wars" (Kalyvas, 2006, 16).

A civil war is a conflict that represents "a challenge to the sovereignty of an internationally recognized state [that] involves the state as one of the principal combatants and the rebels were able to mount an organized military opposition and to inflict significant casualties on the state" (Doyle and Sambanis, 2000). Since casualties are a component of this type of war, different death

thresholds are applied when determining if internal conflicts qualify as civil wars. The UCDP/PRIO Armed Conflict Dataset defines internal armed conflict as "a contested incompatibility that concerns government or territory or both where the use of armed force between two parties results in at least 25 battle-related deaths;" it "occurs between the government of a state and internal opposition groups" (Gleditsch et al., 2002, 618-19). Other datasets use a comparatively higher threshold of 1,000 annual battle-related deaths (Doyle and Sambanis, 2006, Fearon and Laitin, 2003).

According to Kalyvas and Balcells, civil wars can be disaggregated into "irregular wars (or insurgencies), conventional wars, and symmetric nonconventional wars" (Kalyvas and Balcells, 2010). Conventional civil wars entail face-to-face confrontations between regular armies across clear frontlines, and require a commonly shared perception of a balance of power between the two sides; examples include the American Civil war (1861-1865) and the Spanish Civil War (1936-1939). Symmetric nonconventional wars are fought on both sides by "irregular armies following a process of state collapse that reflects the fundamental weakness and eventual implosion of the incumbent actor;" they lack "regular armies and set battles" (Kalyvas, 2005, 92). Examples of this type include the Lebanese Civil War and conflicts in Congo-Brazzaville, Somalia, Liberia, and Sierra Leone.

Irregular war, the focus of this research, can be defined simply as an armed contest between governments and rebel groups where indirect and asymmetric warfare approaches are used with asymmetric strengths. Irregular wars do not entail face-to-face confrontations between regular armies across clear frontlines; insurgent groups generally operate clandestinely. Another distinct characteristic is that the rebel groups usually "lack clear military targets such as bases and expensive equipment, and can often easily blend into a host population" (Cunningham et al., 2009, 575). Throughout this study, I use the terms "intrastate war," "civil war," and "irregular war" interchangeably.

2.2 Violence

Violence is a multifaceted social phenomenon with many different definitions across a wide variety of disciplines. At a very basic level, it is "the deliberate infliction of harm on people" (Kalyvas, 2006, 19). In war, it can involve both combatants and noncombatants. In this research, I follow the definition provided by the UCDP. In their description of one-sided violence first published in 2002, the UCDP described it as "the use of armed force by the government of a state or by a formally organized group against civilians which results in at least 25 deaths per year" (Eck et al., 2004). I focus particularly on "the intentional and direct" (Eck and Hultman, 2007) use of violence against noncombatants. Expanding upon this definition, Eck and Hultman (2007, 235) explained: "Intentional killings refer to any action that is taken to deliberately kill civilians. Direct killings encompass all deaths caused directly by an actor, such as by bombing or shooting." Thus, in this work I exclude indirect (e.g., by disease or other health problems) and unintentional (e.g., civilians caught in crossfire) types of violence against neutrals from my analysis.

Political violence is used by governments and rebel groups for reasons such as "to elicit support and prevent collaboration with the enemy" (Wood, 2010a, 47). Either groups or individuals may believe that their current political system does not respond to their demands, and therefore choose to use political violence as a means of achieving their objectives. Likewise, governments may use violence to intimidate their population into acquiescence, thus eliminating "the option of civilian neutrality" (Wood et al., 2012). In this research, I focus particularly on violence used by states. From this point on, I will use terms such as "governments," "incumbents," and "states" interchangeably.

2.3 Civilian Support

Although there are various players in any given civil war, in this research I highlight three important groups: governments, rebels, and civilians. Obviously, civilians are individuals caught

between a government and rebel group who are fighting one another. While engaged in conflict, combatants are likely to need civilian support "to sustain the military effort" (Zahar, 2000). This support can be either material (food, weapons, shelter, recruits, tax money), or non-material (information, moral power), or both. It is my contention that during civil wars, both political actors desire to control "populations and territory." Civilian loyalty and support is closely related "to the ability of actors to achieve these objectives" (Wood, 2010a, 19).

Therefore, unless certain rare conditions such as a very low civilian population, significant asymmetry between the two political opponents, or massive external backing (Salehyan et al., 2014) are in place to reduce the effects of civilian support, provisions received from the population are usually a *sine qua non* for both. In short, political actors almost always need noncombatant support (or at least acquiescence) to achieve their aims.

2.4 Information

In general, information can be defined as facts provided or learned about something or someone; its key value is that it resolves uncertainties. Here, I emphasize the role of information in civil wars, since such conflicts inherently incorporate large amounts of uncertainty and information asymmetry. More specifically, I herein define information as any kind of knowledge that helps a state to distinguish between actors such as nonaligned civilians, collaborating civilians, and rebel soldiers.

Thus, regardless of how it is obtained, information is power. It can instantly turn "blurred and uncertain conditions" into ones "brighter and [more] certain." The following from Kalyvas and Walsh (2013, 2-21) underscore how information transforms uncertainties into certainties. Kalyvas emphasized information that civilians provide by "informing" on a particular party:

> [Information provision] matters not just because it provides a direct military advantage (e.g., preventing or facilitating ambushes), but primarily because it solves the identification problem. A positive externality is that knowledge among the

> population that one side has crucial access to information undermines the population's willingness to collaborate with the other side. (2006, 105)

Similarly, Walsh highlighted how technologies like UAVs could provide reliable and vital intelligence, or processed information, to accomplish the same aim: to resolve uncertainties. "Drones can collect a great deal of intelligence about the location, movements, and communications of individuals … [Drones] allow the collection of real-time intelligence while monitoring a target…and perform a variety of missions, including reconnaissance…" (2013, 2-21).

From these two examples, I was able to implicitly classify information sources as human and non-human. In civil war literature, information is generally seen as provided by local (human) collaborators. That is, political actors usually receive some help from civilians with regards to the collection of information, solving their informational/identification problems and allowing for informed choices regarding when to initiate violence and what type to employ. Human information can come from espionage, diplomatic reporting (embassy and consulate personnel, military attaches, etc.), non-governmental organizations (NGOs), patrols (military police, gendarmerie, etc.), prisoners of war (POWs) or detainees, refugees, traveler debriefings, strategic reconnaissance by special forces, and so on. However, the point that information sources should not be confined solely to "civilians" is one of the unique contributions made by this research. In my view, especially with the advent of advanced technology, information sources have greatly proliferated, and this change has reduced the need for civilians to be used.

More technical means of intelligence gathering (hereinafter referred to as non-human sources) may be as reliable as human intelligence for collecting useful information. Thus far, little explicit attention has been given to the link between non-human sources of information and the use of violence in civil wars. While some recent studies have analyzed the role of technology such as mass media, television, and radio broadcasting (Warren, 2014, Crabtree et al., 2015) or cell phone coverage (Pierskalla and Hollenbach, 2013, Shapiro and Weidmann, 2015, Shapiro and Siegel, 2015,

Weidmann, 2015a, Bailard, 2015), no empirical research has proposed this kind of direct link between information and violence.

An examination of the current information/intelligence literature serves to explicate certain aspects of non-human sources of intelligence. A few information/intelligence gathering disciplines are responsible for much of the information gathered. Below is a list of the more technical categories, and descriptions of each:

- Signals intelligence (SIGINT): Intelligence derived from "communications, electronic, and foreign instrumentation signals" (USArmy, 2012).
- Geospatial intelligence (GEOINT): "The exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth. Geospatial intelligence consists of imagery, imagery intelligence, and geospatial information" (USNavy, 2012, I-1).
- Imagery intelligence (IMINT): The collection of information via satellite and aerial photography.
- Measurement and signature intelligence (MASINT): Scientific and technical intelligence information obtained by quantitative and qualitative data analysis (metric, angle, spatial, wavelength, time dependence, modulation, plasma, and hydro magnetic) and derived from specific technical sensors such as RADAR, LASERs, etc.

Apart from the information-gathering disciplines mentioned above, recent technological innovations have fundamentally affected information collection and created additional sources such as:

- Dataveillance: The collection, organization, and storage of information about persons.
- Biometrics: Use of the body as a measure of identity (Simon, 2005).

- Sousveillance: Physically mounting cameras on people rather than buildings, or employing laypeople to do the watching, rather than official experts (Mann et al., 2003).

"It's a social contract we make. We're willing to give up certain things. We give you the right to tax us. We give you the right to lock us up. We give you the right to put us on surveillance, search our homes, whatever and, in exchange, we get a functioning society that keeps us relatively safe, and that's the tradeoff we make."

Matt Apuzzo, a Pulitzer Prize-winning American journalist.

CHAPTER 3. BACKGROUND

Civil wars are interesting to scholars, researchers, international organizations, and policymakers primarily because they are violent events. They are responsible for thousands (and sometimes even millions) of deaths. Victims can include government soldiers, armed rebels, and civilians. Therefore, explaining this violence and endeavoring to understand how it can be stopped is an ongoing task of significant importance.

Many, mostly overlapping, uses of violence have been cataloged, including: "terrorization, intimidation, demoralization, polarization … punishment for cooperation with the enemy…" (Kalyvas, 2004). In the current literature, there are two generally-recognized theories regarding the logic of violence against civilians in civil wars: "the first focuses on interactions between armed groups and civilians, and the second one on interactions taking place within armed groups themselves" (Kalyvas and Paul, 2010). Scholars of the former (Kalyvas, 2006, Lyall, 2009, Hultman, 2007, Wood, 2010b, Wood and Kathman, 2014, Arendt, 1970) mainly assert that violence is simply an instrumental component of a general strategy used to influence the conflict process. That is, as described above, political actors are utility maximizers who use violence when the expected gains

minus the expected costs outweigh the net expected benefits of alternative courses of action. Kalyvas has argued that "civil wars are contexts that place a considerable premium on organization, hence reinforcing interpretations of violence as instrumental" (2006, 26).

To further explain this categorization, some examples from the current literature are included below. As followers of the first camp, Wood and Kathman linked victimization to the bargaining process and claimed that it improved insurgents' bargaining position by "revealing to the regime information about rebel resolve and the likely costs of the conflict" (2014, 686). Hultman related [rebel] violence to their performance on the battlefield (2007, 210). She argued that when rebels perform poorly in the zone of combat, they use violence to "impose costs on the government" by killing civilians wherever they could not kill enough government troops to impose similar costs. In my view, it would be rational to apply the same logic to state violence. A government might also use violence to impose costs on rebel groups by killing civilians, since doing so would "affect the ability of the rebels to respond" (Hultman, 2008). Kalyvas's (2006) theory contends that the level of "territorial control" is a major determinant of violence in civil war; violence is a tool employed to compensate for both political actors' inability "to control." For example, when one actor or the other exercises a control monopoly, there is no need to employ violence because civilians will almost always comply with the locally-dominant actor.

Conversely, Weinstein (2007), as a prominent proponent of non-strategic explanations for violence, argued in his famous book entitled *Inside the Rebellion* that violence against civilians is a result of a lack of discipline, rather than a deliberate strategy. He explained that some rebel organizations are resource-rich, whether from access to funding from foreign governments or trade in contraband, while other groups are resource-poor. This variation in access to resources is associated with variations in violence. That is, while some rebel groups have a tendency to victimize, others are less likely to do so, and this is attributable to differences in their access to resources. One factor is that insurgents with lucrative initial resource endowments are prone to

recruit opportunist soldiers who are more likely to exploit their victims. In the same vein, Humphreys and Weinstein described violence against civilians as an externality and argued that "the determinants of civilian abuse are internal to the structure of the faction" (2006, 429). That is, when rebel groups are unable "to police the behavior of their members because they are more ethnically fragmented, rely on material incentives to recruit participants, and lack mechanisms for punishing indiscipline," a high level of abuse is the inevitable outcome. Hovil and Werker also rejected "the rational and functional explanation of violence" (2005, 7), and instead linked violence to the relationship of the insurgents with their financiers abroad.

Regarding state violence, the focus of this research, Downes argued that states use violence against civilians to clearly signal observers regarding "the fate of opponents or traitors" (2007, 421), and thus deter civilians' possible defection and maintain their support. According to this theory, states indirectly use violence "to undercut rebels' fighting capacity" by deterring people who might consider switching sides, and more directly by depriving the adversary of needed recruits, supplies, and intelligence (Downes, 2007). In the same manner, Zhukov (2014) saw state violence in "strategic settings" and noted that states use violence to make "rebellion costlier" for civilians than the alternatives, in order to deter the population from rebelling. Valentino et al. (2004) proposed that mass killing was often "a calculated military strategy used by regimes attempting to defeat major guerrilla insurgencies," and posited that states are more likely to kill civilians when facing a rebel group relying on guerrilla warfare; the rationale would be that these types of situations create strong incentives for the government to target guerrillas' civilian base of support as a way of combating groups difficult to defeat through conventional means. Similarly, Azam and Hoeffler (2002) argued that violence against civilians is used strategically to displace people in areas where rebels have support, since it reduces the rebels' ability to hide and receive backing, thereby increasing "their costs for fighting". My views are reconciled with the idea that violence is a strategic tool in both actors' toolboxes.

"Big Brother is Watching You."

— George Orwell, 1984

CHAPTER 4. A THEORY OF VIOLENCE AGAINST CIVILIANS

4.1 Introduction

In irregular wars, civilians are as important an actor as governments and rebel groups. Normally, the two key groups of combatants fight for sovereignty, seeking to establish a monopoly on the use of force. However, their ability to do so largely depends upon the support each group receives from civilians (Zhukov, 2014, 21). To shoulder the cost of warfare, states and rebels alike must seek to maximize their respective shares of noncombatant support. All material and non-material sources from the population are necessary "to sustain the military effort" (Zahar, 2000). Therefore, each actor must endeavor to gain backing, or at least acquiescence, from the neutral population if they are to achieve their political and military goals. In other words, as Galula (1964, 4) has emphasized, "the exercise of political power depends on the tacit or explicit agreement of the population, or, at worst, its submissiveness". Thus, civilian support is essential for both governments and rebels.

Civilians have two main options when caught up in the fight between two combatants: remain neutral or cooperate with one of the two actors. They face a collective action problem because participation in conflict is "individually costly and benefits are non-excludable" (Zhukov, 2014). Like soldiers, when civilians participate in civil war, they can never know exactly when they might be killed. Conversely, while non-participation is costless and neutrality provides its own incentives, there is no guaranteed benefit, either material or moral. Combatants are well aware of this collective action problem and use violence to overcome it. To accomplish their particular goals, combatants must punish their opponents and protect their supporters, thereby making cooperation

with the enemy costlier than acquiescence with the present force. In other words, combatants have to make switching sides the most expensive choice of all the alternatives. Because civilians are risk-averse and seek security, it is plausible to assume that they would prefer the least harmful alternative of those available to them. As Kalyvas succinctly stated, "civilians collaborate with the political actor that best guarantees their security" (2006, 167).

There are several reasons why states may choose to capitalize on violence against civilians. First, states use violence to clearly signal "the fate of opponents or traitors" (Downes, 2007, 421), and thus deter possible civilian defections and maintain support. Using a "rationalist" baseline, this makes "rebellion costlier" for civilians than other alternatives (Zhukov, 2014). Second, states use violence "to [indirectly] undercut rebels' fighting capacity" by deterring anyone who might consider switching sides, and directly by depriving their adversary of needed recruits, supplies, and intelligence (Downes, 2007). Put another way, governments target civilians to weaken rebel groups. Third, states use violence to physically isolate people in areas where rebels have support. This serves as a clear message to noncombatants to stop aiding and abetting rebels; the isolation weakens them. For rebel groups, such actions increase "the costs of fighting" because they reduce their ability to hide and receive support (Azam and Hoeffler, 2002). Finally, independent from civilians, under certain circumstances states may use violence because they don't have another way of influencing civilian behavior other. Thus, violence may emerge as a forced choice.

States mainly use violence as a means of deterrence to propel civilians past the collective action problem and generally influence their behavior. In order for deterrence to be effective, states must convince civilians "that they are able to monitor and sanction civilian behavior with reasonable accuracy" (Kalyvas, 2006, 190). It is my argument that the means of gathering information and the amount of intelligence gathered are critical factors enabling effective "monitoring and sanctioning;" they deter civilians from defecting. This is because constant and ever-increasing state monitoring and surveillance create a *social control* over the population. The

more states know about the population (even when little physical control is exerted), the harder it is for civilians to switch sides inside the resulting "transparent environment." The fewer civilian defections there are, the less likely it is that states will need to use violence. In sum, what triggers the mechanism is increases or decreases in information supply to the state.

4.2 Social Control: Panopticon-like Conditions

The Panopticon, a word meaning all-seeing, illustrates the relationship between the information level of the state and state violence against civilians. The Panopticon was a building designed by the English philosopher and social theorist Jeremy Bentham in the late 18th century. The concept of the design was to allow all (pan-) inmates of an institution to be observed (-opticon) by a single watchman without the inmates being able to tell who, specifically, was being watched, and when (see Figure 4.1). Thus, the occupants of the Panopticon, not knowing if they were in fact being observed, would come to assume constant surveillance and eventually watch themselves. Therefore, no actual inspector was needed.

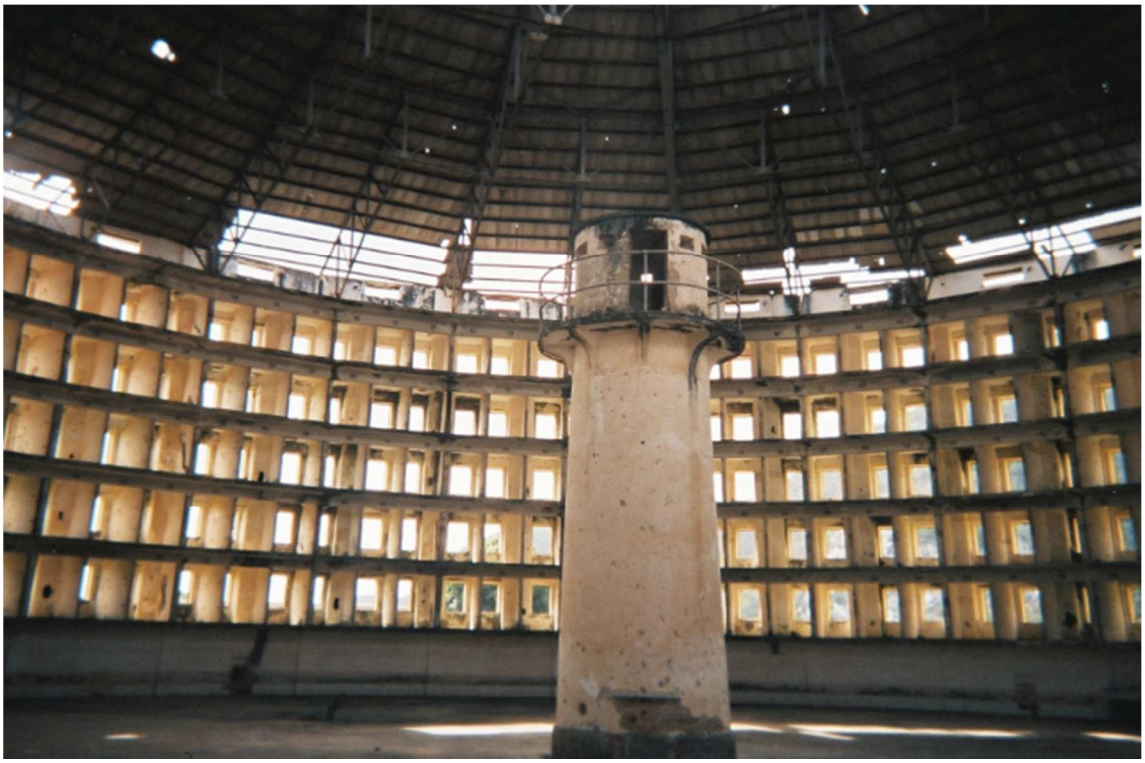

Figure 4.1. A Panoptic Prison Building in 2005 (Isla de la Juventud, Cuba)

The building consisted of a circular structure with an "inspection house" at its center, from which the manager or staff of the institution could watch the inmates stationed around the perimeter. The building was designed to create “a consciousness of permanent visibility as a form of power, where no bars, chains, and heavy locks are necessary for domination” (Allmer, 2012, 22). Simon described the basic tenets of Panopticism;

> Faced with an uncertainty with respect to whether he is being watched, the inmate begins to watch himself. That is, he behaves as if he was being watched and so is careful not to attract the ire of the observer who he imagines is there. The inmate thus tows the line and conforms to the explicit and even implicit rules of the institution, all because he imagines he is being watched. (2005, 5)

This panoptic world is idealistic and most likely utopic. That is, it is difficult to imagine a world where all sense of rebellion is extinct and rebellion-free. However, what I argue through this example is that increasing the information levels of states could lead to a world that comes close to

a virtual Panopticon, yielding a kind of social control that could deeply change the nature of civil wars. When civilians understand that the state is always watching, they are likely to behave as prisoners in the Panopticon, eventually watching themselves.

Especially in recent decades, modern information and communication technology (ICT) has become a significant factor in our daily lives. By producing numerous innovations that offer fruitful opportunities for rapidly transmitting information, ICT can act as a catalyst for important events. ICT not only creates "dense global networks of communication" that link individuals to one another (Weidmann, 2015b, 263), it also makes information easy to share almost anywhere, and any time. Therefore, ICT is likely to assist in creating Panopticon-like civil war conditions.

In times of civil war, a constant Panopticon-like atmosphere will produce different effects for civilians and the state. It will lead civilians to adopt a neutral stance (or one in support of the government), due to fear of being punished for switching sides. Thus, more information about civilian behavior via reliable means makes civilians more accountable; transparency improves accountability (Holmström, 1999). For the state, this environment of constant surveillance and the information it yields will substantially affect the level of social control that can be exerted, thereby affecting the level of violence it might seek to initiate.

In other words, when civilians believe that their behaviors and intentions are likely to be known to the government (and thus, possibly punished), to protect themselves they will instinctively refrain from behaving in ways that might yield government violence. They will decide *not* to switch sides. If they do not switch sides, the state will not be tempted to use violence to discourage defection. It is this logic that leads to the simple conclusion that the amount of information states have about their citizens and the violence they might be tempted to use are closely associated. Violence is a substitute for information (Zhukov, 2014).

4.3 Theoretical Foundations

Similar to Kalyvas's (2006) theory of civil war, this dissertation also links information to violence. Kalyvas, however, binds information to civilians, arguing that political actors "use civilians to collect information" (Kalyvas, 2006, 14). I extend these limits and include technology in the information-gathering effort. Especially in recent decades, more and more technical means of gathering information have been introduced, and this has largely reduced the importance of local civilians in civil wars.

By extending the possible effects of non-human sources, in this research, I emphasize how "social control" is as important as "territorial control", which is described below and has been the main focus of the current civilian victimization literature so far. I also argue that expanding surveillance capacities of the governments also largely affect the conditions and the borders of the "territorial control" they exert. Arguing that violence is a function of "territorial control," Kalyvas described a series of zones, as follows:

> Where the government is able to exercise effective control and where its troops and administrators are able to move with safety day and night, we are in a zone of incumbent control. Where insurgents are able to effectively prevent the operation of government forces day and night, and the government is absent and unable to perform basic state functions, such as collect taxes and draft young men into its army, we are in a zone of insurgent control … Consider a distribution of the geographical space into five discrete zones of control, ranging from 1 to 5. Zone 1 is an area of total incumbent control, and zone 5 is an area of total insurgent control. In between lie zones 2, 3, and 4, which are contested areas where control varies as follows: zone 2 is primarily controlled by the incumbents (dominant incumbent control), zone 4 is primarily controlled by the insurgents (dominant insurgent control), and zone 3 is controlled equally by both sides (parity). (2006, 88-196)

In my view, however, Kalyvas's zone division needs alteration, due to technological advances. Kalyvas felt that "irregular war fragments space. This fragmentation can easily be seen on maps depicting countries that are undergoing civil wars." However, since the time of his writing, civil war

maps have transformed. Some of his empirical examples are drawn from 1944 Germany, 1943 Greece, and 1960s-era Vietnam. For example, with regards to measuring control, he writes:

> Incumbents exercise full control in zone 1; they have destroyed most or all insurgent clandestine cells and are able to prevent the rebels from entering or operating with any effectiveness. The population has no access to them … In adjacent zone 2, incumbents exercise secure but incomplete control; clandestine insurgent cells are still in operation and the rebels, present in the surrounding area, can make sporadic visits by night … What distinguishes zones of incomplete control (2 and 4) from zones of full control (1 and 5) is that in the former the population has access, albeit unequal, to both actors. This is not the case in the latter, where the sovereign has a monopoly of force on a daily basis and in pretty much unequivocal fashion. (Kalyvas, 2006, 210-212)

In reality, via socially controlling the population with dataveillance, surveillance technologies such cell phones tracking, Internet monitoring, UAVs, etc., now allow states to reach noncombatants inside rebel-dominated areas and affect their behaviors. Even though this is accomplished non-physically, states are now more likely have access to civilians, and vice versa.

Additionally, his five-zone conceptualization suffers from being somewhat static. Especially with the advent of advanced technology, "zones" have become more dynamic and can quickly transform. For example, with the help of advanced technology (such as hi-tech UAVs with constant and highly accurate monitoring), a state can quickly 'virtually' transform a zone 5 into a zone 1. In other words, while Kalyvas sees zones of sovereignty as physically transforming phenomena, a transformation can also be 'virtual' by an influx of information.

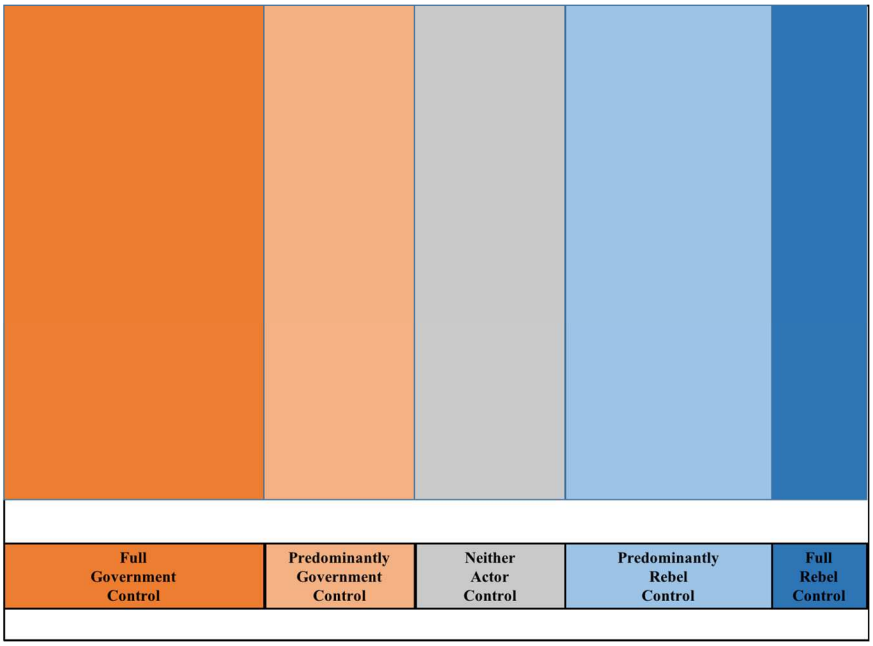

Figure 4.2. Kalyvas's Five-Zone Continuum (Kalyvas, 2006) [My own visualization]

While selective government violence in a territorial zone (for instance, in a zone 2 with dominant state control) in line with the Kalyvas's theory is possible, an equally likely reality might be that a government's indiscriminate violence is attributable to information scarcity; the particular state might lack information sufficient to keep them from needing to engage in a violent event. A recent example can serve as an illustration of this type of situation. In the ongoing Afghan war, the Tora Bora mountains are believed to be a typical zone 4 [in Kalyvas's terms] (with dominant insurgent control); however, US (ISAF) forces, with their highly modern capabilities, could abruptly (and temporally and/or also virtually) set this location as a zone 2 (with dominant state control) by selectively targeting civilians. Even if only a temporary transition, such a change could result in significant outcomes such as less civilian victimization. Thus, these temporal transitions can dramatically change the predictive powers of theories such as Kalyvas's zone model. While Kalyvas's theory predicts a very large number of government killings in zone 4-type areas, a theory that considers state actors' "virtual" territorial control might predict something different (such as fewer government killings).

In Kalyvas's theory, violence is predicted as a function of control, and thus is based on static spatial divisions within already defined and seemingly unchanging/slowly changing zones (see Figure 4.2), whereas in my conceptualization, the zones are more dynamic and can easily transform via an influx of information (see Figure 4.3). Rural areas, where governments have historically been considered to have less control (zone 4 for Kalyvas), can "virtually" transform into a zone 2 or zone 1 via information provided to the state. Thus, because zones are now much more dynamic, the types and levels of violence are also quite different.

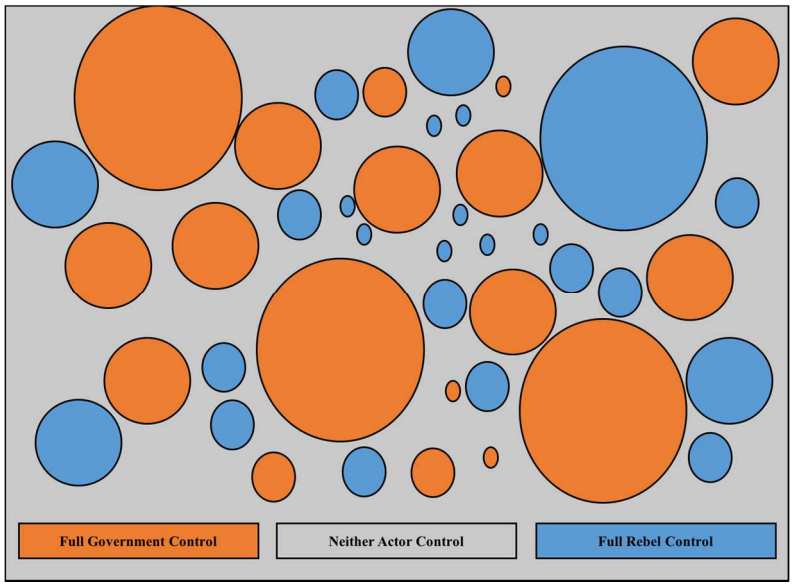

Figure 4.3. Floating Control Zones (A Generic Schema)

What makes zones dynamic is a quick influx of information. As access to advanced technology increases, the possibility of zones becoming dynamic grows. Anything that boosts the information level of an actor in a civil war, such as UAVs and ICT equipment, helps decrease that actor's need to resort to violence. In my conceptualization, there are three spatiotemporal zones: full government, full insurgent, and areas controlled by neither actor. What determines the size of these bubbles is the information level of the actor.

To elaborate on how information provision affects the level of violence, I have constructed two sketches of an imaginary State A vs. Rebel Group B dyad war (see Figure 4.4). The sketch to the

left denotes the condition of the civil war in the t_1 period, where State A physically controls most of the country (orange areas in Figure 4.4). Conversely, Rebel Group B controls only a small part of the territory. The rebel group has formed certain enclaves (dark blue areas in Figure 4.4) with miscellaneous dimensions, and controls the territory and people inside. Outside of these enclaves (light blue areas in Figure 4.4), civilians are more prone to be influenced by Rebel Group B because State A is having trouble reaching them (due to a lack of physical control). In time t_1, State A frequently uses violence against the people inside this contested area in an attempt to influence their behavior and deter them from collaborating with the rebels.

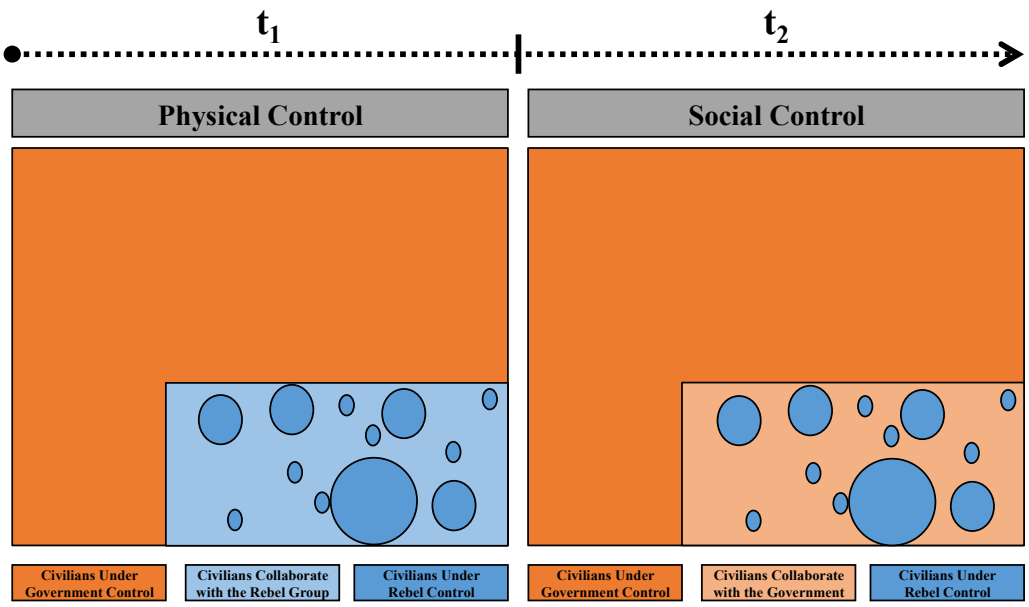

Figure 4.4 The Effects of Social Control in Time

In time t_2, with social control over the entire country achieved by means of advanced technologies such as UAVs, SIGINT, wiretapping, and the monitoring of social media, State A can seize virtual control in areas where it does not have physical or social control. From that point on, people in the rebel-controlled enclaves remain under the physical control of the rebels and thus are prone to remain loyal to them. However, those outside these enclaves (now depicted as light orange

on the right side of Figure 4.4) are now under the social control of the state. Therefore, the individuals in these areas are now more likely to be deterred from joining the rebels because this virtual control alters their behavior and increases the risk of getting caught, and thus of facing state retribution. State A will no longer need to use violence against civilians, at least inside these contested zones, because it can deter civilians through social control. For this reason, state violence drops significantly in t_2. Information provision via social control leads State A to use less violence. In sum, the more information a state possesses, the less likely it is to use violence.

4.4 Mechanisms of Social Control

From a rationalist baseline, state social control through advanced technology seriously affects the relationship between information (the cause) and state violence (the effect). Two mechanisms underscore how this functions: the fear of state retribution and self-censorship.

4.4.1 Fear of State Retribution, or the Risk of Getting Caught

States rationally use violence in areas where there is a significant likelihood that civilians might collaborate with rebels. Violence is employed to deter people from collaboration, and thereby reduce the likelihood of defection. States must maintain a balance between "the profit of the crime" and "the pain of the punishment." As Bentham writes in his book *The Rationale of Punishment*:

> The profit of the crime is the force which urges a man to delinquency: the pain of the punishment is the force employed to restrain him from it. If the first of these forces be the greater the crime will be committed; if the second, the crime will not be committed. If then a man, having reaped the profit of a crime, and undergone the punishment, finds the former more than equivalent to the latter, he will go on offending forever; there is nothing to restrain him. If those, also, who behold him, reckon that the balance of gain is in favor of the delinquent, the punishment will be useless for the purposes of example. (1830, 33)

In other words, Bentham argued that most people refrain from crime to avoid punishment. This understanding of the relationship between crime and punishment might appear to be an oversimplification. Its assumptions are based on an individual behaving rationally, which is used in

many settings as an all-embracing model. However, at its core, this is a valid explanation for criminal behavior, even though there may be other, more nuanced descriptions of the relationship between crime and punishment that operate as well. Using a rationalist model for this research, it is my contention that state-held information increases the likelihood of punishment by increasing the probability of getting caught. Thus, to protect themselves from the overriding pain of punishment (i.e., violence), civilians, as rational actors, see their survival more in information loaded into the state's hands, and thus are likely to choose to be loyal. State-held information (and the government's potential to act upon on that information) is a signal to civilians about possible retribution; thus, the state becomes a safe island for survival. Ever-increasing information levels can also potentially increase the credibility of the threatened punishment. Non-aligned civilians may come to believe that they will be effectively and accordingly punished if they commit a crime. The credibility of the punishment maintained through a high-quality information collection system can separately compel neutral civilians to refrain from delinquency. Therefore, even though there may still be the need for violence, it is lessened due to the presence of information.

4.4.1.1 Overcoming identification problems and the quality of information collection systems

States, in times of civil war, are often faced with an "identification problem," or sorting their opponents from innocent civilians. Afghanistan serves as a succinct example. An American officer patrolling an Afghan village once said: "Two out of 10 people here hate you and want to kill you. You just have to figure out which two" (Kalyvas, 2006, 88-89). A useful tool in finding those two is reliable information gathered by a trustworthy system.

When detecting collaborators, accuracy is very important; it increases the odds of traitors getting caught. Otherwise, unfavorable outcomes can result such as determining that a person is a collaborator (or loyal) when they actually aren't. An analogy between detecting collaborators and

detecting cancer will help to explain how information systems assist states in overcome the identification problem (see Figure 4.5). Just as how a mammogram is able to detect a cancerous growth, an accurate information system is an invaluable means of detecting collaborators/traitors, the ultimate aim for states engaged in civil war. In detecting cancer, there is always an issue of false positives (where the results in the mammogram may appear abnormal but no cancer is actually present) and false negatives (where the results appear normal but cancer is present). Normally, a reliable mammogram finds at least four of every five actual cancers. Likewise, states need dependable systems to find traitors among the population. Non-human technological information systems tend to be very reliable, and thus are an important means of detecting traitors.

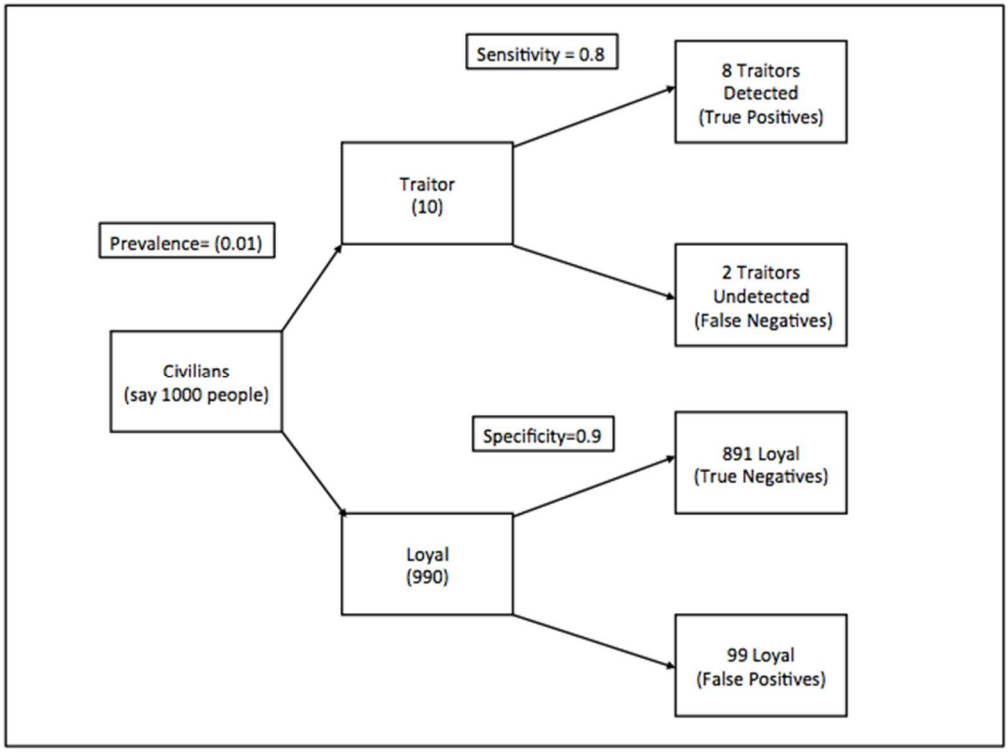

Figure 4.5 Detecting a Traitor (A Generic Schema)

A system's ability to gather reliable information can be assessed according to two key benchmarks: sensitivity and specificity (see Figure 4.5). Technology-based information collection

systems are very likely to achieve high standards in both of these areas. This is why governments have made considerable investments in technological surveillance systems. The above illustration offers a general picture of why these factors are so important to governments seeking to separate collaborators from non-aligned innocent civilians. In Figure 4.5, prevalence is the proportion of a population made up of traitors/collaborators. This portion is not generally high in times of civil war. In other words, it is uncommon for an entire population to defect to the rebels' side. In Kalyvas's example of an American officer patrolling an Afghan village, there were only two collaborators out of ten, meaning the prevalence was only 0.2. Information helps states correctly detect these two people.

The other two concepts in the Figure 4.5, sensitivity and specificity, largely determine the information collection system's quality. If civilians believe they are under constant surveillance by high-quality state-operated equipment, then they will fear that their collaboration may be detected and result in retribution. Sensitivity (also called the true positive rate) is the proportion of hits that are correctly identified as positive. If the system correctly detects 16 traitors out of 20 when, in reality, they are all traitors, the system's sensitivity is 80%. Likewise, specificity (also called the true negative rate) is the proportion of hits that are correctly identified as negative. If the system detects 891 loyal people out of 990 and those 891 are, in fact, loyal, the system's sensitivity is 90%. A perfect system would be 100% sensitive (e.g. all traitors identified as traitors) and 100% specific (no loyal individuals identified as traitors). These two aspects of information systems determine both the quality of the system and the information it produces.

In a civil war, false positives (determining individuals to be opponents/collaborators when in fact they are not) and false negatives (determining individuals to be loyal when in fact they are not) can both cause significant trouble. While the outcome of the former is punishment of the innocent, the second is the release of a traitor, which to the state could be disastrous. Ideally, both would be avoided. Only when a government has reliable information via sources such as UAVs,

espionage-gathering systems, wiretapping equipment, GPS, and radio-frequency identification (RFID) (technology that uses electromagnetic fields to automatically identify and track tags attached to objects) can the detection of traitors be accurate. Less reliable information leads to more false positives and negatives, a significant problem for states to overcome. Technological surveillance is an information collection system that offers governments an enormous advantage.

In this regard, drones (UAVs), for instance, serve as an example of a reliable system. There has been some recent research discussing the potential for drones to become the next layer of surveillance, due to their low cost and high data capacity (Jensen, 2016b, 20). They are like "flying robots/computers" (Goodman, 2013). For example, there are currently nano-drones (3" x 3" x 1") with HD cameras monitoring the earth. States invest substantial funds in drones to reduce violence through superior surveillance. One example occurred in 2013; the National Police in Colombia acquired drones to reinforce security by controlling urban mobility (El Universal, May 2013). Similarly, the municipality of Tigre, Argentina has drones that have cameras that "capture and transmit high definition images" in real time to police command centers. In another Argentine city, San Luis, the local government has also implemented "four drones to add to the 196 fixed video surveillance cameras" (EFF, 2015). These types of technology help states monitor movements on earth, then efficiently detect (or make it easier to detect) traitors/collaborators among the population.

4.4.2 Self-Censorship

A second mechanism that can reduce state violence is that of self-censorship. Civilians may independently self-censor and regulate their actions and predisposition towards collaboration with rebels, much like prisoners in Bentham's Panopticon. Constant state surveillance can serve to discipline civilians and prompt them to auto-censor and suppress any inclination they might have to switch sides. The power of information is "visible and unverifiable" (Foucault, 1979). It is visible

because civilians know that they are under constant state surveillance, and unverifiable because they may never know if the surveillance is occurring at any one moment; thus, they conclude that it must always be so. In other words, "social control" is attained, meaning that people's relationships, commitments, values, norms, and beliefs encourage them not to break the law.

Similarly, there is another factor that facilitates auto-censoring: civilians are more likely to support the side they expect to win. If states are more likely to win, civilians are less likely to collaborate with rebels. Increasing the information level of states enhances both their actual strength and the likelihood of the population's expectation of state success. Since information positively affects people's perception of state success, more information will lead people to auto-censor themselves, and be more disciplined and loyal to the government. Such states will correspondingly decrease their violence against civilians.

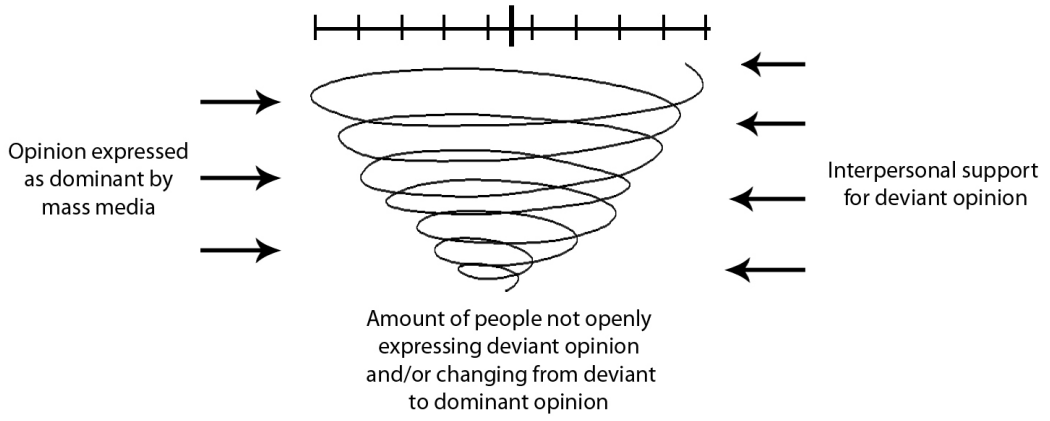

Figure 4.6. Elisabeth Noelle-Neumann (1984)'s famous model called "Spiral of Silence"

This kind of self-censorship has something in common with Elisabeth Noelle-Neumann's (1984) famous model called the "Spiral of Silence," which proposes that people tend to remain silent when they feel that their views are in opposition to those of the majority. In other words, one

view dominates the public scene and others disappear from public awareness. When people find themselves inside a socially controlled environment, they tend to prefer silence to speaking up on things that matter to them (see Figure 4.6). At the same time, they prefer to keep silent and side with the government if they feel that their actual opinions are not in line with it.

4.5 Hypotheses

In the 2001 Afghanistan war against the Taliban, valuable information-gathering UAVs (drones) were actively employed to gather information for the US government; their advanced ability to linger over an area while operating video cameras for as long as 40 hours at a time allowed for the non-stop monitoring and regular exposure of activity on the ground. Due to these long hours of continuous, real-time, reliable surveillance, drones were able to provide vital and accurate information about the Afghan people. What makes this notable is that these devices were able to "see and think" (Himes, 2016, 12), which is uncommon for most military equipment. UAVs are outfitted with technology that allows them to collect SIGINT, MASINT, GEOINT, and IMINT. Their exclusive ability to observe and track a target for many hours at a time with high-tech precision allows them to collect "reliable and time sensitive" information about civilians and combatant targets (Cortright et al., 2015b, Jensen, 2016a). Therefore, by observing and monitoring people's movements for long hours, UAVs are a good option for governments searching for a resource that will help them to acquire reliable information about their enemies.

For example, in the hunt for Osama bin Laden in 2011, the CIA employed drones to fly dozens of secret missions "deep into Pakistani airspace and monitor the compound where bin Laden [was eventually] killed." Using the drones, for months the CIA was able to monitor the area before engaging in the actual assault on May 2. This operation, codenamed Operation Neptune Spear, saw only four additional casualties beyond bin Laden, including very few civilians. With the help of information gathered from several sources, including UAVs (RQ-170), satellites, and mobile

phones (Whitlock and Gellman, 2013), the US forces were able to accurately target combatants and selectively target civilians who helped the enemy. Non-human sources of information were able to facilitate the discriminate use violence through the exceptional advantage they provided of live stream monitoring of earth-surface activities with almost no risk and a relatively low cost. General McChrystal, who was the commander of Joint Special Operations Command (JSOC) in the mid-2000s in Afghanistan, also approved of their use, telling Congress in 2010 that "the intelligence from the drones" and other planes was "extraordinarily effective" (Drew, 2010) for dealing with the broad mix of demands, primarily because it was so sensitive and reliable.

To reiterate, when people are certain that the state knows what they are doing and whether and how they aid the enemy, they often cease any efforts to defect. Under such conditions, a state does not need to resort to violence because the reason to kill (e.g., civilian defection) has been dispelled through the fear of state retribution and self-censorship; thus, violence is unnecessary. Therefore, information assists in discouraging defection, the main goal of the state (Kalyvas, 2012, 660).

Additionally, civilians are more likely to support the side they expect to win. Therefore, I argue that increasing the information held by states both improves their actual strength and the likelihood of people's expectation of state success. The anecdotal evidence weighs heavily in favor of this proposition. One of my personal examples are the claims of a peasant from Daglica, a village in the Hakkari province of Turkey. This area is generally believed to be perpetually pro-PKK, an active rebel group. The peasant, referencing the recent deployment of modern Turkish mini-UAVs and Israeli-made Heron UAVs, stated: "After, the battalion [Turkish] brought here more high-tech equipment … I now see that PKK cannot win this war, and we know where to stand! And whom to back!" He clearly indicated that since the Turkish government's forces had information on the local people and their activities through close monitoring with advanced technology, he was no longer interested in defecting to the rebel cause. It was then the population began seeing the Turkish state

as a possible winner. The information level of this state government urged the Turkish civilians not to collaborate with the rebels [at least less likely to collaborate]. Thus, the state no longer [and/or less] needed to use violence. In other words, when there was clear [at least] "social control" over the people in the contested zones, they were more likely to support the state and, in return, less violence was employed. This logic gives rise to my first hypothesis:

Hypothesis 1: The higher the level of a state's social control over the population, the less likely that state is to resort to violence against its civilians.

What happens in a situation where the people do think that states are less likely to know what they are doing? As pointed earlier, civilians defect when they believe the risk of getting caught, and the fear of retribution is low. In an environment in which information is scarce, people may feel free to support rebel groups. Fear of state retribution is less when civilians believe their actions to be unseen by the state. When states have too little or no information about what the civilian people do and/or intend, the populace is more likely to take advantage of the state's weakness and cooperate with the rebels. Then, logically, these conditions may cause a state to use violence indiscriminately as a coercive tool. The logic is simple. When there is less information, then it is too hard to discriminate, which is the definition of identification problem that the states so often experience in civil wars. Therefore, the hypothesis 2 can be stated as follows:

Hypothesis 2: The lower the level of a state's social control over the population, the more likely that state is to resort to indiscriminate violence against its civilians.

To this end, I explain how violence is produced and what needs to be done to reduce it. I will adopt a mixed-method research design to test the proposed linkage between "information" and "civilian victimization" at both the macro and micro levels. There are three empirical sections to this research. First, I provide broad comparative evidence from civil wars around the world on why information and violence are so closely associated. Second, I quantitatively test the hypotheses

presented above on a macro-level sense. Finally, I complement my statistical analysis with the micro-level case of the ongoing Syrian civil war.

"Up here in space

I'm looking down on you

My lasers trace

Everything you do

You think you've private lives

Think nothing of the kind

There is no true escape

I'm watching all the time

Always in focus

You can't feel my stare

I zoom into you

You don't know I'm there

I take a pride in probing all your secret moves

My tearless retina takes pictures that can prove

I'm made of metal

My circuits gleam

I am perpetual

I keep the country clean

Electric eye, in the sky

Feel my stare, always there"

– Judas Priest, Electric Eye (1982)

CHAPTER 5. EMPIRICS I: COMPARATIVE EVIDENCE

In this chapter, I focus on how "social control" may be associated with state violence by providing qualitative evidence from the stories of civil war-ridden countries. In so doing, I attempt to show how social control may be a plausible explanation for a decrease in government violence perpetrated against civilians. Kalyvas attributed shifts in control to "tactical military decisions" (Kalyvas, 2006, 212). For him, political actors first decide "how to allocate scarce military forces,"

and thus when to deploy military troops to an area to be "conquered and occupied" or "secured and cleared." Afterwards, these areas are "more controlled." As mentioned earlier, the control described in Kalyvas is of a physical nature, but, in my view, it can also be assumed that virtual control can bring similar consequences. This research interprets the notion of "control" in more virtual terms, and attributes shifts to the information gathered by the government in power.

There are many events that support this theory. Civil wars in war-torn countries such as Ethiopia, Indonesia, Iraq, Myanmar, Nigeria, and Sri Lanka highlight how the level of state-held information is inversely related to the amount of government violence perpetrated against civilians. For years Ethiopia, for instance, has dealt with the ongoing separatist insurgency of rebel groups such as the Ogaden National Liberation Front (ONLF), certain armed Anuak groups, the Islamic Front for the Liberation of Oromo (IFLO), and the Eritrean rebel group EPLF. Countless civilians have been severely affected (e.g., killed, tortured, displaced, etc.) by government violence. However, since the 2010s, this violence against civilians has dropped significantly.

This turning point, not coincidentally, aligns with the deployment of US surveillance drones to Arba Minch in southern Ethiopia, the purchase of Boomerang and Spylite systems from Israel (Egozi, 2011), and the production of Ethiopian UAVs (Tekle, 2013). Before the 2010s, the Ethiopian government faced both physical and virtual difficulties controlling its war-torn territories, and had to resort to violence against civilians to deter the population from assisting the rebels. However, after the procurement of surveillance technologies (such as drones), even though physical control was not always present, the increase in information yielded a type of virtual control. Using this information capacity and associated virtual control, the Ethiopian government found its need for violence to be greatly decreased.

Other illustrations can be found in the Indonesian government's fight against GAM (the Indonesian-based Free Aceh Movement or Gerakan Aceh Merdeka), Fretilin (the Portuguese

Revolutionary Front for an Independent East Timor or Frente Revolucionária de Timor-Leste Independente), and the OPM (the Free Papua Movement or Organisasi Papua Merdeka). One-sided government violence against civilians dropped sharply in the early 2000s in all three cases. This change coincided with the Indonesian army's increase in its information capacity through the acquisition of French and Israeli drones (SIPRI, 2000) and escalation of police and military surveillance activities. Additionally, Human Rights Watch reports revealed the systematic government surveillance of activists and journalists in West Papua, a region that had previously witnessed significant separatist activities. These reports also illustrated how Indonesia's special operations forces, Kopassus, illegally surveilled "a broad swathe of Papuan political, traditional, and religious leaders, and civil society groups" (HRW, 2011).

A more recent example is Nigeria, which currently is dealing with two types of rebel groups: the Emancipation of the Niger Delta (MEND), a militant umbrella organization launched in 2005 with the goal of forcing the Nigerian government to address "the myriad socio-economic grievances in the region," and Boko Haram, an Islamist group with the stated aims of "overthrowing the federal government and imposing Sharia law throughout the country" (Giroux, 2011). Upon the government's recent interest in expanding its surveillance capabilities, the course of civil war and civilian victimization has seriously decreased. One possible reason for this change is the fact that the Nigerian government has cumulatively acquired more information about its population, with the help of its recently obtained surveillance technology (such as high-tech drones and a spy program installed by the Israeli Elbit Security, etc.). By intercepting and retrieving data transmitted over the Internet and traditional telecom systems, and hacking computers and mobile phones, the Nigerian government has begun collecting private data about its population and using it to analyze and predict possible targets. Gradually, the government has become able to collect "massive amounts of electronic data – in all formats – from communications of private individuals in Nigeria and around the world" (Emmanuel, 2014), which has helped substantially in furthering their

understanding of their citizenry. Naturally, this kind of social control has produced significant outcomes related to the civil war.

This chapter will proceed as follows. First, I emphasize how social control has shifted and its effects on government violence. Second, I provide relevant examples that also serve as an introduction to the rigorous scientific tests presented in later chapters. Finally, I conclude by underscoring the significance of the relationship between information (and thereby, social control) and violence.

5.1 The shift in social control

As mentioned in the introduction to this chapter, shifts in a government's social control are a function of the information they are able to gather. Dataveillance and surveillance that utilize technologies such as cell phones, UAVs, internet monitoring devices, intelligence gathering equipment, etc., now allow states to reach noncombatants everywhere, even inside rebel-dominated areas, and affect their behavior.

Governments fighting rebel groups have begun investing more resources in surveillance and dataveillance. The main incentive for this action is obvious. When more effort, money, and time is dedicated to gathering information about civilians, governments need to use less counterproductive, indiscriminate violence against the citizenry. Physical elements of control such as troops, guns, and ammunition are costly; thus, surveillance and dataveillance technologies offer a less expensive and invasive means of helping governments engaged in civil war reach their primary aim: to control the public and earn their support. Consider the photograph in Figure 5.1, below. Why might someone put up a poster calling for the destruction of CCTV cameras on a column at the Al-Aqsa Mosque compound in Jerusalem? Clearly, Palestinians in Jerusalem understand the effectiveness of the Israeli government's social control via technology and believe it to be supplying the Israeli government with much more information about the population than in the past.

Conversely, this is also indicative of decreasing civilian support for rebel groups (such as Hamas) and a reduction in the need for violence on the part of the Israeli government. Surveillance technologies such as CCTV cameras can be effective in helping governments create an environment of social control.

Figure 5.1 A poster calling for the destruction of CCTV cameras is posted on a column at the Al-Aqsa Mosque in Jerusalem in front of the Dome of the Rock, April 8, 2016. Photo: Ahmad Gharabli/AFP/Getty Images.

Figure 5.2 shows a photo showing an Israeli intelligence officer viewing video provided by surveillance cameras on screens located inside the Jerusalem Police Department's Mabat 2000 unit on November 17, 2015. The goal of the cameras is to supply government forces with the maximum amount of information about the population, thus ensuring a level of virtual control. Without these cameras, the Israeli government would have to allocate more energy and effort to physically and virtually controlling the people.

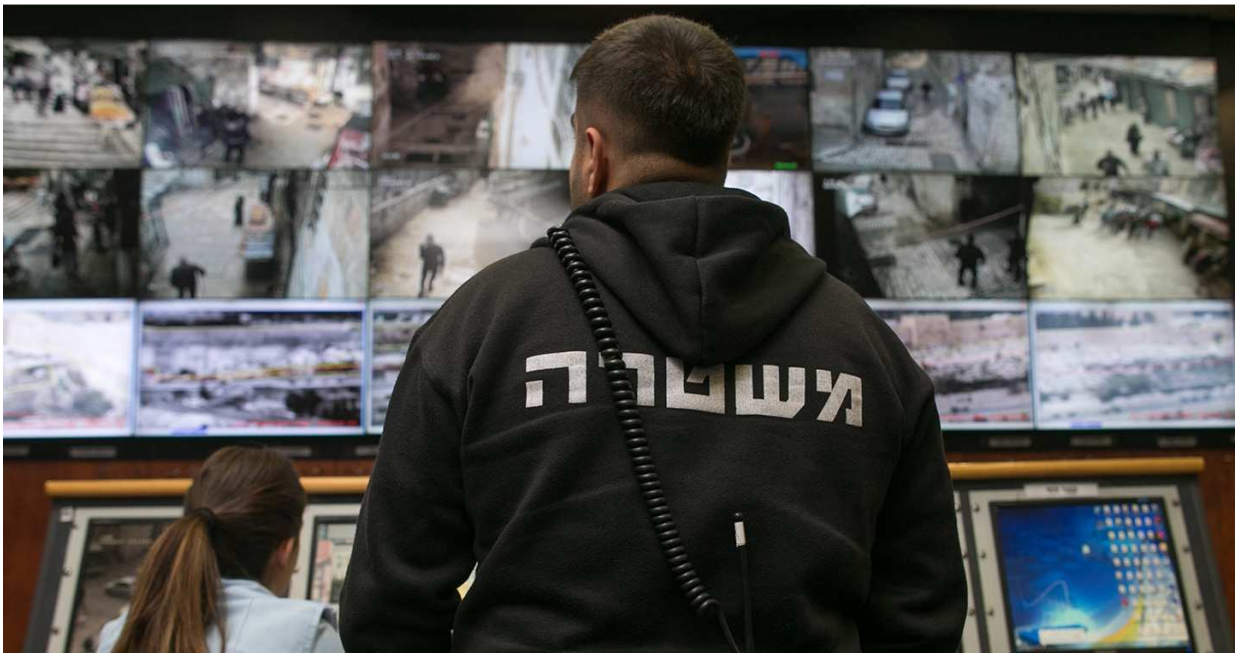

Figure 5.2 Screens inside the Jerusalem Police Department's Mabat 2000 unit showing video from surveillance cameras on November 17, 2015. Photo: Ohad Zwigenberg.

As hypothesized in the theory section above, there is an inverse relationship between social control and government violence against civilians. When a government focuses its surveillance and dataveillance resources on an area that up to then has not been socially controlled, virtual control in this area increases (see a simple illustration of this in Figure 5.3). The result is that most of the people inside the area begin to collaborate with the government, and eventually less government violence against civilians.

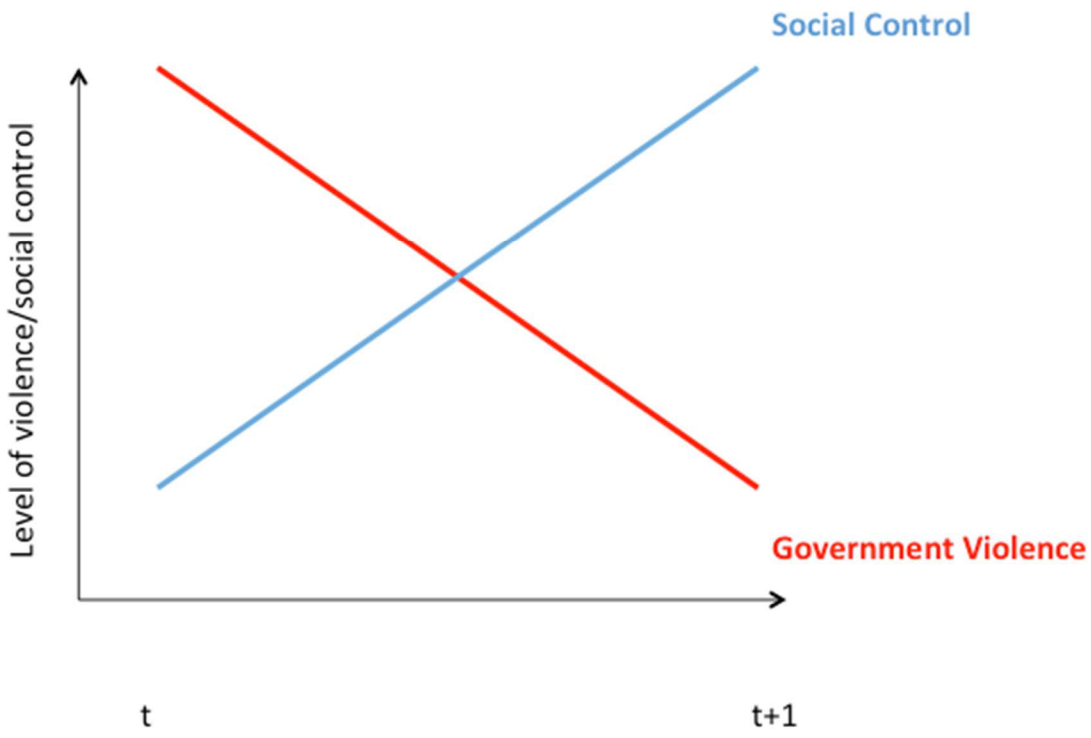

Figure 5.3 The inverse relationship between social control and government violence.

5.2 Anecdotal evidence for the relationship between social control and violence against civilians

Before offering examples of how social control has profoundly affected state violence against civilians, I must first emphasize a point that is essential to this discussion but has only been alluded to in earlier chapters. Civil wars are generally more prevalent in non-democracies; most developed countries (such as the US, Canada, EU countries, etc.) seem to be insulated. One possible explanation for this is the commitment to surveillance and dataveillance technologies that these states have already made. Their investment in these types of surveillance and dataveillance technologies is substantial and well-documented. Thus, in an already social controlled society, the opportunity for rebellion decreases considerably; this, in turn, affects the governments' need to use violence against civilians as an effective means of suppressing such uprisings.

In recent decades, developing countries have followed this trend and begun investing in means of surveillance. It is no coincidence that nearly all governments fighting rebel groups employ a similar strategy: prioritizing technical intelligence-gathering over more traditional means of mass suppression. The most recent reports (Wezeman, 2011, Dobbing and Chris, 2014, GAO, 2012) show that the governments of civil war-ridden countries have expressed a great deal of interest in buying equipment such as drones, surveillance systems, Internet monitoring programs, etc. This is understandable, since it is clear that these technologies may dramatically change their fight against insurgents.

Israel is one of the largest producers and users of these types of intelligence technology. Due to its delicate geographic location and ongoing conflict with Palestinians, it is no surprise that Israel is interested in this type of tool. Neve Gordon, an Israeli scholar who has studied the country's homeland security industry, explained that Israel's decades-long occupation of the West Bank, Gaza, and eastern Jerusalem, along with its periodic wars, "provides a laboratory for testing and fine tuning different commodities that are created, or different technologies" (Kane, 2016). Another remarkable product from Israel is the Strategic Actionable Intelligence Platform, or SAIP. This system collects data from "multiple and diverse sources and enriches them with real-world information, tracing the hidden connections between seemingly unrelated events, and disseminates actionable intelligence to authorized stakeholders" (Mer Group, 2016). Eyal Raz, the product director for Mer Security, has said that the product "claim[s] to understand what it's reading. For instance, a list of chemicals included in a paragraph may seem innocuous to the layperson, but the language analysis machine can recognize that the person is talking about making an explosive device" (Kane, 2016).

It is also important to note that to manage the Palestinian Arab community, the Israeli government not only uses this type of technology to maintain an active intelligence presence in relevant areas, it also employs "selective control, co-optation and divide and rule" (Byman, 2002).

Increasing intelligence about the population also affects the Israeli government's use of violence. Although it is known that there was a significant crackdown after certain notable incidents that particularly aroused the Israeli public's sentiments (e.g., the discovery of the bodies of three Jewish teenagers buried under a shallow pile of rocks, just north of Hebron in the occupied West Bank); (Roos, 2014), it is also a fact that Israeli government forces often times selectively use violence based upon the information they gather (Luft, 2003).

Especially after the second intifada, which began in September of 2000, targeted killing became apparent and was proven to be effective. Apart from some benefits such as "impeding the effectiveness of Palestinian terrorist organizations where leadership, planning, and tactical skills are confined to a few key individuals," targeted killing also acts as "a deterrent" (David, 2003), and therefore has been crucial in the fight against rebel forces. This is why in 2002, for example, when then Israeli Prime Minister Sharon asked for their demands, Palestinian Authority leaders requested "an end to [the] targeted killings" (David, 2003).

It is also evident that high capacity surveillance systems (e.g., those in Israel and the US) have attracted widespread attention in other parts of the world. For example, in 2011 the Mer Group in Israel signed "a $42 million contract with Buenos Aires to set up a 'Safe City' system, complete with 1,200 surveillance cameras, including license plate recognition technology" (Kane, 2016). Another Argentinian city, Tigre, in an effort to improve public safety and security, has created a sophisticated surveillance program that includes: CCTV cameras, intelligent video analysis, a command and control center, and a datacenter (Vargas, 2014). There are many similar examples available. What I argue is that all of these efforts to acquire intelligence and surveillance systems have one particular aim: to gather information, and thus create social control over the population.

Another recent example is also from the Middle East. In 2015, the Kuwaiti government passed a law that regulates the installment and operation of security cameras and other surveillance devices in public areas (United States Department of State, 2016). Especially after the June 2015 bombing of the Imam Sadeq Mosque, in which 27 people were killed and 227 people were wounded, surveillance has become integral to the Kuwaiti government as a means of socially controlling the population and weakening civilians' ties with the Islamic State of Iraq and the Levant (ISIS), who claimed responsibility for the attack. In weakening these ties; it is clear that the government's investment in surveillance technologies played a very important role.

Many African countries currently experiencing civil war have also begun to procure surveillance technologies. Unsurprisingly, Israel, the US, Russia, and China are primary sellers. For example, Algeria invests substantial funds into surveillance equipment, both items produced domestically and those that must be imported from other countries. Importing medium-range Seeker II tactical drones from South Africa in 1998 was only the start for Algeria, and many other similar investments followed (Walid, 2014). Nigeria, Chad, Rwanda, Uganda, and Guinea are other frequent purchasers (Wezeman, 2011).

After the July 2010 Kampala suicide bombings were carried out against crowds watching a screening of the 2010 FIFA World Cup Final match in the capital city of Uganda, the Ugandan government sought to heighten surveillance in the country; since then, it has increased "the budget for monitoring and vigilance by a billion shillings." The government has also started using a surveillance program, codenamed "Fungua Macho, or 'open eyes' in Swahili," to spy on opposition politicians and anyone "deemed dangerous to state security," according to an investigation by Privacy International and BBC Newsnight. Investment in cyber security infrastructure has helped Uganda to "easily detect and act fast on threats to national security," which has paid off; violence (by both government and rebels) has discernibly decreased in the years since the attack (Mujuni, 2015).

Another country in Africa, Ethiopia, fights rebel groups and also uses surveillance tools over its people in order to deter civilian support for insurgency. The Ethiopian government even tries to control its people abroad by all means. In recent years, one Ethiopia-born American citizen filed a lawsuit against the Ethiopian government, claiming that "his Skype calls, web searches, and emails have been monitored and recorded by Ethiopian authorities" (Kuo, 2015). This is an example explaining well how this is the case.

Nigeria also provides a useful illustration of the relationship between social control and state violence. As mentioned above, in the last decade, the Nigerian government has invested substantially in surveillance technologies. For example, in 2014, a $40 million dollar spy program was installed by Israel's Elbit Security. The project has the ability to collect "massive amounts of electronic data – in all formats – from communications of private individuals in Nigeria and around the world" (Emmanuel, 2014). Citizen Lab, a Canadian human rights monitoring group, found evidence of US and UK-developed Internet surveillance and censorship technology in Nigeria in 2013 (Markoff, 2013). Additionally, the US Government has brought in "officials from its Federal Bureau of Investigation (FBI) and other security experts to provide technical assistance to the Nigerian Government to deal with terrorism" (Vanguard, 2016). Yet we can also see a substantial drop in state violence against civilians in recent years (see Figure 5.4); in my view, this can at least partially be attributed to the government's investment in its surveillance capacity.

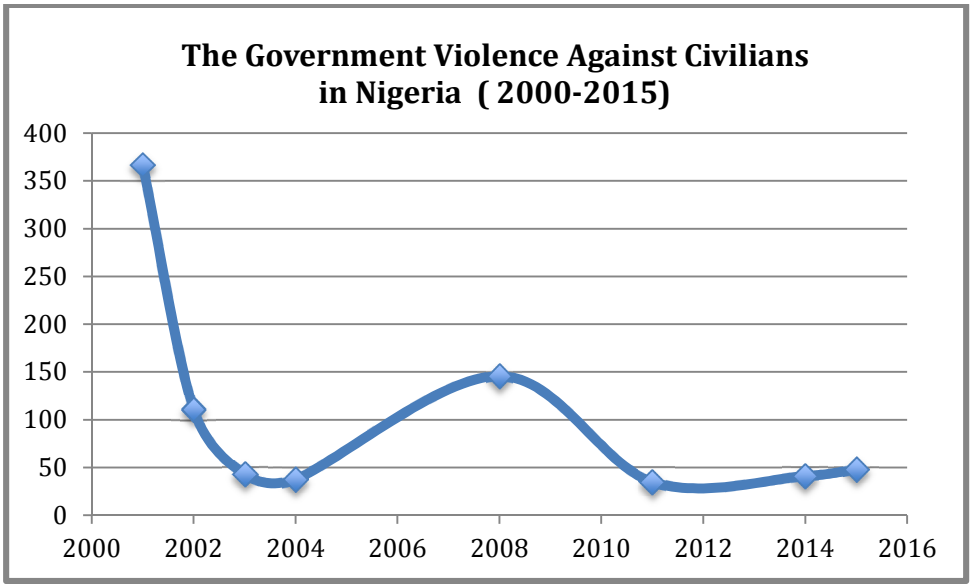

Figure 5.4 Government Violence Against Civilians in Nigeria (2000-2015). Eck and Hultman, 2007, Version 1.4, September 2016.

Likewise, in 2011, Sudan established the Cyber Jihadist Unit, "using equipment developed in Italy to monitor political opposition figures and journalists, according to Citizen Lab" (Kuo, 2015). Uganda, Kuwait, Nigeria, and Sudan are not alone. According to a recent Wall Street Journal report, "more than 60 countries now have or are developing tools for computer espionage and attacks," including an estimated 31 countries that can now create their own attack software, 29 that have formal or military units dedicated to cyber warfare, 36 that possess surveillance tools for use against internal enemies (such as by law enforcement), and 63 that employ cyber-surveillance against their own citizens or abroad. There are many other examples that serve as clear indicators of an emerging postmodern arms race in surveillance and dataveillance capacity (Valentino-DeVries et al., 2015).

5.3 Conclusion

My argument is that the means of gathering information and amount of intelligence gathered are critical factors enabling effective "monitoring and sanctioning;" they deter civilians from defecting. This is because constant and ever-increasing state surveillance creates a type of social control over the population. The more states know about their citizenry (even when little physical control is exerted), the harder it is for civilians to switch sides inside the resulting "transparent environment." The fewer civilian defections there are, the less likely it is that states will need to use violence. In sum, what triggers the mechanism is increases or decreases in information supply to the state.

What helps governments create this social control is surveillance and dataveillance technology, which transforms the nature of political conflict. Scenes from battlefields in countries such as Syria, Libya, and Yemen clearly illustrate the essential role of technology in changing the dynamics of such conflicts, and its substantial influence on participants' actions. Recent conflicts in Syria, Egypt, Libya, Tunisia, Turkey, etc., have demonstrated how the Internet, cell phones, and social media platforms such as Twitter, Instagram, Facebook, YouTube, and WhatsApp have affected the course of politics by significantly contributing to the level of information distributed among actors and spectators alike. States are able to monitor, collect, and store their citizens' personal information through constantly-evolving forms of technology.

Throughout this chapter, I argue that qualitative evidence confirms this relationship between state-held information and state violence against civilians. There are many examples from countries experiencing civil wars, from Africa to the Middle East. In a wide variety of contexts, once the social control created by information is achieved, state violence becomes redundant. In other words, when people are under the social control of the state, they are more likely to be deterred from joining rebel forces; virtual control increases their risk of getting caught and facing state

retribution. The result is that states are less likely to use violence against civilians, because they have a non-violent means of deterrent on hand.

In the next two chapters, I will provide quantitative evidence to support my hypotheses. Chapter 6 examines the relationship on a macro-level, and Chapter 7 addresses the micro-level case of the ongoing Syrian civil war.

> *"Throughout American history, intelligence has helped secure our country and our freedoms…we have real enemies and threats, and that intelligence serves a vital role in confronting them. We cannot prevent terrorist attacks or cyber threats without some capability to penetrate digital communications -- whether it's to unravel a terrorist plot; to intercept malware that targets a stock exchange; to make sure air traffic control systems are not compromised; or to ensure that hackers do not empty your bank accounts. We are expected to protect the American people; that requires us to have capabilities in this field"* (Obama, 2014, his speech on N.S.A.'s Phone Surveillance)

CHAPTER 6. EMPIRICS II: MACRO-LEVEL TEST

For the macro-level test, I relied on quantitative analyses to evaluate the relationship between the information level of states and the violence they initiate (Hypothesis 1). The dataset yielded a sample of roughly 850 country-year observations for all intrastate conflicts (69 countries); these data spanned the years 1989 to 2014. In this chapter, after a brief description of the research design, I will provide information about the three indicators used to measure states' information levels: unmanned air vehicles (UAV), Cell phone subscriptions (CPS), and Internet usage (IU). I finish with descriptive statistics about violence against civilians and the above-mentioned three variables, and a test of the theory.

6.1 Research Design

My unit of analysis is country-year. To test the relationship between information and state violence against civilians, I used several datasets. To measure the dependent variable (number of civilian deaths), I analyzed the data on one-sided violence against civilians collected by the Uppsala

Conflict Data Program (UCDP), which provides information on the number of people killed by a group during a particular year (Eck and Hultman, 2007). The definition of one-sided violence employed by the UCDP is the intentional and direct use of violence against civilians that results in at least 25 deaths per year. This definition excludes deaths by siege or infrastructure damage, as well as fatalities resulting from battlefield error, negligence, or crossfire.

The structure of the dependent variable is a time-series cross-section of states with annual counts of one-sided violence against civilians. The independent variable is information-level data that a particular government has about its civilian population at a given time. To estimate the information levels achieved by certain political actors, I examined information-gathering tools such as UAV, cell phones, and the Internet. These tools make it easier for states to gather detailed data on non-combatants, consequently apply less widespread violence. Thus, the information gathered by states creates a social control and, at the same time, a constraint on their use of violence.

6.2 Measuring the Independent Variable: The Information Level of States

To measure the independent variable, I first used UAV, which is a useful reflection on a country's high-tech capabilities (see Appendix A for more technical information on UAV). UAV may initially seem lacking as a precise measurement for states' information levels. However, this proxy correlates well with the complex notion of the overall information levels of states. If one were to ask if drones could instead be presented as an accurate proxy, I would answer that it would depend upon to what they were being compared. Drones are far superior with regards to information gathering, at least as compared to many other sources (Cortright et al., 2015a, Walsh, 2013, Jensen, 2016a, Chamayou, 2015). In this research, to code countries' drone usage. I counted the country as a user if it possessed and actively used at least one tactical LALE (low altitude, long endurance) drone in a given year. These drones can fly at altitudes of a few thousand meters for extended periods and acquiring this type of drones is generally viewed as an initial but very important step in

increasing the surveillance capacity of interested countries. In other words, when a government tries to purchase or develop a LALE drone, it would mean that she has started to reach an important surveillance capacity. The general pattern for those countries is to acquire MALE and HALE drones later on.

I also supplemented UAV with two other proxies for information: cell phone subscriptions (CPS) and Internet usage (IU). Cell phones make it substantially easier for the population to share information with the government and create valuable opportunities for "intelligence collection" (Shapiro and Weidmann, 2015, 247); therefore, their presence reflects how well the government knows their civilian population. If one compares two situations in which people do have cell phones and do not have, it can be said that when people use cell phones it is more likely and easier for the governments to tap them and get more information comparative to the situation in which people do not use cell phones. The governments can "trap and trace the cellphones, which allowed them to obtain the numbers, which call the phone or are called by it, and the time those calls are made" and what is talked (Cameron, 2008). This is simply intelligence gathering.

Suppose that a government fights against a rebel group. When this is the case, one thing the government will need is absolutely that: 'any amount of intelligence about its population'. Why? Because any piece of information is so necessary in order to deter civilian support for the insurgency. When the governments have no or little access to information, [then, as an almost sole choice left in the hand] using indiscriminate violence is 'the last stop', which is also "counterproductive". Conversely, selective violence, which is productive and effective, however, requires "private information" (Kalyvas, 2006), which in the end directly or indirectly thus helps governments in their fight against rebel groups. Then how would a government obtain any kind of information about its population? I argue that any capability including wiretapping, monitoring, surveilling, dataveilling etc. would be used by the governments that ultimately desire information.

What makes this possible? The answer is: Cell phones are increasingly used everywhere. These days, everyone has a cell phone.

My argument is that they offer great chances for the government to gather information since they store vast amounts. For example, in areas such as Africa, "what makes them special in this context is that cell phones not only provide a new way for communication, but in many areas are the only way for interpersonal, direct communication over distance. Many areas that are now covered by cell phone networks were never connected to land lines" (Pierskalla and Hollenbach, 2013). This is very important because the intelligence obtained from cell phone tracking/tracing/tapping might sometimes be the only way available. Thus, cell phones offer a good deal of information for the governments. Using data from the World Bank, I created a dichotomous cell phone variable to indicate whether a country had at least one cell phone user per 100 people; this served as an indicator of whether that country's citizens had actually used cell phones in a given year.

The Internet has also been used to supply information to governments, especially in recent decades (my period of interest). In my view, the above argument about cell phones also holds true for the Internet. It is a fact that the Internet and social media platforms such as Twitter, Instagram, Facebook, YouTube, and WhatsApp substantially contribute to the amount of information in the world. The Internet has "revolutionized the computer and communications world like nothing before" and it is "a world-wide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location" (Leiner et al., 2012). Then monitoring and controlling it should offer a good deal of advantages to the governments. There is no doubt that its expansion therefore is good for the governments that aim to acquire information in their fights against rebel groups. I argue that the more Internet expands its scope, the more governments have a chance to obtain information via monitoring it. If a government needs information, then why wouldn't she make use

of tools that helps monitor it? I created the *Internet Usage* variable with information obtained from the World Bank dataset. I coded it as a dichotomous variable to indicate whether a country had at least one user per 100 people in a certain year, which shows its prevalence inside the society.

6.2.1 The First Proxy: Unmanned Air Vehicles (UAV)

Unmanned aerial vehicles (UAV), commonly known drones or unmanned aircraft systems (UAS), are "fixed or rotary winged" aircraft without human pilots aboard (Excellence, 2009, 21). This does not mean that humans do not control UAV; to the contrary, humans are at the core of the overall system. Humans are not on board, but are required for the systems to work. Thus, UAV are also referred to as remotely piloted vehicles (RPV), because in every RPV there is a "human being interacting with a machine" (see Appendix A for more information).

Table 6.1- UAV Category Types

Type	Range
Micro UAV	1-5 km
Mini-UAV	10-30 km
Low Altitude Long Endurance (LALE)	80-200 km
Medium Altitude Long Endurance (MALE)	200-500 km
High Altitude Long Endurance (HALE)	500+ km

Depending on features and reach, there are many different categorizations of these types of vehicles, such as "micro-UAS (unmanned aircraft systems), mini-UAS Tactical UAS (TUAS), Medium Altitude Long Endurance (MALE) or High Altitude Long Endurance (HALE)." Other types include

"Micro/Mini, Tactical, Strategic, [and] Special Task." An example of one such categorization can be found in Table 6.1.

In this research, I argue that drones are a useful source of information for states; they also serve as a helpful proxy for measuring states' information levels. This is why many states have acquired these high technology machines; they are useful in many different contexts, including civil wars against rebels. Why are drones so unique? What are their fundemental contributions in intelligence gathering and other types of warfare? And, why do they serve as a useful proxy for measuring the information levels of states? To answer these important questions, I follow Chamayou (2015, 38-45). In his research, he categorized the benefits of drones according to six key principles:

- *Persistent surveillance or permanent watch:* Drones can watch constantly, without the constraints of a human pilot. Also, drones can remain in the air for very long periods of time. For example, some can provide 24/7 aerial coverage, which is a force multiplier for a government engaged in a civil war.
- *Totalization of perspectives or synoptic viewing:* This is the notion of "wide area surveillance," seeing everything, all of the time. Equipped with such systems of synoptic imagery, "a drone would have at its disposal not just one but dozens of high-resolution micro-cameras facing in every direction, like the multiple facets of the eye of a fly. A software system would aggregate the various images in real time into a single overall view that could be seen in detail when necessary."
- *Creating an archive or film of everyone's lives:* Surveillance is not limited to the present time. It also assumes the important function of recording and archiving. Once such a comprehensive movie is completed, it could be "rerun thousands of times, each time focusing on a different person, zooming in on him or her so as to reexamine that person's own particular history." Thus, it would give the states the ability to archive information regarding the particular segment of the population of interest at that moment.

- *Data fusion:* Drones not only have eyes, but also ears and many other organs. For example, "Predator and Reaper drones can also interpret electronic communications from radios, cell phones or other communication devices … associating a particular telephone call with a particular video sequence and particular GPS coordinates."

- *Schematization of forms of life:* The main objective of continuous surveillance devices is "not so much to tail individuals already known, but rather to spot the emergence of suspect elements based on their unusual behavior."

- *Detection of anomalies and preemptive anticipation:* Drones can detect anomalies through their constant surveillance capabilities. Any behavior that diverges from "the web of habitual activities may indicate a threat. According to an Air Force intelligence analyst who spoke on condition of anonymity, analyzing imagery captured by drones is like a cross between police work and social science. The focus is on understanding 'patterns of life,' and deviations from those patterns. For example, if a normally busy bridge suddenly empties, that might mean the local population knows a bomb is planted there." Or this also may help government forces identify the criminals who put the bomb there.

6.2.1.1 Coding Unmanned Air Vehicles (UAV)

To code this important proxy as an independent variable, I employed a binary unmanned air vehicle (UAV) variable indicating whether a country possessed and effectively used UAV (at least tactical LALE/Tier I level devices; see Appendix A) as intelligence-gathering equipment in their conflicts with rebel groups in a given year. Then, I spatiotemporally coded each government's UAV usage. In total, I coded the UAV use of 69 countries engaged in civil war during the years 1989 to 2014. To complete this coding process, I examined:

- First, if a country actually possessed drones and effectively used them;

- Second, if a country possessed no drones, I determined if there was another country that employed drones on behalf of that country.

For example, in 2010, the Peruvian army purchased five Israeli-made drones for use against the guerrilla group Shining Path. However, those UAV were not used; they were found to be "inoperable" (Glickhouse, 2013). In this case, I coded zero for Peru for those years because while drones were owned, the country did not use any during that time period. Another example is Nigeria, who acquired Aerostar UAV in 2006 and used them in 2007 and 2008; later, they were grounded due to maintenance problems. I coded Nigeria with a 1 in 2007 and 2008, and a zero in 2009. As another example, Cote D'Ivoire imported Israeli UAV (Aeronautics) in 2005, but a French unit gained control of the equipment and destroyed it. I coded Cote D'Ivoire with a zero for those years. Conversely, Somalia normally has no drones. However, the U.S. sent its drones in 2011 and Somalia has actively used them ever since. Thus, I coded Somalia with a 1 for 2011. Afghanistan has no domestic drone use or production; however, ISAF forces working with the Afghan government have been actively using UAV since 2002. Therefore, I coded Afghanistan with a 1 for every year since 2002.

To code the UAV variable, I relied on several sources. There is no single comprehensive dataset or source that systematically reports any information on countries' UAV capacity and use. Yet there are reliable sources that can be employed to create this kind of dataset. I especially benefitted from the New America Foundation's (NAF) drone database, a professionally-collected and thorough body of information on drones. Based on their analysis of hundreds of news reports and government documents, the NAF's report system tracks which countries currently possess drones and how they acquired them.

The other important database I used was that of the Stockholm International Peace Research Institute (SIPRI), which provides reliable data on UAV transfers. To create my dataset, I

checked, compared, and refined all data from these two valuable sources (NAF and SIPRI) together, and formed a comprehensive description of the UAV capability of the included countries. I also supplemented the NAF and SIPRI data with other reliable sources such as reports, books, magazines, and articles prepared by prominent governmental organizations and research companies, universities, think tanks, and task groups such as NATO, Reuters, World Bank, United States Government Accountability Office, CIA, BBC, New York Times, Guardian and so on. I examine all these auxiliary sources to check the accuracy and completeness of the two main sources used here (i.e. NAF and SIPRI). Especially news agencies and media mentioned above were very helpful in determining whether each particular country actually used drones in their fight against the rebel groups or not. They served as reliability check of the two sources. For example, I could not have learned that, in 2010, the Peruvian army stopped using their newly acquired drones found to be "inoperable". Without the news from La Republica newspaper (Páez, 2013), I could not have coded it right (see Appendix A).

6.2.2 The Second Proxy: Cell Phone Subscriptions (CPS)

Especially in recent years, ICT has dramatically changed the dynamics of civil wars; the information now available has had a tremendous effect on the ways such battles are fought. We can see from recent events in Egypt, Tunisia, Syria, Turkey, and so on that the Internet, cell phones, and social media platforms such as Twitter, Instagram, Facebook, YouTube, and WhatsApp have substantially contributed to the amount of information available to key players and the rest of the world. It is now substantially easier to broadcast scenes from battlefields and make and distribute propaganda. In Turkey's Gezi Park protests in 2011, people used Twitter to instantly inform thousands and gather them quickly to protest the government; ISIS also regularly uploads propaganda films to YouTube and the Taliban uses "SMS to narrowcast propaganda" in Afghanistan (Dafoe and Lyall, 2015, 401). Conversely, the more technologically advanced the environment, the

easier it is for states to track these information channels, form an information pool, and quickly take alternative actions.

All of these information conveyance systems can be simply executed with small and inexpensive smartphones. Thus, one man with a cell phone has access to far more information than any man without one. Both theoretically and practically, more cell phones mean more information. Moreover, when cell phones are monitored, it is generally to gather information and intelligence about civilians and combatants. I argue that with the help of this flow of information, actors – and especially states – can more closely know their opponents, and thereby efficiently select the amount and type of violence they intend to initiate. Thus, technology clearly contributes to the course of human events.

However, this development leads to another question: how are these new technologies (cell phones and the Internet) different from "old" technologies like newspapers, telephones, radio, and television? As Weidmann (2015b, 264) has argued, these "new" technologies allow for information to be digitalized, which makes easy transmission via "computer based channels" possible. When information is digitalized, it can easily and quickly reach any point in the world, and be stored indefinitely. I used cell phones as a proxy to measure the information levels of actors in a civil war context because of the unique advantages these devices convey. A cell phone is an electronic device used for mobile telecommunications, and primarily for voice communication. However, the newest generation cell phones support many additional services such as SMS for text messaging, email, the Internet, cameras, and so on. As can be seen from Figure 6.1, which shows the increase in cell phone usage in recent years, these devices are nearly ubiquitous. For instance, in 2017 the number of cell phone subscriptions is forecast to reach 4.77 billion, which corresponds to nearly two-thirds of the world's population.

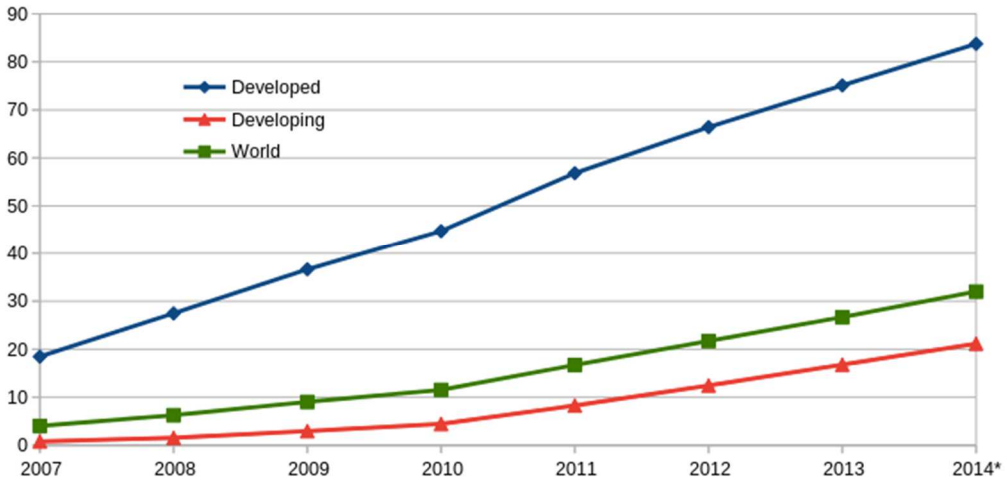

Figure 6.1 Active Mobile Band Subscriptions per 100 people (International Telecommunication Union, 2015)

Cell phones radically improve communication abilities; consequently, the amount of information produced and shared has grown exponentially. The spread of this relatively cheap and reliable form of mobile communication also offers increased opportunities to gather information, and therefore enables states to increase their cache of reliable intelligence. For example, with little or no effort, governments can now monitor cellphones and gather valuable information about their civilians. Police and secret agencies such as the CIA, FBI, MOSSAD, etc., can determine "where you are, where you have been, even where you are going" by simply tracking your cell phone. One can claim that here I only code the overall number of phones and not the ability to track. I assume that almost every government will have some level of capability to track and control the communication. Then, if it is essential in fighting against rebels, the governments should not be shy about taking advantage of cell phone data by tapping them.

Recently, the FBI asserted the right to use "stingrays" to monitor cell phone locations, calls, and texts (Pagels, 2015, 7). As Hacker5, a monthly magazine covering the latest happenings in the Cyber world, reports, there are also devices such as the "Cellbrite UFED" (see Appendix B), which is a comprehensive mobile technology that enables investigators "to extract, decode and analyze

evidentiary data in a forensically sound manner" from a wide range of mobile devices, and typically retrieve information such as "contacts, SMS messages & call logs (incoming, outgoing & missed), multimedia (videos, photos, ringtones) files etc." (Hacker5, 2013). Moreover, national governments have not been reluctant to use cell phone data to their advantage. According to the American Civil Liberties Union (ACLU), U.S. law enforcement agencies made "1.5 million requests for user data from cellphone companies in 2011" (Bailey, 2013, 36). Thus, it is ultimately more convenient and efficient to collect intelligence from digitalized sources such as cell phones than from other, more traditional sources.

6.2.2.1 Coding Cell Phone Subscriptions (CPS)

I reviewed cell phone subscription information for particular countries within a specific set of years, and coded the data spatiotemporally. I again examined 69 countries engaged in civil wars between 1989 and 2014. I used World Bank data and compared it to information gathered by the International Telecommunication Union (ITU), the United Nations' agency for information and communications technologies. CPS is a dichotomous variable, indicating if a country has at least 1 user per 100 people, which is taken to be an indicator of if the citizens of that country had actually used cell phones in that year. In my dataset, I did not include decimals (e.g. 0.00002, 0.00032, etc.) because decimal values would not be a useful indicator that shows the cellphone usage in that country has reached a remarkable level of expansion. Thus, I specified a cut point at 1 to define whether a country-year observation actually satisfied the level of cellphone capacity required for this analysis. I also carried out robustness checks on this arbitrary cut point [1]. Even if I used 5, 10, 20, or 50 as cut points, this variable still achieved significance and all coefficients are in the same direction (see section 6.5 below).

6.2.3 The Third Proxy: Internet Usage

The Internet is a reliable information distribution system. It is the global system of interconnected networks that uses the Internet protocol suite (TCP/IP) and links billions of devices worldwide. Though the origins of the Internet go back to "research commissioned by the United States federal government in the 1960s to build robust, fault-tolerant communication via computer networks" (Stewart, 2000), it has become nearly universal, especially in recent years. The Internet brings information within many people's reach. In doing so, it opens up significant opportunities for states to gather intelligence. Unsurprisingly, most governments (covertly most of the time) monitor Internet communication via some secret equipment and programs. The news such as UK spy agencies want to "install 'black box' surveillance devices across the country's communications networks to monitor Internet use" (Gayle, 2013) or the NSA searches "the content of virtually every email that comes into or goes out of the United States without a warrant" (Savage, 2013) are not seldom or limited only to the developed countries. For example, it is made public that, only in 2013, Nigeria Government awarded $40 million contract to Israeli company to monitor computer, Internet communication by Nigerians. Or one of the less developed countries in the world, Ethiopia started to use surveillance technology over its people in order to gather information (Kuo, 2015). Thus, we can claim that using high technology computer programs and equipment, the governments can easily access information about its population. When there is more communication by citizens, there are more chances to track and more information to be gathered by governments.

6.2.3.1 Coding Internet Usage (IU)

The World Bank dataset supplies certain details regarding Internet usage, such as the number of cell phone subscriptions per 100 people, the number of secure internet servers operating, and so on. To measure whether the Internet was actively used in a country in a given

year, I created a dichotomous variable denoting whether the country had at least 1 Internet user per 100 people in that year. I again did not include decimals (e.g., 0.00002, 0.00032, etc.), which I believe do not reflect a remarkable level of Internet expansion. Thus, my first cut point is again at 1. Some robustness checks at other cut points such as 5, 10, 20, 50 are reported in the robustness check section below. In all results, the coefficients for information variables mostly achieved significance and negative as expected (see Robustness check section 6.5 below).

6.3 Alternative Explanations and Control Variables

I also included several controls to account for additional explanations regarding states' victimization levels. Recent research has suggested that a state's economic wellness influences its level of violence. When states are more economically wealthy, they are less likely to use violence against their civilians because they are better able to provide security and other benefits that foster loyalty among the population (Wood, 2010b). Therefore, they have less need to engage in violence. I operationalized economic development as the natural log of *GDP per capita*; a good indicator of more advanced societies, data were obtained from the World Bank.

Recent research has also suggested that territorial control is strongly related to the violence political actors employ. Kalyvas (2006) demonstrated that armed groups are less likely to use indiscriminate violence against civilians in areas where they possess strong territorial control. I believe that in the aggregate, the ability to exert effective control over a territory negatively correlates with violence against civilians. *Territorial Control* was used as a binary indicator measuring whether the state exerted at least a moderate level of territorial control. In order to measure this, I used the *Rebel Territorial Control* variable from the NSA dataset, where at least one rebel organization exercised a moderate or high level of control over that territory within a given year. Basically, I reversed this by replacing each binary indicator with its opposite (e.g., ones became zeros, and zeros became ones); the result was the *State Territorial Control* variable. This

variable basically shows if a government controls especially the specific territory the rebel groups operate and fight for. The absence of spatially disaggregated data on territorial control prohibited me from directly testing my arguments. However, I believe that in the aggregate, the ability to exert effective state control over a contested territory will negatively correlate with government violence against civilians.

Previous research has demonstrated that more intense conflicts create greater incentives for violence against civilians (Downes, 2006, Eck and Hultman, 2007, Wood, 2010b). The dichotomous variable *Intensity* was used to represent the level of conflict in years in which the number of battle deaths exceeded 1,000, which is the standard definition of civil war used in the literature. I also controlled for the duration of the insurgency to test whether older conflicts bred more violence against civilians. *Duration* was used to count the years since the beginning of the conflict.

Characteristics of governing states may also influence their use of violence, so I included a control variable indicating the institutional composition of the conflict nation. Democracies may be less violent towards civilians by virtue of the connection between the preferences of the citizens and the actions of the state (Hultman, 2012). I measured *Democracy* with a dummy variable indicating a score of 6 or greater on the combined Polity IV scale. Additionally, I also controlled for the size of the population of the state. Countries with larger populations present more opportunities for violence against citizens. Logically, a larger population would be more difficult to control, which could increase political actors' incentives to use violence as a means of retaining power (Wood et al., 2012). *Population* was measured using the natural log of the conflict state's total population, which was taken from World Bank data.

Past research has also shown a positive relationship between insurgents and government violence (Eck and Hultman, 2007, Wood, 2010a, Wood, 2010b). Consequently, I included *Rebel One-*

Sided Violence as the log-transformed value (plus 1 to account for zeros) of the total amount of one-sided violence perpetrated by rebel groups in a given year. The measures were taken from the UCDP. Another control was *Multiple Rebel Groups*. This would have "implications for the dyadic bargaining situation; when several groups are competing with the government simultaneously, the bargaining process becomes more complicated," and thus might affect the government's attitude towards civilians (Wood et al., 2012). Therefore, I included a dummy variable indicating whether there were multiple rebel groups challenging the same government in a given year. One would expect that the presence of multiple rebel groups would increase the threat to the regime, which in turn would increase the level of government violence. That is, a government would seem likely to change their policy on violence if encountering multiple factions expected to be motivated by "intragroup competition" (Hultman, 2007). This measure was taken from UCDP.

Additionally, the size of the conflict area was to be expected to have an effect on the propensity of the government for one-sided violence. As the size of the conflict zone increases, governments have less control over local people and "less ability to access information about the loyalty of the population" (Wood et al., 2012); this leads to more violence against civilians (Kalyvas, 2006). Conversely, in this situation government forces are also more scattered around the country and thus will have less opportunity to perpetrate large-scale violence against civilians. Using geo-referenced conflict data from the International Peace Research Institute, Oslo (PRIO) (Dittrich Hallberg, 2012), I measured *Conflict Area* as the natural log of the estimated area of the conflict zone in square kilometers. I also included a count variable indicating a state's engagement in one-sided violence in the previous year in order to address temporal dependence and serial correlation. All of these variables are summarized in Table 6.2.

Table 6.2 - Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum

Government OSV	89.28	364.37	0	5801
Unmanned Air Vehicles	.32	.46	0.00	1.00
Cell Phone Subscriptions (log)	7.11	7.70	0.00	20.66
Internet Users	.45	.49	0.00	1.00
GDP Per Capita (log)	6.22	2.26	0.00	10.52
Territorial Control (log)	.63	.48	0.00	1.00
Intensity	.21	.41	0.00	1.00
Duration	11.62	12.51	0.00	50.00
Democracy	3.37	3.29	0.00	10.00
Population (log)	17.06	1.34	12.90	20.98
Multiple Rebel Groups	.34	.47	0.00	1.00
Conflict area (log)	11.86	1.67	6.05	14.64

OSV= one-sided violence; GDP = gross domestic product

Table 6.3 displays the Pearson correlations among my three indicators for measuring the information levels of states. As can be seen, there are distinct positive associations among these three different measures (i.e., UAV, cell phone subscriptions, and Internet usage). These close relationships suggest that the indicators do not reflect different attributes of state-held information, and can be understood as different measures of the same underlying phenomenon.

Table 6.3 - Correlation Matrix (Pearson Correlations)

	UAV	Cell Phone Subscriptions	Internet Users
UAV	1	-	-
Cell Phone Subscriptions	0.47	1	-
Internet Users	0.49	0.69	1

6.4 Statistical Analysis

Given that my dependent variable is a count of civilian deaths demonstrating significant over-dispersion, I employed a negative binomial model to test my hypothesis. The results are reported in Table 6.4. Owing to the potential for correlation among countries in this analysis of government violence, I reported robust standard errors clustered by country. The results from the negative binomial analysis support my theoretical argument.

Looking first at the results regarding the relationship between state-held information and one-sided government violence (see Table 6.4), there is a negative, statistically significant relationship; however, we cannot speculate as to the magnitude of that relationship (see Figures 6.2-6.4). As expected, when the amount of state-held information increases, the related government is less likely to target civilians. This finding is robust to alternate measures of information level (e.g., cell phone subscriptions, as in Model 2, and Internet usage, as in Model 3). Thus, all strongly support my hypothesis.

Table 6.4- One-Sided State Violence (Negative Binomial)

	(1)	(2)	(3)
VARIABLES	Model 1	Model 2	Model 3
Unmanned Air Vehicles	-0.946**		
	(0.372)		

Cell Phone Subscriptions		-0.784**	
		(0.382)	
Internet Users			-1.400***
			(0.375)
Conflict Area	-0.238*	-0.237*	-0.346**
	(0.139)	(0.140)	(0.160)
Territorial Control	-0.932**	-1.053**	-1.575***
	(0.415)	(0.438)	(0.519)
Democracy	-0.171**	-0.183***	-0.194**
	(0.0690)	(0.0701)	(0.0958)
Duration	-0.0202	-0.0275	-0.0368
	(0.0182)	(0.0192)	(0.0230)
Population $_{(t-1)}$	-2.11e-07***	-2.24e-07***	-0.0664
	(6.38e-08)	(6.71e-08)	(0.200)
Conflict Intensity	0.417	0.336	0.112
	(0.403)	(0.403)	(0.467)
Multiple Rebel Groups	0.724	0.815*	1.702***
	(0.483)	(0.490)	(0.657)
GDP Per Capita	-0.135*	-0.130	-0.123
	(0.0822)	(0.0976)	(0.133)

Rebel Violence	0.0891	0.0838	0.112
	(0.0571)	(0.0572)	(0.0698)
Government Violence $_{(t-1)}$	0.00256**	0.00236**	0.00236
	(0.00120)	(0.00105)	(0.00159)
Constant	8.245***	2.902***	2.968***
	(2.042)	(0.185)	(3.857)
Constant	2.901***	8.463***	11.20***
	(0.186)	(2.054)	(0.208)
N	843	843	638
α	18.18	18.20	19.45
	(3.389)	(3.389)	(3.389)

Robust standard errors in parentheses

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

Next, to facilitate an interpretation of the substantive relationship between information and government violence, I employed Clarify (King et al., 2000) to generate all of the predicted count values. To calculate the predicted counts listed in Figures 6.2 to 6.4, I used the regression models shown in Table 6.4, holding all independent variables at their means; this provided me with an actual assessment of the magnitude of this relationship. When I simulated the expected level of one-sided rebel violence in relation to changes in state-held information (e.g., the minimums and

maximums of the proxies for the information variables), the expected values for government violence changed dramatically between absence and presence (UAV, cell phones, and Internet usage).

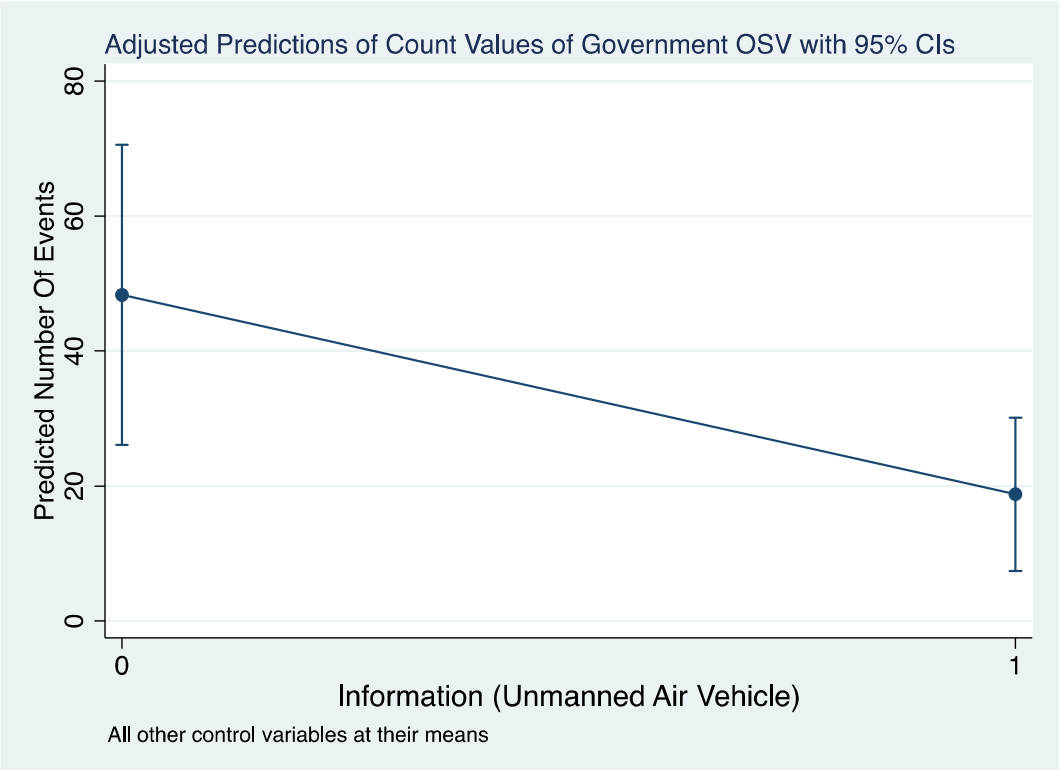

Figure 6.2 Substantive Effect of State-held Information (UAV) on Government OSV

Figure 6.2 reports that the substantive shift from no UAV to their active use results in the expected number of annual civilian killings by government forces decreasing from 48 to 19, a nearly 60% drop in government violence. In other words, governments kill 155% more people when they don't possess UAV. This result provides strong support for my hypothesis that states determine whether or not to engage in violence based on an assessment of the information they possess about their civilians, and perpetrate less violence when they have more information.

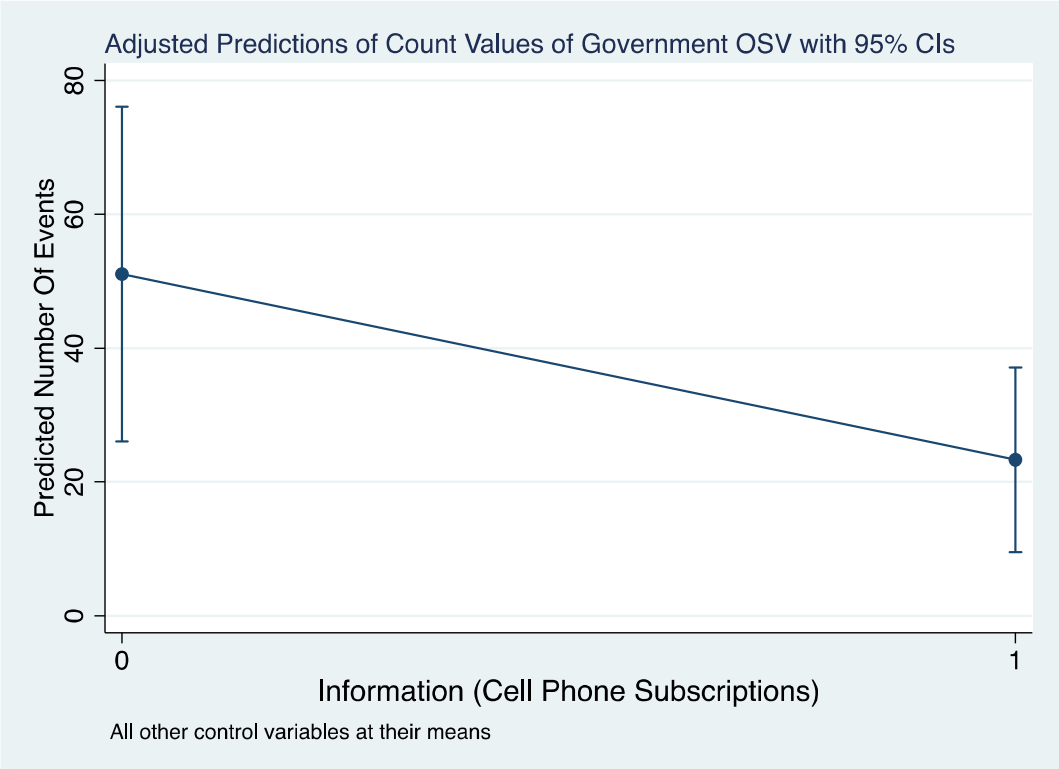

Figure 6.3 Substantive Effect of State-held Information (CPS) on Government OSV

According to Figure 6.3, the shift from no cell phones to their active use results in the expected number of annual civilian killings by government forces decreasing from 53 to 24, a nearly 55% drop in government violence. In other words, governments kill 123% more people when there is no access to cell phones. This result provides additional support for my hypothesis.

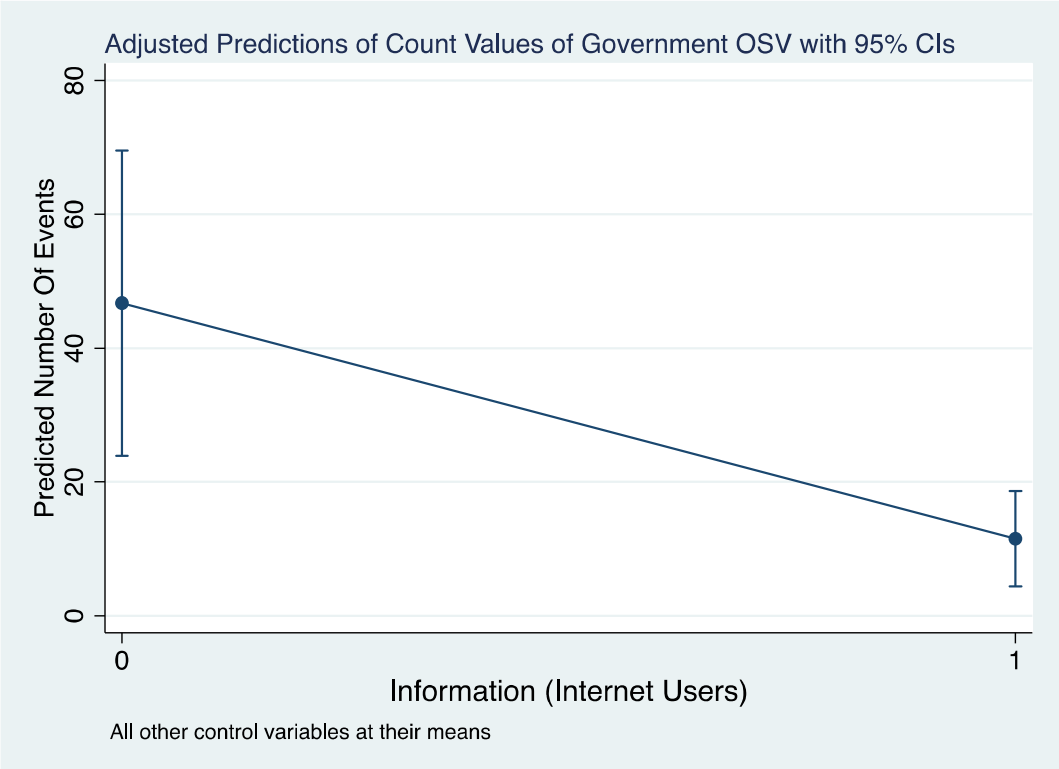

Figure 6.4 Substantive Effect of State-held Information (Internet) on Government OSV

According to Figure 6.4, the shift from no Internet to its active use results in the expected number of annual civilian killings by government forces decreasing from 46 to 14, a nearly 70% drop in government violence. In other words, governments kill 300% more people when there is no Internet access. This result provides complementary support for my hypothesis.

Comparing the confidence intervals around the expected number of civilian killings, one can claim that since they overlap in two of three cases, we cannot say two statistics are significantly different. It is always true that if the confidence intervals do not overlap, then the statistics will be statistically significantly different. However, it is not necessarily true that they are not significantly different when they overlap. In other words, when a pair of two confidence intervals about two point estimates do overlap, the confidence interval about the difference between the point

estimates "may or may not contain zero" (Cole and Blair, 1999), which means there is still a possibility that they can be significant even if they overlap. Actually, "the root of the discrepancy" comes from the calculation methods of distance from the mean for the t-statistic (see Figure 6.5) (Knezevic, 2008).

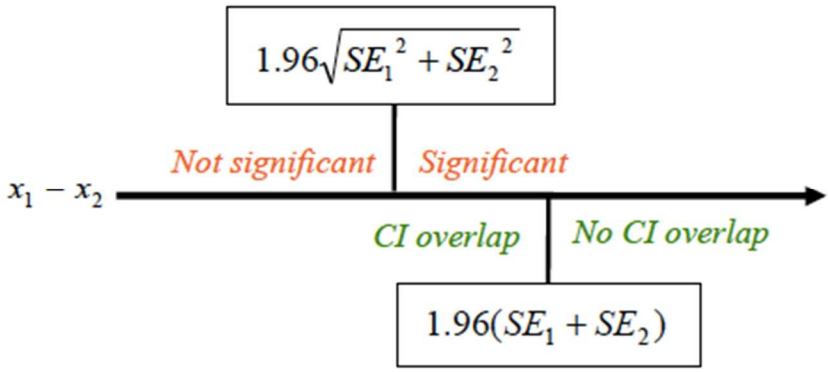

Figure 6.5 Statistical Significance and Confidence Intervals (Knezevic, 2008)

I provide the calculation of the confidence intervals in Table 6.5. We see that the difference in point estimates for *unmanned air vehicle* variable is statistically significant even if the confidence intervals overlap. The difference between *Internet* variable is statistically significant because the confidence intervals do not overlap. However, considering the estimate for *Cell Phone* variable, the situation is a little different. We can argue that since confidence interval for *CIs* here overlap and they are out of the significance limits at % 95 level, the results here do not provide strong support for the Hypotheses in the research. Thus, it might be a sign of the fact that Cell Phone variable may not be a good indicator of information that the governments have on their citizens.

The estimates are significantly different when: X_1-X_2 > $1.96(\sqrt{}SE_1^2 + SE_2^2)$

	X_1-X_2	$1.96\sqrt{(SE_1^2+ SE_2^2)}$	$1.96(SE_1+SE_2)$	CIs Overlap	Significant
UAV	29.556	24.985	33.616	Yes	Yes
Cell Phone	27.754	28.567	38.811	Yes	No
Internet	35.199	23.914	29.961	No	Yes

Table 6.5 CI Overlap Space Calculations at % 95 and the Significance Evaluation of the Expected Number of Civilian Killings

With regards to the other variables, the coefficients for *Democracy* were negative and statistically significant in all models; this indicates that the level of democracy has a negative relationship, which was expected. In other words, democratic governments are less likely to use violence against civilians. Additionally, the coefficients for *Duration* are all negative but statistically insignificant. Still, the direction is as expected, suggesting that older conflicts tend to be less violent. I failed to find support for the proposition that more intense conflicts produce more state violence. The coefficients for the *Intensity* variable were positive, but again failed to achieve statistical significance in all models. Finally, the coefficients for the *Conflict Area* variable were negative and did reach statistical significance in all three models, suggesting that the size of the conflict area decreases the propensity of the government to perpetrate violence against civilians.

Additionally, the variable accounting for the countries' level of development (GDP per capita) was negative and achieved significance in all models. This result indicates that there is a negative and statistically significant relationship between the economic development of countries and the extent of civilian abuse by the associated governments. The variable accounting for a state's ability to exert *Territorial Control* over a territory was negatively correlated with civilian targeting, and the coefficient was significant in all models. This provides some support to theories suggesting

that the ability to control and govern a territory makes civilian abuse less likely (Kalyvas, 2006, Balcells, 2011).

The coefficients for *Population* were significant and negative in all model specifications. Thus, countries with larger populations were less likely to see high levels of violence against civilians, which is contrary to many studies' results. Looking at these results, we can argue that the effects of the population can be properly measured and observed in a more disaggregated level. It is possible that when the population is examined in a subnational/subdistrict level, the real effects can be more properly evaluated, which is the opposite (e.g. negative) of the conventional expectation of positive effects. The coefficients for *Multi Rebel Group* achieved significance in Models 2 and 3, while in all models the direction was positive, as was expected. That is, the presence of multiple rebel groups was positively associated with more state violence. The coefficients for *Rebel Violence* were not statistically significant in any of the models. Therefore, it is likely that violence perpetrated by rebel groups has no effect on government violence. Lastly, the lagged dependent variable achieved positive statistical significance in all models, suggesting that past government violence is likely to have a positive relationship with current violence against civilians.

In sum, regarding all three variables, these results demonstrate that more state-held information reduces the likelihood of government one-sided violence, even when accounting for other variables thought to affect violence against civilians.

6.5 Robustness checks

I carried out some robustness checks on the arbitrary cut point [1] used in the main section. I applied 5, 10, 20, or 50 as cut points for both variables (CPS and IU). While the coefficients for Cell Phone variable still achieve significance and are in the expected direction. while the coefficients for

Internet variable loses significance in cut points of 10 and 20, but in all cut points they are negative as expected (see Tables below).

6.6 Conclusion

Especially in recent years, information and communication technology (ICT) has transformed the nature of political conflict. Scenes from battlefields in countries such as Syria, Libya, and Yemen clearly illustrate the essential role of technology in changing the dynamics of such conflicts, and its substantial influence on participants' actions. Recent events in Egypt, Tunisia, Turkey, etc., have demonstrated how the Internet, cell phones, and social media platforms such as Twitter, Instagram, Facebook, YouTube, and WhatsApp have affected the course of politics by significantly contributing to the level of information distributed among actors and spectators alike. Specifically, ICT has had a remarkable influence on states' perpetration of violence against civilians. Consequently, throughout this dissertation I argue that when states' levels of information increase, they are less likely to initiate violence against civilians.

In highly transparent environments, people are much more susceptible to social control, making physical control less essential; they auto-censor themselves, are more disciplined, and likely to behave as if loyal to their government. Correspondingly, states decrease the amount of violence against civilians if such violence affords no benefits. Much of the previous work in this area has focused on physical control related to political actors and their associated civilian populations inside a given country (Kalyvas, 2006). However, this research has advanced our understanding of the motives for violence against civilians by proposing how behaviors can be altered by information useful for social control.

In this chapter, I describe my quantitative testing of this argument at the macro-level; I found considerable support for my hypothesis. When states' levels of information increase, violence against civilians drops concordantly. Information creates peaceful environments. These findings

should resonate with policymakers. These results indicate that equipping countries with better information technology such as drones, wiretapping equipment, the Internet, cell phones, etc., will increase the overall level of information and eventually decrease the need for violence. These technologies (and the associated social control of the civilian population) will yield a loyal population whose support is desperately needed in the fight against rebels.

6.7 Robustness Check Table for Models 4-11 (Table 6.6)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Conflict Area	-0.237*	-0.287**	-0.270**	-0.235*	-0.292	-0.298*	-0.308*	-0.304*
	(0.140)	(0.138)	(0.136)	(0.143)	(0.182)	(0.178)	(0.186)	(0.178)
Territorial Control	-0.848**	-0.969**	-0.943**	-1.048**	-1.466***	-1.757***	-1.932***	-1.884***
	(0.416)	(0.402)	(0.409)	(0.451)	(0.505)	(0.552)	(0.506)	(0.499)
Democracy	-0.220***	-0.221***	-0.222***	-0.201***	-0.209*	-0.183	-0.195*	-0.186
	(0.0755)	(0.0759)	(0.0752)	(0.0770)	(0.125)	(0.115)	(0.113)	(0.114)
Duration	-0.0296	-0.0252	-0.0215	-0.0104	-0.0255	-0.0323	-0.0390	-0.0358
	(0.0191)	(0.0186)	(0.0202)	(0.0204)	(0.0319)	(0.0289)	(0.0273)	(0.0264)

Population $_{(t-1)}$	-2.02e-07***	-2.08e-07***	-2.03e-07***	-1.83e-07***	-0.149	-0.215	-0.217	-0.231
	(6.00e-08)	(6.22e-08)	(6.43e-08)	(6.68e-08)	(0.228)	(0.208)	(0.187)	(0.200)
Conflict Intensity	0.150	0.217	0.239	0.283	-0.172	-0.0697	-0.0659	-0.0682
	(0.348)	(0.339)	(0.345)	(0.359)	(0.436)	(0.479)	(0.507)	(0.494)
Multiple Rebel Groups	0.937**	0.934*	0.825*	0.650	1.177	1.381*	1.543*	1.488**
	(0.451)	(0.482)	(0.499)	(0.494)	(0.787)	(0.801)	(0.804)	(0.758)
GDP Per Capita	-0.0618	-0.0660	-0.0874	-0.0731	-0.0709	-0.284	-0.429	-0.352*
	(0.0813)	(0.0784)	(0.0813)	(0.0857)	(0.185)	(0.250)	(0.282)	(0.205)
Rebel Violence	0.0939	0.0895	0.0880	0.107*	0.0986	0.105	0.108	0.106
	(0.0573)	(0.0620)	(0.0618)	(0.0590)	(0.0738)	(0.0697)	(0.0702)	(0.0692)
Government Violence $_{(t-1)}$	0.00215**	0.00214**	0.00212**	0.00242**	0.00180*	0.00219*	0.00249	0.00234
	(0.00100)	(0.00102)	(0.000979)	(0.00109)	(0.000950)	(0.00129)	(0.00165)	(0.00147)

Cell Phone Subscriptions (5)	-1.314***				
	(0.402)				
Cell Phone Subscriptions (10)		-1.444***			
		(0.384)			
Cell Phone Subscriptions (20)			-1.362***		
			(0.394)		
Cell Phone Subscriptions (50)				-1.616**	
				(0.770)	
Internet Users (5)					-1.753***
					(0.616)
Internet Users (10)					

Internet Users (20)							0.444	
							(1.101)	
Internet Users (50)								-21.50***
								(1.115)
Constant	8.115***	8.712***	2.894***	2.901***	11.63***	2.994***	2.996***	2.979***
	(2.017)	(2.001)	(0.188)	(0.187)	(4.514)	(4.889)	(4.787)	(4.484)
Constant	2.887***	2.889***	8.564***	7.856***	2.968***	14.01***	15.10***	14.80***
	(0.187)	(0.188)	(1.982)	(2.068)	(0.212)	(0.211)	(0.207)	(0.209)
Observations	843	843	843	843	638	638	638	638

Robust standard errors in parentheses

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

> *"Another old man walked slowly up the hill and across an intersection towards one of two impromptu rebel outposts. A helicopter hovered menacingly above and chunks of masonry from a nearby explosion made his going difficult. "Where are you going, Haj [respected elder]," one rebel asked him. "I want to go to the mosque," he replied.*
>
> *"The mosque?," the rebel said, pointing to a no-man's land further up the hill. "It's very dangerous. You will have to go back to your house." The rebel called for a cup of water to give to the man, who seemed confused and tired. Other fighters eased his heavy frame into a plastic chair. "Who is better, the regime army or the Free Syrian Army," one asked him. He waved his arms and said: "I swear I don't know. You are all my sons."*" (Chulov, 2012)

CHAPTER 7. EMPIRICS III: MICRO-LEVEL TESTS: THE SYRIAN CONFLICT

In the previous chapter, I tested my first hypothesis: that with a macro-level analysis of a country-level large-N setting, the amount of state violence against civilians tends to decrease when the information the state has on its population increases. Here, I will analyze whether my second hypothesis also holds true in a more disaggregated, micro-level sense. I turn to a micro-level approach because one might suspect that highly aggregated macro-level data may have a spurious effect. Previous work has argued that explanations of conflict at the national level do not always match subnational dynamics (Sambanis, 2004a); therefore, I needed to test whether my explanation of state violence against civilians would still be valid in a micro-level setting. Furthermore, various governments' surveillance capabilities may, hypothetically, spatially vary (e.g., geographically, within each state). By employing a micro-level analysis, I was able to measure and evaluate the spatial effects of my independent variable – states' information on their population – on firmer and more precise grounds.

In this chapter, to highlight the proposed information-violence mechanism more directly, I have built upon my previous macro-level statistical analysis with a case study of a very recent conflict: the ongoing Syrian Civil War (2011-2016). By examining this war in detail, I was able to

investigate the relationship between state killings and the level of information a state has on its population. As in earlier chapters, I have again tried to determine if violence is the product of a lack of information, or in other words, if it acts as a "substitute for information" (Zhukov, 2014).

I expect that when a state understands its population (e.g., what they are doing and who they support), civilians become virtually separated from rebel influence, discouraging disobedience and defection. The more a government increases its virtual control, the more its people are encouraged not to break the law and the less likely for the government to require the use of violence to maintain control. More information about the civilians' behavior makes the civilians "more accountable" because transparency improves accountability (Holmström, 1999). How are those "transparency and accountability" achieved? Firstly, when a state knows more about its civilian population, it is harder for civilians to turn against the state. Secondly, information provision to states will cause civilians to self-censor. That is why, the more closely people are watched, the better they behave (i.e., they closely follow the state's rules and distance themselves from defection) (Prat, 2006). In other words, when the people are metaphorically insulated from collaboration with rebels, the government has less need to use violence. If rulers understand their subjects in greater detail (e.g., have a better understanding of who to victimize), indiscriminate violence is less necessary.

Put it differently, civilians defect when they believe the risk of getting caught, and thus the fear of retribution is low. In an environment in which information is scarce, people may feel free to support rebel groups. Fear of state retribution is less when civilians believe their actions to be unseen by the state. When states have too little or no information about what the civilian people do and/or intend, the populace is more likely to take advantage of the state's weakness and cooperate with the rebels. Then, logically, these conditions may cause a state to use violence indiscriminately as a coercive tool. The logic is straightforward. When there is less (more) information, then it is too hard (easy) to discriminate. Therefore, the hypothesis 2 in this chapter can be stated as follows:

Hypothesis 2: The lower the level of a state's social control over the population, the more likely that state is to resort to indiscriminate violence against its civilians.

To explore and test this anticipated inverse relationship between violence and state-held information, I used a relatively new dataset. I employed high-resolution satellite images of the earth at night as a proxy because it avoided the biases and missing data problems that commonly affect traditional measures. The new availability of nighttime light (NTL) images has inspired substantial scientific research in a broad range of disciplines such as geography, physics, demography, and economics. So far, these data have been used to develop indicators of many different concepts, such as electrification (Min, 2011), socio-economic development (Shortland et al., 2013), poverty (Elvidge et al., 2009), human settlements (Sutton, 1997), economic activity (Chen and Nordhaus, 2011), energy consumption (Elvidge et al., 1997, Kulkarni et al., 2011) and selective goods provision (De Juan and Bank, 2015). While I believe that all of these uses seem credible and convincing, I have confidence that these data can also be employed as a persuasive indicator of the level of information a state may have on its population. In this research, I assumed that more illumination would afford more information-gathering opportunities, due to a high correlation between nighttime light and state's productivity in obtaining information on their population. Where can one find a good deal of information about people that especially the governments want to have? My straightforward answer would be where people agglomerate. One can take one thing for granted: When people agglomerate, there will be artificial light (Mellander et al., 2015), which is why my proxy here for information.

Additionally, greater illumination affords more opportunities to use surveillance and dataveillance. When an area is more illuminated, there is more likely for governments to easily monitor people and area via their surveillance technologies. I even go further and claim that this should logically also hold true even for daytime monitoring of the places, where normally well illuminated at nights. Likewise, it would be easier to dataveil those people and areas where more

illuminated at nights when compared to the less illuminated ones. Logically, the governments can also easily choose to concentrate their efforts and energy into those more illuminated ones out of extremely larger areas at their hand.

I also argue that more electrified areas are significantly more likely to have more roads, irrigation, power grids, cell phone towers (Min, 2011), and so on, which facilitate the government collection of information. For example, when there are more cell phone towers in an area, it is rationally easier to collect information since there is more likelihood for any person to access to phones, which also means more eavesdropping chances for the governments. As another example, it is normally expected that in more illuminated areas, there will be more Internet users (especially true for recent decades), which means more likely for government intelligence offices to monitor social media, email boxes, chats etc. and gather more information about people.

For my independent variable, the original data came from the Earth Observations Group (EOG) at the National Oceanic and Atmospheric Administration (NOAA)/National Centers for Environmental Information (formerly the National Geophysical Data Center). This group provides Visible Infrared Imaging Radiometer Suite (VIIRS) Day/Night Band Composite data that displays geographical variations in observable nightlight in cities, towns, and other sites with permanent lighting, including agricultural fires and gas flares. I downloaded the monthly VIIRS nighttime data for Syria from April of 2012 to March of 2016. These digitized images contained information on the monthly average brightness per 15 arc-second grid (500 x 500 meters). To explain briefly, at the equator, an arc-second of longitude approximately equals an arc-second of latitude, which is 1/60th of a nautical mile (or 101.27 feet or 30.87 meters). Then, 15 arc-second equals approximately 500 meters, which is the resolution of NTL maps used in this research.

Since VIIRS is a calibrated instrument, it was possible for me to compare the results across various months (Min, 2011, NOAA, 2012-2016). These data were highly disaggregated, and

therefore more detailed and precise than more common nightlight data use of per 30 arc-second grids that can be found in the literature (De Juan and Bank, 2015, Shortland et al., 2013, Min, 2011). Even though the NTL dataset was global in scope (meaning that it provided for every part of the world, in a longitudinal format), I extracted only the Syrian geographical data for analysis.

There were several reasons why I chose the Syrian Civil War for my micro-level case study. First, there was a lack of available data on civilian killings during most other civil wars. Although many new, more disaggregated datasets have emerged (such as UCDP GED, ACLED, PRIO ACD, etc.), comprehensive and spatially and temporally disaggregated datasets are still missing for many conflicts. I selected the Syrian Civil War because there has been a good deal of effort expended to gather this kind of disaggregated data in recent years. The information collected by certain nongovernment initiatives such as the Humanitarian (Syria) Tracker, Syrian Revolution Martyr Database, Syrian Observatory for Human Rights, and Syrian Center for Policy Research (SCPR), is exemplary and publicly available. To determine the level of violence in the Syrian Civil War, I used data from the Syria Tracker, which is part of the larger Humanitarian Tracker project, a non-political and non-partisan organization.

To check for potential data dependencies on specific sources, and to further demonstrate that my findings are not related to the operationalization and measurement of my outcomes, I estimated the actual count models using two other datasets that were collated by other organizations using other strategies. The first alternative measure was based on data provided by the Violations Documentation Centre (VDC), which relies on local networks of informants rather than crowdsourcing. Fatalities data included information on time and governorate. The second source was the Global Data on Events, Location, and Tone (GDELT) dataset, which is based on news reports from international news sources (Leetaru and Schrodt, 2013).

Below, I first briefly touch upon the ongoing Syrian Civil War by providing a timeline and emphasizing the important moments and civilian victimization events. Then, I elaborate on how the changing information level of the Syrian regime has dramatically affected its use of violence against civilians. Next, I model the relationship between state violence and state-held information, and test my hypothesis using monthly data from the Syrian Civil War from April of 2012 to March of 2016. Following that, I describe the series of additional robustness checks I implemented to further establish the strength of the findings of the main models. Lastly, I conclude with a short discussion of how these findings relate to other theories on state violence and offer some possible implications.

7.1 The Arab Spring and Syrian Civil War

Before addressing the Syrian Civil War in greater detail, it is important to briefly discuss the Arab Spring, as it was responsible for the recent chaos in the Middle East. The Arab Spring was a series of anti-government protests, uprisings, and armed rebellions that began on 17 December 2010 with the Tunisian Revolution, when 26 year old Mohamed Bouazizi set himself on fire as a means of protesting the confiscation of his produce by local municipal officials. Public outrage quickly grew in response to this tragic incident, leading to protests that spread throughout Tunisia and other countries in the Arab League and surrounding areas. This remarkable event took the whole world by surprise, and engulfed many countries such as Iraq, Libya, Syria, Yemen, Bahrain, Egypt, Algeria, Iran, Lebanon, Jordan, Kuwait, Morocco, Oman, and Sudan. Many nations are still experiencing the dramatic consequences of this so-called "spring."

The revolution reached Syria in March of 2011, when residents of the small southern town of Dara'a took to the streets to protest the torture of students convicted of anti-government graffiti for simply writing the motto of the Arab Spring on house walls ("al-Sha'b Yurid Isqat al-Nizam," or "the people want the downfall of the regime") (Thompson, 2016). The unrest spread quickly to

other parts of the country. Protesters demanded general reform, the ouster of President Bashar al-Assad, permission to form political parties, equal rights for Kurds, and broad political rights such as freedom of the press, speech, and assembly. Security forces used tanks and snipers to force people off the streets, openly firing on demonstrators. Despite security forces' concerted and ruthless efforts to crush who they described to be "terrorists" and "armed criminal gangs," the uprising has continued unabated. It should be noted that the conflict is also severely complicated by Syria's ethnic divisions. Briefly, the Assads and much of the nation's elite, especially in the military, belong to the Alawite sect (Nuṣayrī), a small ruling minority in a country where many other ethno-religious minorities, including Armenians, Assyrians, Druze, Palestinians, Kurds, Yazidi, Mhallami, Arab Christians, Mandaeans, Turkmens, and Greeks, also live. However, it is also important to note that Syria is majority Sunni; it is here that the Islamic State of Iraq and the Levant (ISIL, also known as the Islamic State of Iraq and Syria or ISIS, the Islamic State or IS, and by its Arabic language acronym of Daesh) finds its roots.

By early 2012, the violent political standoff had escalated into a massive civil war (International Crisis Group, 2011); it is now being fought among several factions: the Syrian government and its various supporters, a loose alliance of Syrian Arab rebel groups, the Syrian Democratic Forces, Salafi jihadist groups such as the al-Nusra Front, and ISIL. These factions also receive substantial support from foreign actors, a fact that has led many to label this conflict a proxy war waged by both regional and global powers (Barnard and Shoumali, 2015, Gerges, 2013). The war has already claimed many lives and driven countless people to leave their homes and become refugees. However, the armed opposition has yet been unable to overthrow the regime by military means (and vice versa). As Gerges (2013) succinctly stated: "the uprising has mutated and produced unintended consequences. It has been hijacked by religious hardliners, criminal warlords and regional rivalries. The early hopes and dreams of millions of Syrians of an open, inclusive and pluralistic post-Assad government are now buried in the country's killing fields."

7.2 The Syrian War and Governmental Violence

In the latter half of 2015, the war in Syria shifted in favor of the Syrian government. Many factors such as Russia's involvement, covert external support for the Assad regime, decreasing backing for the opposition, etc., may explain this change. Also changing is the type and extent of violence seen by the Syrian people. In this research, I examine how state-perpetrated violence has been transformed through the course of this war, and propose that the shifting information level enjoyed by the Assad regime could be a key explanation for this evolution in the Syrian conflict.

7.2.1 The Syrian Government's Changing Information Level

In this research, I differentiate between two types of control: physical and social. In general, physical control of a citizenry follows from virtual control, and both can affect the types and level of violence initiated. Currently, the Syrian government has lost both social and physical control of certain Syrian cities; power has shifted to opposition factions such as FSA, ISIS, etc., and the country is largely divided among groups of combatants. However, the Assad regime has seen some military success in recent years, especially when compared to earlier points in this war. In areas where the Assad regime has lost control, indiscriminate violence is the norm. Conversely, in places where social (and eventually, physical) control has been retained or regained, the number of civilian killings has substantially declined. Thus, it is clear that state violence against civilians is highly influenced by state-held information. In this research, three key elements of the Syrian conflict are explored: the regime's changing information level, the violence perpetrated, and the relationship between the two. Thus, in this chapter I will first elaborate on how the information the Syrian government has on its people has changed in both amount and quality, and provide qualitative examples.

As discussed above, in the very early months of the conflict, the Syrian government was unprepared for war and the country soon devolved into chaos. Many cities rapidly fell to opposition groups. However, the Assad regime quickly adapted to the situation and fully devoted its time, energy, and resources to regaining power. Syria is a relatively large country, with 20 million people and 71,500 square miles of land. The government first distributed its resources to the most fragile areas such as Damascus, Lattakia, Tartous, Aleppo, and so on, and focused its efforts on less costly types of control (i.e., social) such as intelligence-gathering via wiretapping, surveillance, dataveillance, etc. To socially control the public, Syria has also acquired more significant, sophisticated tools such as surveillance drones and other monitoring equipment. Especially in places where more sophisticated technology has been deployed, the state's level of information on civilians has increased over time. News from the field supports these conclusions. "We are seeing unmanned aircraft much more frequently," Louay al-Mokdad, the political and media coordinator for the Free Syria Army, said in a phone interview with Washington Post reporter Joby Warrick (2013).

These successes have been supplemented by the aid received from allies such as Russia, China, and Iran (England, 2016). Russia has also deployed advanced surveillance, signals intelligence, and electronic warfare equipment such as the IL-20 surveillance aircraft, "better known by its NATO name 'Coot' and roughly equivalent to the U.S. Navy's P-3 Orion, a mainstay of the Pentagon's spy tools" (Groll, 2015). This Russian plane is equipped with surveillance radar, electronic eavesdropping gear, and optical and infrared sensors, all of which facilitate information-gathering. Thus, the government's intelligence collection is "not only conducted by regular forces and special purpose forces, it [also] includes a large and growing number of irregular forces and fighters from Hezbollah, and technical advisors from Syrian allies such as Iran and Russia" (England, 2016).

Russia and Syria have worked together especially closely on gathering intelligence. On 5 October 2014, for example, it was announced that the Free Syrian Army captured "the Center S SIGINT (Signals Intelligence) facility jointly operated by the Russian Osnaz GRU radio electronic intelligence agency and one of the Syrian Intelligence Agencies." This underscores the close relationship between the two states. Situated near al-Hara, the facility was of "vital importance for the Assad regime as it was responsible for recording and decrypting radio communications" (Mitzer and Oliemans, 2014). This installation was likely one of many important intelligence units distributed throughout the country.

7.2.2 Violence Against Civilians: Indiscriminate or Selective

A second step in understanding the information-violence relationship is an examination of the course of the Assad regime's use of violence. The government began using indiscriminate violence once leaders recognized that their loss of social and physical control over the populace was imminent. Conversely, where social control has increased, the government's use of violence has decreased. There is much qualitative evidence for both. Regarding the former, there are many instances of government aggression against civilians in Aleppo, Ar-Raqqa, Idleb, Homs, and Hama, areas where state-held information has decreased over time. When rebel fighters from neighboring villages converged on Alleppo in July of 2012, the government responded by indiscriminately bombarding the city (Harding and Chulov, 2012). This was initiated once the Syrian regime believed it had lost control of the city and people. Although Aleppo seemed to remain largely supportive of the regime in the early days of the Arab Spring (Darke 2016), Assad had since seen his control continue to decrease. The violence was a way for the Syrian government to send a clear message: "Choose our side and stay alive!"

Airstrikes and artillery bombing are the two main types of indiscriminate killing the government has used against civilians. The release of barrel bombs and metal drums packed with

explosives are also quite common in Syria, especially in areas where people have been stranded in between combat zones, and thus forced to choose sides. Many lives have been lost in these indiscriminate attacks. Government forces have even bombed markets, schools, and hospitals. There were a number of attacks on Jabal al-Zawiya and other parts of the Idleb and north Hama regions in 2012 (Amnesty International, 2012); the bombing of a school in Idleb killed at least 35 and injured more than 100. A hospital was destroyed in Allepo, killing at least 114 children and injuring another 32 (Shaheen, 2016). Douma's popular market and certain residential areas were bombed in 2015, killing at least 112 people (Human Rights Watch, 2016a). According to an Amnesty International Report on Syria (2017), "44 health facilities" were attacked in July of 2016 alone, and "four hospitals and a blood bank" in eastern Aleppo were destroyed in aerial attacks on 23 and 24 July 2016, all by the Syrian government. Also, two barrel bombs "allegedly containing chlorine gas were dropped by suspected government aircraft on 1 August on two residential neighborhoods controlled by non-state armed groups in Saraqeb city, Idleb province, reportedly injuring at least 28 civilians." Another government airstrike on the town of Deir al-Assafir on March 31 killed at least 31 civilians, including nine women and 12 children (Human Rights Watch, 2016b). All of these brutal events were perpetrated in response to the government's decreasing control over the people.

Another recent report about barrel bombs from Human Rights Watch (2016a) details the scope of the violence: "Between February 2014 and January 2015, Human Rights Watch determined at least 450 major damage sites that showed damage consistent with barrel bomb detonations. One local group estimated that by February 22, 2015 aerial barrel bomb attacks had killed 6,163 civilians in Syria, including 1,892 children." Yet this is only one side of the story. In some places, state-perpetuated violence has begun to decrease, such as in Lattakia, Damascus, Hama, and Tartous. In these areas, the Assad regime has focused on virtual control and the gathering of intelligence; physical control has soon followed. As can be seen in the Figure 7.1 (obtained from the

Syrian Tracker database), while deaths from government artillery were at a rate of approximately 400 people per month in Damascus in 2012, these numbers fell to the 50s in 2016.

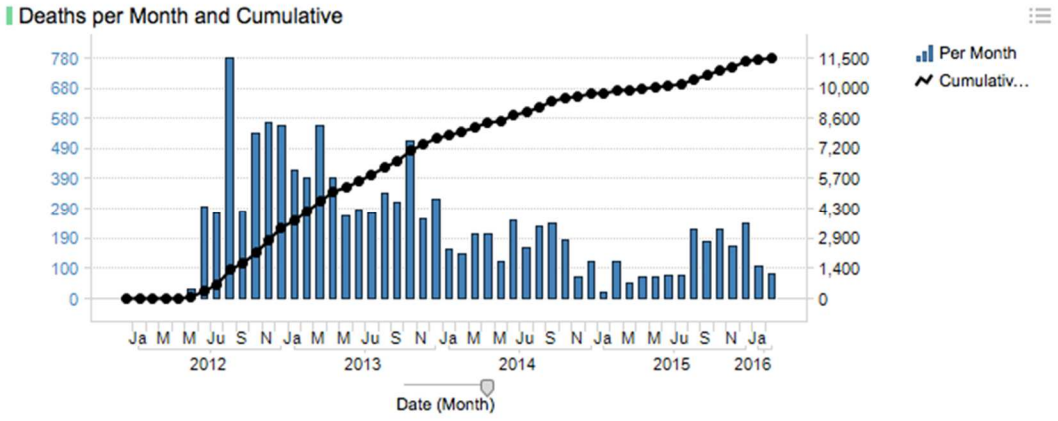

Figure 7.1 Civilian Killings by Military Artillery in Damascus (Syrian Tracker, 2011-2016)

In Hama, the death rate of 70 per month in 2012 decreased to approximately 10 per month in 2016 (Syrian Tracker, 2011-2016). There have also been many other locations such as Dara and Homs where an obvious, gradual decrease in civilian killings by government forces can be seen.

In sum, while there has been a steady increase in government violence in some areas in Syria, there has been a steady decrease in others. Below, I will attempt to explain these variations in state violence across sub-districts and time, not only through changes in the government's level of physical control, as Kalyvas (2006) has argued, but also through shifts in the government's level of social control of the Syrian people.

7.2.2 How Social Control Affects State Violence

Before discussing the significance of the relationship between social control and state-perpetuated violence against civilians, it is important to address the background of the Syrian conflict. Bashar al Assad inherited a police state from his father, Hafez al-Assad. Though some serious blows have been dealt to this regime in recent years (such as defections from the army,

etc.), Bashar al Assad continues to hold power, in part through his ability to collect intelligence on his people. If asked before this civil war, many would not have believed that repercussions of the Arab Spring could have reach Syria, due its leader's intelligence capabilities. However, almost six years have passed since the first protests in Syria, and thousands of people have been killed or wounded. And while they have not been able to regain complete control, Syria's government has survived the war, due in large part to this intelligence capacity. As of March 2017, Assad appears to be in the strongest position he's held in years.

The Syrian government's "intelligence and security capabilities" have not only helped them to maintain control over a diverse population, they have also determined the type and level of violence perpetrated (Hawthorne, 2016). This effect is in proportion to the amount of intelligence, which determines the level of violence. From the verifiable data on civilian killings (Syrian Tracker, 2011-2016), it is clear that the level of indiscriminate violence in sub-districts such as Tortous, Lattakia, and Damascus have substantially decreased over time. One potential explanation for this is that regime forces are regaining social control. Thus, changes in the Syrian regime's level of information (and associated social control) have seriously affected the level and type of one-sided violence in these sub-districts. Social control is attained through intelligence, and the government's intelligence capacity has been fortified by Russian (Pejic, 2016, Gibbons-Neff, 2016) and Iranian contributions (Fulton et al., 2013). The intelligence that the government has accumulated has facilitated their virtual control over the population, which in turn has decreased their need to use indiscriminate violence.

Conversely, in cities such as Aleppo, Ar-Raqqa, Al-Bab, and so on, the regime has filled their information gap with violence. For example, in Aleppo, the Syrian regime has gradually lost social and physical control over the population; as a result, massive acts of indiscriminate violence by government forces have taken place. Civilians throughout Aleppo, including areas such as A'zaz, Afrin, Al Bab, Atareb, Jebel Saman, Mare, and Menbij have suffered massive state violence in

exchange for diminishing state control. In order to make the rebellion "costlier" for civilians, the state has punished them with bombings. The Syrian military has besieged rebel areas to make them "uninhabitable for civilians and rebels, forcing the opposition to surrender or leave" (Myre, 2016). That is, when no physical or virtual control was possible, the military turned to massive destruction.

When the pattern is examined, it is clear that violence begins to drop before an area falls under physical control of state forces, which is in line with my social control theory. Even virtual control over a population (i.e., before physical control is attained) can result in a reduction of state violence. Social control convinces civilians to collaborate with the state, which makes state violence unnecessary. The focus on intelligence has been the turning point in the Syrian conflict. When the government has more intelligence, their virtual control increases and civilians become more insulated from rebel influence. Thus, social control prevents ordinary people from collaborating with rebel groups, allowing the government to reduce its civilian killings. Moreover, when social control increases, defection is more unlikely. For example, the early months of the civil war saw many defections, including top military and civilian figures such as General Ali Habib Mahmoud, General Manaf Tlass, and many other civil servants (Tabler, 2013); this was at a time when the government's social and physical control was far reduced. Now, due in part to significant Russian and Iranian contributions, control has increased and defections have considerably fallen.

7.3 Research Design

7.3.1 Data and Operationalization

The hypothesis that the level of indiscriminate state violence against civilians decreases as its information on the population increases was tested on a newly generated dataset of Syrian sub-districts; this dataset was comprised of monthly observations of all sub-district level state violence against civilians and the amount of information possessed by the Syrian government, proxied by

access to electricity. For administrative purposes, Syria is divided into fourteen governorates (in Arabic, muhafazat, or the singular, muhafazah). The governorates are divided into sixty districts (manatiq, or the singular, mintaqah), which are further separated into sub-districts (nawahi, or the singular, nahia). The nawahi contain villages, the smallest administrative units. Following de Juan and Bank (2015), from the total of 274 sub-districts, I excluded the "nine Golan Heights subdistricts due to their specific political status" and because it was assumed that the conflict dynamics in this area were different from in other areas of the country. Moreover, I also discarded four sub-districts due to their geographic specificities: the island of Arwad, and the three sub-districts of Haritana, Jerablus, and Tall Daww (each of which consists of two geographically separated areas).

To measure the dependent variable, I used crowdsourcing data from Syrian Tracker. Crowdsourcing is a means of gathering information "in a decentralized way, relying on information provided by people 'on the ground.'" Individuals submit their observations by email, or directly through various online platforms (De Juan and Bank, 2015). This method combines crowdsourced reports (such as eyewitness accounts), machine learning, and data mining techniques of mainstream and social media on the same platform. It indicates where human rights abuses are happening in Syria, charting exactly "when and where violence such as murders, rapes and chemical attacks have taken place" (Syrian Tracker, 2011-2016). Below, I critically analyze these data and compare them with information from other sources.

For my main dependent variable, I counted indiscriminate killings by the Syrian regime. I assumed any air bombardment and artillery killings to be indiscriminate, due to their natural characteristics of less selectivity, limited accuracy, and high lethality. The Syrian Tracker dataset categorizes civilian deaths according to 22 types (such as asphyxiation, beating and stabbing, burning, chemical, gunshot, etc.); two are air bombardment and artillery. I chose these two as proxies of indiscriminate violence because in both cases, it was easy to determine if they were initiated by the Syrian government. The Syrian Tracker also provides photo scenes and YouTube

clips, when available, together with location and time information. Out of the 149,002 killings recorded from March of 2011 to March of 2016, indiscriminate killings by air bombardment (17,245) and artillery (45,489) comprised 12% and 31% of all documented killings, respectively.

I coded the dependent variable, the number of civilian killings, according to various specific conceptualizations, and tested all of these different conceptualizations in my analyses. In my main models, I did not set any threshold on monthly killings. In the robustness check section below, I also set an annual threshold of 25 killings, which was in line with analogous annual country-level thresholds (Gleditsch et al., 2002). If this specifically-set annual threshold was not met by the sub-district month observations, I recorded zero violence for this sub-district for all months of that year. I also repeated my estimations with three alternative annual thresholds (5, 10, 50 see robustness check section below), not to mention the annual threshold of 25 was – like all the other thresholds – arbitrary. I excluded killings from March of 2011 to April of 2012 because the NTL emissions data, which I extracted as my explanatory variable, began in April of 2012.

For my main independent variable, I used nightlight data from the EOG at the NOAA, which provides VIIRS Day/Night Band Composites that display geographical variations in observable nightlight in cities, towns, and other sites with permanent lighting; this includes agricultural fires and gas flares. I downloaded the monthly nighttime data for Syria from April of 2012 to March of 2016. These digitized images contained information on the monthly average brightness per 15 arc-second grid (500 x 500 meters). Since VIIRS is a calibrated instrument, it was possible to compare results across months (Min, 2011, NOAA, 2012-2016). I used ArcGIS 10.4.1 software to generate Syria's nightlight emissions for every month from April of 2012 to March of 2016. The data consisted of monthly average radiance composite images. Prior to averaging, the data were filtered to exclude information impacted by "stray light, lightning, lunar illumination, and cloud-cover" (NOAA, 2012-2016). I only extracted Syria's state borders from the whole data to obtain the

monthly variations in average nightlight output across and within Syria's sub-districts (see Figure 7.2).

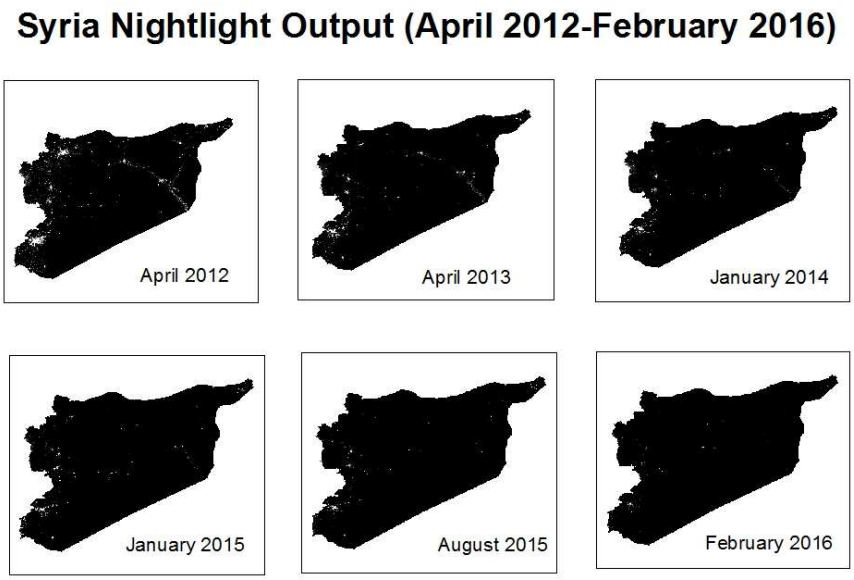

Figure 7.2 Monthly high-resolution nightlight images of Syria.

I constructed three separate independent variables with the aim of capturing various facets of change and differences in light output, thereby increasing the robustness of my operationalization. The first indicator was the absolute change in mean light output between the current and previous months. Second, I measured the absolute change in the light output for each month from the first month in the data (April of 2012), in order to see if the absolute change from the start of the war was a more meaningful proxy for information level in each sub-district. Lastly, I created a change rate indicator by dividing the absolute increase or decrease from the previous month by the mean light output of the from the first month in the data (April of 2012), to see whether the proportion of change can also be more determinant than absolute change itself, and therefore may be a good indicator for comparison purposes.

7.3.3 Alternative explanations and control variables

Past research has concluded that the level of one-sided state violence will increase with population size. In subdistricts with larger populations, there are more opportunities for violence (Collier and Hoeffler, 2004). Thus, I included log-transformed population size in my analyses in order to account for excessive variations across Syria's sub-districts. Unfortunately, the most recent population census for Syria was completed in 2004. Despite this, I included population (logged), as an indicator because I expected subsequent changes would be proportionally similar during the Syrian Civil War. However, to account for any weakness in this assumption, I included another indicator to account for possible changes across the sub-districts; many urban areas have, to date, undergone dramatic changes in their makeup, due to thousands fleeing the violence, destruction, and collapse of basic services. The net result has been "a significant concentration of the population in urban centers, accompanied by large IDP movements" (United Nations, 2016, 13). To account for these possible changes in population, I added an Internally Displaced Persons (IDP) over-population variable obtained from the UN's Humanitarian Needs Overview Report on the Syrian Arab Republic (United Nations, 2016).

In line with this report's suggestions, my assumption was that the proportion of IDPs over population among the sub-districts properly represented the variation in population over time, which was significantly influenced by the civil war. I used the maps supplied by the UN's Office for the Coordination of Humanitarian Affairs (OCHA), which categorically illustrated the IDPs over population variable in Syria's sub-districts. There were six categories: 0%, 1%-20%, 21%-40%, 41%-60%, 61%-80%, and 81%-100% (e.g., a subdistrict in the 81%-100% category had almost as many IDPs during the war as their actual population before the war). Since these were annual maps, I had a substantial number of missing monthly observations. To fill in these missing values, I used an interpolation technique. I assumed that the IDPs over population variable was a function of the yearly IDP population trend for the country; this justified filling in the missing values by linear

interpolation. Thus, I included this new variable to account for population movement across the country into my model. Even though there could have been some relocation even at the sub-district level, this information only covered sub-district level variances, which was consistent with my research's level of analysis.

I also followed de Juan and Bank's (2015) study of the Syrian Civil War, which included variables serving alternative explanations. As explained above, the conflict began with some Syrian students' anti-government graffiti in Dara'a. Mass protests then began in Syria's semi-urban areas, and eventually spread to the urban centers. This fact could indicate that people in urban centers were more likely to be victimized than those in more rural areas. Therefore, I included information on each sub-district's degree of urbanization to account for the Syrian government's strategic selection of sites of violence. Following the thresholds used by the United Nations, the urbanization variable represented the share of the population living in cities with more than 20,000 inhabitants (De Juan and Bank, 2015). I also included the share of people working for the state, as a means of controlling for variations in state presence across sub-districts, since "previous quantitative analyses of the subnational level demonstrate that violence is less likely in areas where the state maintains an effective presence" (Buhaug, 2010, Kalyvas, 2006). I also use information from De Juan and Bank's usage of the Syrian road network provided by the UNDP to proxy accessibility. It is simply calculation of the number of road kilometers per subdistrict and divided it by the size of the respective subdistrict areas. I assume that accessibility may also influence violence against civilians perpetrated by the Regime forces. Additionally, I included ethnicity variables such as Alawi and Sunni to control for the effects of ethnicity on the regime's selection of sites of violence against particular Syrian sub-groups (De Juan and Bank, 2015).

I also controlled for the age of the civil war, in months. According to Kalyvas (2006), indiscriminate violence should decrease over time as the actors' exposure to its counterproductive effects increases. I coded the age of the civil war variable as the natural log of the number of months

since the beginning of the conflict (March of 2011). To account for the effects of Russian intervention on 30 September 2015, I also included a dummy variable.

One can argue that less government violence should be expected in more developed areas. I operationalize economic development as the natural log of Gross Cell Product (GCP). It was difficult to find monthly economic development (e.g., GDP) or disaggregated-level data that were subdivided into sections as small as sub-districts. But, I could find relatively fine-grained economic development indicators such as Gross Cell Product (GCP) for all sub-districts from 2010 and 2015, that were estimated based on projections of geographically-based economic data (G-Econ). This dataset calculated the gross value added at a 1-degree longitude by 1-degree latitude resolution, on a global scale and for all terrestrial cells; out of this set, I extracted the information related to the Syria Arab Republic (William Nordhaus et al., 2006), which at the time was available only for the years 1990, 1995, 2000, and 2005. Per month, the GCP was unknown, so I filled in these values through linear interpolation. One can expect that governments' violence against civilians assume that as the size of a conflict zone increases, government forces have "less control over their foot soldiers and less ability to access information about the loyalty of the population" (Wood et al., 2012, Kalyvas, 2006, Weinstein, 2007); thus, I lastly included conflict area as the natural log of the estimated area of each sub-district in square kilometers.

Table 7.4 Summary Statistics

	mean	min	max	sd	count

State Violence	4.366	0.000	1010.000	27.830	12227
Population (log)	10.461	5.979	14.595	0.996	12227
IDPs (log)	23.651	0.000	118.702	22.675	12221
Urbanization	0.180	0.000	1.000	0.306	12227
Gov. employees	32.643	3.300	90.750	20.169	12180
Road density	0.246	0.000	1.944	0.225	12227
Sunni	0.700	0.000	1.000	0.458	12227
Alawites	0.281	0.000	1.000	0.449	12227
War age	38.995	16.000	62.000	13.566	12227
Russian Intervention	0.085	0.000	1.000	0.279	12227
GCP per capita (log)	6.728	0.420	19.658	6.266	12221
Area (square mile)	0.071	0.000	1.680	0.170	12227
NTL (Change from previous month)	-0.000	-68.795	68.419	1.265	11182
NTL (Change from first month)	-1.590	-70.936	66.278	4.251	11182
NTL (Change rate)	-0.327	-1.000	69.403	2.310	11183

7.3.4 Model specifications and results

I have a longitudinal data covering 46 consecutive months (from April 2012 to February 2016) for each 260 Syrian subdistricts. Given that my dependent variable is a count of civilian deaths, I estimate negative binomial regression models to test my hypothesis. As part of my

robustness checks, described below, I have also performed alternative estimations using different models. The results from the negative binomial analyses support my theoretical argument. The Summary Statistics are reported in Table 7.1 and the results in Table 7-2.

Model 1 presents the results of my baseline model without the inclusion of any nightlight variable. This model illustrates that the population and IDP movement are both important in explaining state violence against civilians. As was expected, both were positively related to government violence; in places with larger populations, there were more opportunities for the state to use violence against its citizens (Collier and Hoeffler, 2004). Additionally, each sub-district's degree of urbanization seemed to explain the Syrian government's strategic selection of sites of violence. The Syrian government tends to perpetrate violence against civilians in more urbanized areas. Also, state presence and government violence seem to be closely related. The government tends to kill more people in areas where a larger percentage of the population works for the state, which is contrary to some existing research in this field (Buhaug, 2010, Kalyvas, 2006). This divergence can be explained either by certain characteristics of the Syrian civil war, or that urban violence is more common because the cities are home to most of the government workers. Though it failed to reach conventional significance levels, the coefficient for road density was in the expected direction.

Regarding the sectarian factions in the country, both sectarian variable coefficients were found to be significant in the expected direction, giving support to the belief that the Assad regime primarily targets the Sunni people (Akkar, 2013, Beaumont 2013). This comes as no surprise, as the Syrian regime has a notable cohort of Alawite leaders (including the Assad family) and draws a good deal of support from the many Alawites in the country. This is in spite of the fact that Sunnis make up approximately 75% of Syria's 22 million inhabitants. Although the size of the Sunni population could also be a reason for such a high mortality rate, there is additional evidence indicating that the Syrian conflict is a sectarian war. Although initial protests appeared mostly to be

non-sectarian, starker divisions have emerged that are in line with the model's results. Moreover, the age of the war is inversely related to the level of government violence, which comports with Kalyvas's (2006) argument that indiscriminate violence should decrease over time, as actors' exposure to a war's counterproductive effects increases.

With regards to the other variables, I was surprised to find that Russian intervention was not significantly related to the Syrian regime's level of violence. This may be because the dependent variable, the total amount of indiscriminate violence, was formed by excluding the casualties resulting from Russian strikes. In terms of economic development, it could be expected that there would be less government violence in more developed areas. However, the results indicated the opposite. The government seems to target civilians in greater numbers in more economically developed areas. The reason for this might be that people live in higher concentrations in cities. Finally, the coefficient for area was significant and in the expected negative direction, meaning that the size of the conflict area decreases as does the propensity of the government to perpetrate violence. Put differently, as the size of the conflict zone increases, government forces appear to have "less control over their foot soldiers and less ability to access information about the loyalty of the population" (Wood et al., 2012, Kalyvas, 2006, Weinstein, 2007), which eventually leads them to perpetrate more violence against civilians.

After the inclusion of a nightlight variable, Model 2 established the negative binomial model for controlling for confounding factors. The coefficient for the NTL variable (change in absolute light output from the previous month) was statistically significant and negative below the 1% level, indicating that the more the Syrian government has access to information (i.e., the more luminous the area) in a sub-district, the lower the probability that the Syrian government will perpetrate violence against civilians. All other covariates in this model were in the same direction as in the first model. Model 3 included the second proxy as an absolute change from the start of the war with regards to the information level in each sub-district; again, the findings were in line with the

theoretical argument. There was a statistically significant relationship (at the 1% level) between light output and government violence. Model 4 determined the results for changes in light output in relation to the original output in April of 2012. I found a statistically significant inverse association between changes in light output and the likelihood of government violence. In all of the models, the variables of population, IDP, urbanization, state presence, war age, GCP per capita, and conflict area all achieved statistical significance below the 1% level. The coefficient for road density only attained sufficient significance in Model 4. Lastly, considering the sectarian side of the conflict, while the coefficient for Alawite was statistically significant below the 1% level, the coefficient for Sunni only achieved significance at the 5% level, which was remarkable.

Table 7.2 Government Indiscriminate Violence Against Civilians in Syrian Subdistricts, April 2012 to March 2016

	(1)	(2)	(3)	(4)
Population (log)	0.287***	0.327***	0.264***	0.369***
	(0.000)	(0.000)	(0.000)	(0.000)
IDPs (log)	0.005***	0.004**	0.005***	0.004**
	(0.000)	(0.003)	(0.001)	(0.008)
Urbanization	0.724***	0.802***	0.844***	0.768***
	(0.000)	(0.000)	(0.000)	(0.000)

Gov. employees	0.015***	0.015***	0.014***	0.016***
	(0.000)	(0.000)	(0.000)	(0.000)
Road density	0.148	0.229†	-0.202	0.698***
	(0.193)	(0.060)	(0.267)	(0.000)
Sunni	0.298*	0.319*	0.316*	0.325*
	(0.023)	(0.020)	(0.020)	(0.018)
Alawites	-0.660***	-0.623***	-0.588***	-0.617***
	(0.000)	(0.000)	(0.000)	(0.000)
War age	-0.024***	-0.025***	-0.026***	-0.026***
	(0.000)	(0.000)	(0.000)	(0.000)
Russian Intervention	0.080	0.080	0.098	0.044
	(0.450)	(0.453)	(0.361)	(0.680)
GCP per capita (log)	0.064***	0.054***	0.057***	0.051***
	(0.000)	(0.000)	(0.000)	(0.000)

Area (square mile)	-0.815***	-0.874***	-0.736***	-1.000***
	(0.000)	(0.000)	(0.000)	(0.000)
NTL (Change from previous month)		-0.061***		
		(0.000)		
NTL (Change from first month)			-0.026**	
			(0.002)	
NTL (Change rate)				-0.056***
				(0.000)
Constant	-4.745***	-5.135***	-4.390***	-5.698***
	(0.000)	(0.000)	(0.000)	(0.000)
ln_r				
Constant	-1.225***	-1.211***	-1.220***	-1.207***
	(0.000)	(0.000)	(0.000)	(0.000)
ln_s				
Constant	-2.718***	-2.674***	-2.691***	-2.663***
	(0.000)	(0.000)	(0.000)	(0.000)

Observations	12174	11137	11137	11138
AIC	16479.026	15196.119	15218.290	15204.176
ll	-8225.513	-7583.060	-7594.145	-7587.088

p-values in parentheses; † < 0.1, *p < 0.05, **p < 0.01, ***p < 0.001.

7.3.5 Testing for causality: Instrumental Variables

Despite the strength of the results described above, questions may remain regarding the direction of causality between state-held information (nightlight output) and government violence against civilians. One reason for this is the possibility that evidence of government-initiated indiscriminate violence is represented in the data by aerial bombing and shelling, both of which might also affect nightlight output through collateral damage. That is, when the Syrian government bombs cities, it is possible that those bombings impact sources of light and reduce nighttime light production. To take this into account, I use past values of the dependent variable (government violence against civilians) as instruments of the independent variable (nightlight output), and examine the effects of the independent variable on government violence. My data is monthly, and I assume that government violence in a certain month [n^{th} - 1] could affect the level of nightlight output in the following month [n^{th}], and then the nightlight output in that month [n^{th}] affects the violence in the subsequent month [n^{th} +1], as my main theory proposes.

Using a lag in the dependent variables as an instrument for endogenous covariates is nothing new in the literature; thus, I chose to use past values of government violence as instrumental variables. Technically, a valid instrument Z must satisfy two conditions: (1) relevance: corr (Zi,Xi) ≠ 0 and (2) exogeneity: corr (Zi,ui) = 0. In other words, to be relevant, instruments must actually explain the endogenous variable, meaning that there must be some correlation between the two. Accordingly, government violence in a given month [n^{th} - 1] is a good instrument for

nightlight output in the next month [n^{th}] if the coefficients measuring this relationship are significant at the conventional level.

To be exogenous (excludable), the instruments must be conditionally independent from the error term in the unobserved true regression, meaning that there should be no correlation between these variables and the error term. In other words, this requires that there be no unobserved relationship between the instrumental (government violence in the month [n^{th} - 1]) and dependent variables (government violence in the subsequent month [n^{th} + 1]). If these two conditions are met, it is possible to employ "government violence in the month [n^{th} - 1])" as an instrument to obtain an asymptotically unbiased estimate of the causal relationship between nightlight output and government violence in the month [n^{th} + 1].

I began by examining the first stage relationship between the instrument (past values of government violence) and the endogenous variable (nightlight output). I regressed the latter to the former, including additional related covariates. The first stage IV regression results are reported in Table 7.3. The coefficient for government violence in the previous month that was used to measure this relationship was significant at the ($p < .1$) level. The results indicate that government violence is a good instrument for nightlight output.

Table 7.3 First Stage Instrumental Variable Model Results

	(1)
INSTRUMENT	-0.001√ú
Government Violence (*t-3*)	(0.072)

CONTROLS	
Industrialization	-0.061**
	(0.004)
Russian Intervention	-0.241***
	(0.000)
IDPs (log)	-0.014***
	(0.000)
GCP per capita (log)	-0.028*
	(0.025)
Oil and Gas Production	-0.396*
	(0.040)
Population (log)	0.582***
	(0.000)
Road density	6.450***
	(0.000)

Constant	-5.869***
	(0.000)
Observations	11396
AIC	.
ll	

p-values in parentheses

√ú $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The model in Table 7.4 is the second stage of the model in Table 7.3. The second stage regression results in Table 7.4 indicate that the effect of nightlight output on a government's level of indiscriminate violence is negative and significant at the (p < .01) level. These results mirror those from the original negative binomial models listed in Table 7.2. As expected, nightlight output is strongly related to the government's level of indiscriminate violence.

Table 7.4 Second Stage Instrumental Variable Model Results

NTL	-0.383**
	(0.007)
Russian Intervention	0.201
	(0.123)

IDPs (log)	-0.002
	(0.381)
GCP per capita (log)	0.038√ú
	(0.079)
Population (log)	0.515***
	(0.000)
Road density	2.863**
	(0.002)
Urbanization	0.742***
	(0.000)
Gov. employees	0.020***
	(0.000)
Sunni	0.282
	(0.141)

Alawites	-0.588**
	(0.002)
War age	-0.036***
	(0.000)
Area (square mile)	-1.134***
	(0.000)
Constant	-6.766***
	(0.000)
ln_r	
Constant	-1.195***
	(0.000)
ln_s	
Constant	-2.699***
	(0.000)
Observations	11396
AIC	15480.592
ll	-7725.296

p-values in parentheses

√ú $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

7.4 Robustness checks

Theoretically, I use random effects models since I do not assume that each subdistrict has its own individual characteristics that may influence the explanatory variables. However, statistically, to decide between fixed or random effects, I ran a Hausman test where the Null hypothesis is that the preferred model is random effects vs. the alternative the fixed effects. The Hausman test pointed out that the unique errors (ui) are not correlated with the independent variables (i.e. the null hypothesis), which confirms that random effects model is also statistically appropriate. Even still, I estimated fixed effects at the subdistrict level (see Table 7.5 in the Appendix) to address for unobserved heterogeneity, which should be fixed for a subdistrict, if there really is. All three proxies of NTL are again statistically significant and in expected negative direction.

I also repeated my estimations with four alternative annual government violence thresholds (5, 10, 25, 50). The results also well correspond to those obtained with my initial operationalization (see Tables 7.6, 7.7, 7.8 and 7.9).

As mentioned earlier, NTL data include gas flares resulting from oil or gas production sites in Syria. To rule out the possibility that gas flares from oil and gas fields might impact the relationship between nightlight output and government violence, I excluded five governorates (82 subdistricts) from the dataset with varying numbers of oil and gas fields (De Juan and Bank, 2015), and repeated my standard estimation. For the remaining 178 subdistricts, the coefficients for the NTL variables are again all negative and statistically significant (see Table 7.10).

7.5 Conclusion

Whether indiscriminate or discriminate the violence, governments may at times find targeting civilians to be helpful in achieving their aims. Obviously, there are many factors that affect

the government's calculus when choosing to use violence. Thus far, the literature has paid significant attention to macro-level aspects of this topic, such as conditions that might lead to violence (Wood and Kathman, 2014, Wood, 2010b, Wood and Kathman, 2015, Salehyan et al., 2014, Downes, 2007, Schutte, 2015), or micro-level changes in control and power (Kalyvas, 2006, Kocher et al., 2011, Shapiro and Weidmann, 2015, Schutte, 2016). However, to date little attention has been paid to the "social control" aspect of civil war, an important micro-level feature of this type of conflict.

I have focused on a government's social control by means of surveillance and dataveillance. Obviously, governments have the upper hand in acquiring the technical means and equipment necessary for this type of control. Attainment of virtual control (i.e., information on citizens) over the population leads the citizenry to refrain from collaborating with rebel groups and, accordingly, motivates the government to use less violence. My findings strongly support the relationship between a government's access to information and the level of violence perpetrated against civilians.

The findings here in this chapter strongly support the relationship between the information that the governments have on their people and the violence they perpetrated against them. This is also in line with one of the findings of Zahar (2000) who proposes that the lower the degree of identification, between the rebels and the civilian population, the more likely that the rebels mistreat civilians. What determines this identification is obviously 'information' at hand for governments.

The findings here go along with the studies of government killings that have focused on the strategic use of violence (Valentino et al., 2004, Kalyvas, 2006, Azam and Hoeffler, 2002). The governments, in my view also, start to use violence against civilians strategically as a tool when the

information about the population decreases. When the information increases, they refrain from violence.

The findings of this research will be of interest to two important groups: scholars and policy makers. For scholars, "social control and its possible effects on violence perpetrated by governments" comprise an essential area of investigation, likely to yield findings useful to policy recommendations that could eventually save innocent lives. For policy makers, this research will provide important guidelines for dealing with insurgency, and thus help with the development of counter-insurgency plans in response to civil wars. One implication of these results is the likely redirection of scarce resources to intelligence-gathering, rather than troop recruitment or the acquisition of arms and ammunition. Using surveillance and dataveillance is far less costly in terms of money, effort, time, and human life.

In a broader context, these results also reinforce the selection of more indirect strategies of achieving control, rather than direct control in counterinsurgency operations. Civilian support is often essential to sustaining a "military effort" (Zahar, 2000) in a civil war, since both sides often need civilian support in the form of food, shelter, weapons, refuge, recruits, and so on. Consequently, controlling civilian activity is a top priority. Civilian isolation through virtual control via surveillance and dataveillance would be an optimum solution to a government seeking popular support, since the result would be less violence.

In this research, I focused solely on the Syrian Arab Republic, which is home to a highly authoritarian regime in a society divided along multiple sectarian lines. However, there are many different settings within which this type of investigation would be appropriate. Thus, caution should be exercised when drawing conclusions from this sole example. I can only emphasize that this research would be an excellent starting point for future work examining this phenomenon in other national settings.

7.6 Robustness Check Tables

Table 7.5 Government Indiscriminate Violence Against Civilians in Syrian Subdistricts, April 2012 to March 2016 (Fixed Effects)

	(1)	(2)	(3)	(4)
Population (log)	0.278***	0.315***	0.251***	0.356***
	(0.000)	(0.000)	(0.000)	(0.000)
IDPs (log)	0.005***	0.004**	0.005***	0.004**
	(0.000)	(0.003)	(0.001)	(0.008)
Urbanization	0.674***	0.744***	0.790***	0.710***
	(0.000)	(0.000)	(0.000)	(0.000)
Gov. employees	0.016***	0.016***	0.015***	0.017***
	(0.000)	(0.000)	(0.000)	(0.000)
Road density	0.174	0.260*	-0.196	0.716***
	(0.128)	(0.034)	(0.290)	(0.000)
Sunni	0.260*	0.275*	0.275*	0.280*
	(0.048)	(0.044)	(0.044)	(0.042)

Alawites	-0.646***	-0.605***	-0.569***	-0.599***
	(0.000)	(0.000)	(0.000)	(0.000)
War age	-0.024***	-0.025***	-0.026***	-0.026***
	(0.000)	(0.000)	(0.000)	(0.000)
Russian Intervention	0.079	0.079	0.097	0.044
	(0.457)	(0.459)	(0.363)	(0.680)
GCP per capita (log)	0.066***	0.056***	0.059***	0.054***
	(0.000)	(0.000)	(0.000)	(0.000)
Area (square mile)	-0.826***	-0.885***	-0.741***	-1.007***
	(0.000)	(0.000)	(0.000)	(0.000)
NTL (Change from previous month)		-0.061***		
		(0.000)		
NTL (Change from first month)			-0.027**	
			(0.001)	

NTL (Change rate)				-0.055***
				(0.000)
Constant	-4.627***	-4.992***	-4.226***	-5.531***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3572	3268	3268	3268
AIC	15060.671	13790.387	13810.925	13799.289
ll	-7518.335	-6882.194	-6892.463	-6886.644

Table 7.6 Government Indiscriminate Violence Against Civilians in Syrian Subdistricts, April 2012 to March 2016, Alternative Threshold for Dependent Variable (5 killings per year)

	(1)	(2)	(3)
Population (log)	0.322***	0.259***	0.364***
	(0.000)	(0.000)	(0.000)
IDPs (log)	0.005**	0.005***	0.004**
	(0.002)	(0.000)	(0.005)
Urbanization	0.786***	0.829***	0.752***
	(0.000)	(0.000)	(0.000)

Gov. employees	0.015***	0.014***	0.016***
	(0.000)	(0.000)	(0.000)
Road density	0.237√ú	-0.208	0.701***
	(0.052)	(0.255)	(0.000)
Sunni	0.313*	0.311*	0.318*
	(0.022)	(0.023)	(0.020)
Alawites	-0.628***	-0.592***	-0.622***
	(0.000)	(0.000)	(0.000)
War age	-0.025***	-0.026***	-0.026***
	(0.000)	(0.000)	(0.000)
Russian Intervention	0.085	0.104	0.050
	(0.423)	(0.333)	(0.640)
GCP per capita (log)	0.054***	0.058***	0.052***
	(0.000)	(0.000)	(0.000)

Area (square mile)	-0.871***	-0.729***	-0.996***
	(0.000)	(0.000)	(0.000)
NTL (Change from previous month)	-0.061***		
	(0.000)		
NTL (Change from first month)		-0.027**	
		(0.002)	
NTL (Change rate)			-0.056***
			(0.000)
Constant	-5.079***	-4.321***	-5.633***
	(0.000)	(0.000)	(0.000)
ln_r			
Constant	-1.281***	-1.291***	-1.277***
	(0.000)	(0.000)	(0.000)
ln_s			
Constant	-2.824***	-2.840***	-2.813***
	(0.000)	(0.000)	(0.000)

Observations	11137	11137	11138
AIC	15079.144	15100.216	15087.260
ll	-7524.572	-7535.108	-7528.630

p-values in parentheses

√ú $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7.7 Government Indiscriminate Violence Against Civilians in Syrian Subdistricts, April 2012 to March 2016, Alternative Threshold for Dependent Variable (10 killings per year)

	(1)	(2)	(3)
Population (log)	0.319***	0.255***	0.360***
	(0.000)	(0.000)	(0.000)
IDPs (log)	0.004**	0.005***	0.004**
	(0.004)	(0.001)	(0.010)
Urbanization	0.790***	0.833***	0.757***
	(0.000)	(0.000)	(0.000)
Gov. employees	0.016***	0.016***	0.017***
	(0.000)	(0.000)	(0.000)

Road density	0.233	-0.212	0.696***
	(0.056)	(0.247)	(0.000)
Sunni	0.305*	0.303*	0.310*
	(0.026)	(0.027)	(0.024)
Alawites	-0.631***	-0.596***	-0.626***
	(0.000)	(0.000)	(0.000)
War age	-0.025***	-0.025***	-0.025***
	(0.000)	(0.000)	(0.000)
Russian Intervention	0.082	0.100	0.046
	(0.445)	(0.351)	(0.667)
GCP per capita (log)	0.053***	0.057***	0.051***
	(0.000)	(0.000)	(0.000)
Area (square mile)	-0.895***	-0.753***	-1.019***
	(0.000)	(0.000)	(0.000)

NTL (Change from previous month)	-0.061***		
	(0.000)		
NTL (Change from first month)		-0.027**	
		(0.002)	
NTL (Change rate)			-0.055***
			(0.000)
Constant	-5.064***	-4.306***	-5.614***
	(0.000)	(0.000)	(0.000)
ln_r			
Constant	-1.295***	-1.303***	-1.291***
	(0.000)	(0.000)	(0.000)
ln_s			
Constant	-2.854***	-2.870***	-2.844***
	(0.000)	(0.000)	(0.000)
Observations	11137	11137	11138
AIC	15030.962	15051.989	15039.178
ll	-7500.481	-7510.995	-7504.589

p-values in parentheses

$^{\surd ú}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7.8 Government Indiscriminate Violence Against Civilians in Syrian Subdistricts, April 2012 to March 2016, Alternative Threshold for Dependent Variable (25 killings per year)

	(1)	(2)	(3)
Population (log)	0.330***	0.270***	0.372***
	(0.000)	(0.000)	(0.000)
IDPs (log)	0.004**	0.005***	0.004**
	(0.004)	(0.001)	(0.009)
Urbanization	0.726***	0.770***	0.689***
	(0.000)	(0.000)	(0.000)
Gov. employees	0.021***	0.020***	0.022***
	(0.000)	(0.000)	(0.000)
Road density	0.207$^{\surd ú}$	-0.215	0.679***
	(0.088)	(0.235)	(0.000)

Sunni	0.240√ú	0.242√ú	0.243√ú
	(0.083)	(0.079)	(0.080)
Alawites	-0.758***	-0.722***	-0.751***
	(0.000)	(0.000)	(0.000)
War age	-0.025***	-0.026***	-0.026***
	(0.000)	(0.000)	(0.000)
Russian Intervention	0.082	0.100	0.045
	(0.440)	(0.349)	(0.671)
GCP per capita (log)	0.078***	0.081***	0.075***
	(0.000)	(0.000)	(0.000)
Area (square mile)	-0.895***	-0.759***	-1.022***
	(0.000)	(0.000)	(0.000)
NTL (Change from previous month)	-0.060***		
	(0.000)		

NTL (Change from first month)		-0.025**	
		(0.003)	
NTL (Change rate)			-0.056***
			(0.000)
Constant	-5.279***	-4.566***	-5.836***
	(0.000)	(0.000)	(0.000)
ln_r			
Constant	-1.374***	-1.381***	-1.371***
	(0.000)	(0.000)	(0.000)
ln_s			
Constant	-3.048***	-3.061***	-3.041***
	(0.000)	(0.000)	(0.000)
Observations	11137	11137	11138
AIC	14616.729	14639.005	14624.228
ll	-7293.364	-7304.503	-7297.114

p-values in parentheses

√ú $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7.9 Government Indiscriminate Violence Against Civilians in Syrian Subdistricts, April

2012 to March 2016, Alternative Threshold for Dependent Variable (50 killings per year)

	(1)	(2)	(3)
Population (log)	0.361***	0.297***	0.400***
	(0.000)	(0.000)	(0.000)
IDPs (log)	0.003*	0.004**	0.003√ú
	(0.031)	(0.007)	(0.057)
Urbanization	0.692***	0.744***	0.646***
	(0.000)	(0.000)	(0.000)
Gov. employees	0.021***	0.020***	0.022***
	(0.000)	(0.000)	(0.000)
Road density	0.092	-0.361√ú	0.574***
	(0.469)	(0.059)	(0.000)
Sunni	0.020	0.027	0.022
	(0.893)	(0.857)	(0.884)

Alawites	-0.779***	-0.741***	-0.772***
	(0.000)	(0.000)	(0.000)
War age	-0.023***	-0.024***	-0.024***
	(0.000)	(0.000)	(0.000)
Russian Intervention	0.030	0.047	-0.004
	(0.784)	(0.666)	(0.973)
GCP per capita (log)	0.072***	0.076***	0.069***
	(0.000)	(0.000)	(0.000)
Area (square mile)	-1.002***	-0.865***	-1.110***
	(0.000)	(0.000)	(0.000)
NTL (Change from previous month)	-0.063***		
	(0.000)		
NTL (Change from first month)		-0.027**	
		(0.002)	

NTL (Change rate)			-0.056***
			(0.000)
Constant	-5.337***	-4.585***	-5.863***
	(0.000)	(0.000)	(0.000)
ln_r			
Constant	-1.458***	-1.464***	-1.457***
	(0.000)	(0.000)	(0.000)
ln_s			
Constant	-3.378***	-3.388***	-3.372***
	(0.000)	(0.000)	(0.000)
Observations	11137	11137	11138
AIC	13520.960	13543.245	13530.367
ll	-6745.480	-6756.623	-6750.184

p-values in parentheses

√ ú $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7.10 Government Indiscriminate Violence Against Civilians in Syrian Subdistricts, April 2012 to March 2016, Control for Oil and Gas

	(1)	(2)	(3)	(4)

Population (log)	0.269***	0.316***	0.212***	0.346***
	(0.000)	(0.000)	(0.000)	(0.000)
IDPs (log)	0.004*	0.003√ú	0.004*	0.003√ú
	(0.014)	(0.050)	(0.020)	(0.057)
Urbanization	0.790***	0.904***	1.006***	0.840***
	(0.000)	(0.000)	(0.000)	(0.000)
Gov. employees	0.022***	0.023***	0.022***	0.023***
	(0.000)	(0.000)	(0.000)	(0.000)
Road density	0.023	0.055	-0.634*	0.543**
	(0.877)	(0.739)	(0.013)	(0.005)
Sunni	0.114	0.083	0.065	0.095
	(0.455)	(0.603)	(0.680)	(0.549)
Alawites	-1.686***	-1.734***	-1.665***	-1.693***
	(0.000)	(0.000)	(0.000)	(0.000)

War age	-0.019***	-0.021***	-0.022***	-0.022***
	(0.000)	(0.000)	(0.000)	(0.000)
Russian Intervention	0.045	0.056	0.075	0.025
	(0.715)	(0.655)	(0.546)	(0.844)
GCP per capita (log)	-0.017	-0.035√ú	-0.032	-0.038√ú
	(0.388)	(0.100)	(0.129)	(0.074)
Area (square mile)	-2.827***	-2.977***	-3.232***	-2.766***
	(0.000)	(0.000)	(0.000)	(0.000)
NTL (Change from previous month)		-0.065***		
		(0.000)		
NTL (Change from first month)			-0.040***	
			(0.000)	
NTL (Change rate)				-0.050***
				(0.000)

Constant	-4.173***	-4.575***	-3.308***	-4.984***
	(0.000)	(0.000)	(0.000)	(0.000)
ln_r				
Constant	-1.167***	-1.145***	-1.163***	-1.144***
	(0.000)	(0.000)	(0.000)	(0.000)
ln_s				
Constant	-2.584***	-2.515***	-2.555***	-2.509***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	8274	7569	7569	7570
AIC	11643.403	10721.025	10734.135	10734.853
ll	-5807.701	-5345.513	-5352.067	-5352.427

p-values in parentheses

√ú $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

CHAPTER 8. CONCLUSION

8.1 Review

Civil wars have been fought around the world and throughout human history. However, especially after the end of the Second World War and the collapse of several empires, the number of civil wars increased globally. There have been many adverse consequences from these wars, including "mass dislocation, epidemics, famines, and the degradation of the state apparatus," as well as substantial "economic costs" (Kalyvas, 2009). However, perhaps the most important is the upsurge in civilian deaths. According to Sambanis (2004b), in the 145 civil wars that took place between 1945 and 1999, the mean number of deaths was "143,883." There are two principal actors – the state and rebel groups – responsible for these fatalities. This research addresses one: the state.

From the literature on civilian victimization, we have learned a great deal about why established governments may use violence against civilians (Downes, 2007, Azam and Hoeffler, 2002, Zhukov, 2014, Lyall, 2009, Kalyvas, 2006, Kalyvas, 1999, Schutte, 2015, Kalyvas, 2004, Valentino et al., 2004). Kalyvas (2006), for example, in his influential book entitled *The Logic of Violence in Civil War*, argued that violence is a function of "territorial control," and the targeting of specific individuals is motivated by information provided by collaborators. I find Kalyvas's conceptualization of territorial control to be overly focused on the "physical," and his use of information to be bound to local people. Thus, the current research departs from Kalyvas's theories in two ways. First, isolation of the people (i.e., control over them) can also be achieved non-physically, via "social control." Second, information provision should not be bound solely to local people.

My foundation for this inquiry is the assumption that technological advances and the expansion of digital infrastructure should help states achieve an effective level of virtual control

over the citizenry, delivering information without the help of local collaborators. Considering the digital age in which we now live, especially in recent decades states no longer must depend solely upon locals or other conventional means of surveillance; they are now capable of monitoring, collecting, and storing their citizens' personal information through constantly-evolving forms of technology. Thus, I argue that surveillance and dataveillance technologies that governments are likely to obtain can make social control over the population possible through the provision of key information.

Technological surveillance and dataveillance are omnipresent and ever-expanding. For example, according to a survey regarding surveillance cameras, "in Manhattan, it is [almost] impossible to walk around the city without being recorded nearly every step of the way" (Stanley and Steinhardt, 2003, 2). If states allocate sufficient resources to acquire more advanced surveillance and dataveillance technologies, they can effectively turn many of their territories into places like Manhattan, at least in terms of accessibility to their people. Recent research (Wezeman, 2011, GAO, 2012 , Dobbing and Chris, 2014) confirms this, arguing that many countries (especially those war-torn nations suffering from civil uprisings), have already begun to procure significant amounts of surveillance/dataveillance tools.

In Chapter 4, I presented a theory and associated evidence for why state violence against civilians follows a predictable logic that depends upon the level of information possessed by a state regarding its population. As information fluctuates over the course of a conflict, so does the level of violence adopted. I defined "information" as any kind of knowledge that helps political actors sort through civilians to identify who is loyal and who might assist their adversary; their subsequent targeting of specific individuals is almost always based upon such information. Chapter 5 provides qualitative evidence, with illustrations from civil wars around the world. Chapter 6 supports these claims with a quantitative analysis evaluating this relationship on a macro-level, using a 1989 to 2014 dataset with a sample of roughly 850 country-year observations for 69 countries. My findings

indicate that the greater the amount of state-held information on the population, the less likely the government is to perpetrate violence against civilians.

Lastly, in Chapter 7, my analysis moves to a more micro-level setting. My findings from the ongoing Syrian civil war illustrate that when a state monitors its population (e.g., determining what they are doing and who they support), civilians become virtually separated from rebel influences, discouraging disobedience and defection. More information about their behavior makes them more accountable to the party in power. The more a government increases its virtual control, the more its people are encouraged not to break the law and the less likely the government is to need violence to maintain control. The results of Chapter 7 indicate that state violence is also influenced by social control's ability to isolate the population from rebel groups seeking to recruit their assistance.

8.2 New Perspectives for Scholars and Policy Makers

I propose that governments should make use of advanced surveillance/dataveillance technologies in order to create social control over their citizenry, which will help decrease the number of civilian killings. The results from Chapters 6 and 7 indicate that "Panopticonic conditions" (i.e., social control) either via surveillance technology such as drones or dataveillance equipment such as internet monitoring, wiretapping, social media control, etc., offer the potential to dramatically change the conflict environment and have a limiting effect on the number of civilian deaths. Inside this Panopticon-like atmosphere where states enjoy an unlimited level of knowledge about citizens, individuals must adopt a neutral stance (or one in support of the government) out of fear of being punished for switching sides. In circumstances where the risk of civilian defections is minimized, the state has less of a need to initiate violence.

For researchers, social control and its possible effects on violence perpetrated by governments comprise an essential area of investigation, likely to yield findings useful to policy recommendations that could eventually save innocent lives. Until quite recently, very little

theoretical or empirical research considered social control a possible remedy that could be applied in the context of civil wars. I believe that future research on civilian victimization will find substantial qualitative and/or quantitative evidence to prove that state and/or rebel violence can be reduced by social control. Further investment of time and energy into social (over physical) control will pay off by providing alternative, less-expensive means of reducing civilian fatalities in civil wars. For policy makers, this research will provide important guidelines for dealing with insurgency, and thus help with the development of counter-insurgency plans in response to civil wars. One implication of these results is the likely redirection of scarce resources to intelligence-gathering, rather than troop recruitment or the acquisition of arms and ammunition. Using surveillance and dataveillance is far less costly in terms of money, effort, time, and human life.

In a broader context, these results also reinforce the selection of more indirect strategies of achieving control. Civilian support is often essential to sustaining a "military effort" (Zahar, 2000) in a civil war, since both sides often need support in the form of food, shelter, weapons, refuge, recruits, and so on. Consequently, controlling civilian activity is a top priority. Isolation via surveillance and dataveillance provides an optimum solution to governments seeking popular support, since the result is less indiscriminate violence.

CHAPTER 9. APPENDICES

9.1 Introduction

Argus Panoptes and Panopticon are two under-recognized things from the history. The former one, Panoptes (literally means "all-seeing"), was a primordial giant with a hundred eyes in Greek mythology. He was thus known to be a very effective watchman, as only a few of the eyes would sleep at a time; there were always eyes still awake. And the latter, Panopticon (closer to "all seeing"), inspired by the mythological giant Panoptes, is a building designed (and named as a reference to Panoptes) by the English philosopher and social theorist Jeremy Bentham in the late 18th century.[1] The concept of the design is to allow all (pan-) inmates of an institution to be observed (-opticon) by a single watchman without the inmates being able to tell whether or not they are being watched. Thus, the occupants of the Panopticon, not knowing if they were in fact being observed, would come to assume constant surveillance and eventually "watch themselves." Therefore, no actual inspector needed. To elaborate the structure a bit, the design of the building consists of a circular structure with an "inspection house" at its center, from which the manager or staffs of the institution are able to watch the inmates, who are stationed around the perimeter (see Figure 3.1)

What led Bentham to design such a building was his belief that this design could solve most of society's ills as it is understood from his own words "Morals reformed--health preserved--industry invigorated--instruction diffused--public burthens lightened--Economy seated, as it were, upon a rock--the Gordian knot of the poor-law not cut, but untied-all by a simple idea in Architecture!" (Bentham and Bowring, 1962).

[1] I should also emphasize here that Jeremy Bentham later repeatedly acknowledged that who conceived the basic idea of a circular building was his brother Samuel Bentham, who was then an architect.

In a nutshell, the Panopticon creates “a consciousness of permanent visibility as a form of power, where no bars, chains, and heavy locks are necessary for domination any more” (Allmer, 2012, 22). I argue that, though hypothetically, if Bentham’s idea is currently possible through other means in civil wars? For now, finding or creating an Argus Panoptes seems a bit unrealistic and fictitious. But how about finding a kind of design (not meaning here the building) that looks like Panopticon? Thus, I claim that especially governments have the capacity to create a Panopticonish design that can change the conditions of civil war and deeply affect the actors’ attitudes in civil war. In this regard, I here argue that modern information and communication technology (ICT) can be possible candidates that can make the conditions seem like more ‘Panopticonish’.

As is known to all, especially in recent decades, modern ICT has become a significant factor in all puzzles and equations of political science, one of which, in my view, is civil war. By producing many innovations that offer a lot of fruitful opportunities for transmitting the information more rapidly than ever, ICT can act as a catalyst that speeds up the important events/phenomenon. ICT not only creates “dense global networks of communication”, that links individuals to all others (Weidmann, 2015b, 263), but also makes the information produced be easily shared almost anywhere and anytime. What happens if the information is shared and gathered more easily than before? Can human being create a Panopticon-like design with the help of ICT? In that case, does this affect the violence the political actors initiate? Regarding the answers to these questions, as oft-repeated throughout this dissertation, my view is that information what ICT produces clearly has some remarkable effects on political actors’ use of violence and civilians’ attitudes.

I argue that when ICT helps create a Panopticon-like world, then the people and all political actors would behave like the occupants of the Panopticon, not knowing if they were in fact being observed, would come to assume constant surveillance and eventually "watch themselves." This is of course a utopic idea; however, I also believe at least some part of it could be doable. This constant “Panopticon effect” in my terms has two faces: one on combatants and the other on

civilians. For combatants, this constant surveillance environment will lead them to behave more constrained and therefore stop/reduce using violence (especially indiscriminate). When it comes to civilians, this effect will lead them to choose remaining neutral in fear of being punished in return for their misbehaviors such as choosing the possible costlier alternatives like supporting the either side. And here, I explain how UAVs, cell phones, Internet as unquestionably important ICT equipment are valuable in creating information about civilian population.

Though hard to digest, every single day there is an overwhelming information flow upon us, which also holds true for political actors in civil wars. Then I claim that with the help of this 'so called information flow', actors can more closely know their opponents and people, thereby efficiently select the amount and the type of violence they intend to initiate. Thus, one can argue that modern technology in recent decades clearly contribute a lot to our courses of actions.

In these Appendices, I describe how I created three datasets and offer general information about them. As explained above, I used these three variables as proxies to measure the level of information possessed by a government or rebel group. This Appendix details these three variables (Unmanned Air Vehicles, or "UAV," and Cell Phone Subscriptions, or "CPS") and how they were used to test my basic argument regarding information's effects on the use of violence.

In recent decades, UAVs have become the new face of warfare; many countries use them in their counterinsurgency operations. For example, at the time of the 9/11 attacks, the US had "roughly fifty drones;" now it has thousands (Himes, 2016, 11). Why are countries more interested in these types of devices now than in the past? One plausible answer is their substantial information-gathering capability. UAVs have been invaluable in gathering intelligence from the air, such as signal intelligence (SIGINT), geospatial intelligence (GEOINT), and image intelligence (IMINT). Therefore, many countries have begun to invest in these proven platforms in recent years.

What makes them notable is that they can "see and think" (Himes, 2016, 12), which is not common among other types of military equipment.

Another main advantage over other platforms is that they have more flight time than traditional aircraft; this enables them to observe and track a target for many hours at a time (over forty hours in one flight, in some versions). UAVs are regularly outfitted with equipment that successfully allows them to collect SIGINT, measurement and signature intelligence (MASINT), GEOINT, and IMINT. There are also many other uses for drones. For example, the Defense Advanced Research Projects Agency of the US Department of Defense (DARPA) is now exploring how to turn drones into Wi-Fi hotspots, with an equivalent of 4G smartphone connectivity on the battlefield.

This ability to exclusively observe and track a target for many hours, coupled with their high-tech, accurate, and precise equipment, makes these devices ideal for collecting reliable and time-sensitive information about either civilian or combatant targets. As I have argued above, in any civil conflict, what is needed by both sides is accurate information that allows them to determine if someone is friendly or counter to their cause. Therefore, by observing and monitoring targets and helping their operators distinguish friend from foe, UAVs can potentially limit indiscriminate violence against non-combatants.

As a second proxy, I supplemented the UAV variable with CPS; this variable recorded the number of subscriptions to a public mobile telephone service that provides access to the public switched telephone network (PSTN) using cellular technology. In 2017, cellphones are omnipresent; the current number of cellphone subscriptions is believed to have reached 4.77 billion, which is approximately two-thirds of the world's population. My discussion of cell phone use includes two key elements. One is that cellphones can make it substantially easier for the population to share information with one another, and thus provide assistance to one side in a political conflict. The second is that one actor (usually, the government) may have

monitoring/wiretapping abilities, which means that even if the population does not willingly share information, the government may still succeed in collected it, either legally or illegally. Thus, cellphones create valuable opportunities for "intelligence collection" (Shapiro & Weidmann, 2015, 247). In my view, more cellphones mean more opportunities for information-gathering, especially for the government. Therefore, I believe that the number of cell phone subscriptions can be used to help us quantify how much the government or a rebel group knows about the civilian population. I used World Bank data to gather cell phone subscription information for countries during the study years, and spatiotemporally coded each country's cell phone usage. CPS was a continuous variable showing how many cell phone subscriptions existed per 100 people in a given year and country. My aim was to test whether the information capability provided by cellphones affected the amount and type of violence perpetrated in a civil war.

Third, I employ Internet Usage as another proxy. Appendix A (UAV) and B (Cell Phone) and Appendix C (Internet Usage) examine the variables in detail, offering definitions and descriptions. I also elaborate on how I created the datasets and used each to test my theory. I have also included a conclusion, which summarizes all.

9.2. Appendix A- Drones Dataset

9.2.1 An Introduction to Unmanned Aerial Vehicles (UAVs)

A UAV, commonly called a drone or unmanned aircraft system (UAS), is "a fixed or rotary winged" aircraft without a human pilot (Excellence, 2009, 21). This does not mean that humans do not operate UAVs. To the contrary, human control is required for the system to work. Thus, UAVs

are also referred to as “remotely piloted vehicles” (RPV) because in the end there is a “human being interacting with a machine.”[2]

In general, unmanned vehicles (UV) can be classified by whether they operate in the air (UAV), on the ground (UGV), under the surface (USV), or under water (UUV). Regardless of where it is deployed, a UV functions as part of a larger system that requires a control station and data link to control the vehicle. Generally, an UAS (see Figure 1, below) includes a Ground Control Station (GCS) and is linked to one or more UAVs. This link can either be line of sight (LOS) or used with satellite communications (SATCOM). SATCOM allows a UAV to fly much further, such that its reach depends only on its fuel.

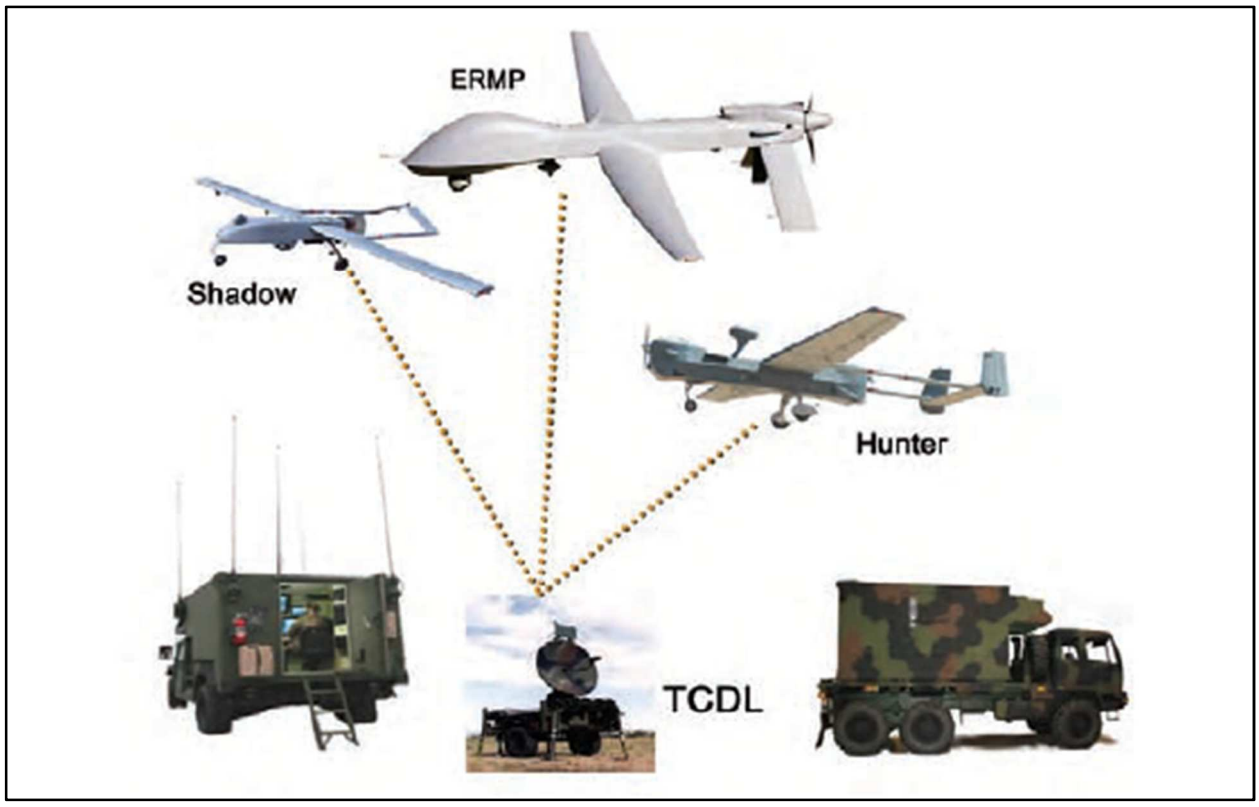

Figure 9.1 Unmanned Aerial Systems (Excellence, 2009, 10).

[2] http://www.eldailypost.com/news/2015/07/mexicos-drones-who-uses-them-and-why/

Depending on features and reach, there are many different categorizations of UVs, such as "micro-UAS, mini-UAS, Tactical UAS (TUAS), Medium Altiude Long Endurance (MALE) … High Altitude Long Endurance (HALE)" (see Appendix, Table 1),[3] "Micro/Mini, Tactical, Strategic, [or] Special Task."[4] My analysis categorizes these into one of three groups: Tactical, MALE, and HALE.

9.2.2 Unmanned Aerial Vehicles Dataset

Below, I explain how I created the UAV dataset. Unfortunately (and surprisingly), there is no single comprehensive dataset or source that systematically reports information on particular countries' UAV abilities. Yet there are reliable sources from which a dataset can be formed. I used the New America Foundation (NAF) drone database,[5] which exhibits a professionally collected body of information. The NAF's reporting system tracks the countries that currently possess drones and how they acquired them, based on an analysis of hundreds of news reports and government documents. According to the NAF project "Word of Drones," there are currently 86 countries that have some sort of drone capability. As emphasized in its code of conduct, the media outlets that the NAF relies upon are the three major international wire services (Agence France Presse, Associated Press, and Reuters), which allow it to be considered reliable.

I made use of one other database, that of the Stockholm International Peace Research Institute (SIPRI); this database provides information on conflict, armaments, arms control, and disarmament. SIPRI provides information on all international transfers in seven categories of major conventional arms, beginning in 1950. It describes itself as "the most comprehensive publicly

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[3] http://www.eldailypost.com/news/2015/07/mexicos-drones-who-uses-them-and-why/

[4] http://geospatialworld.net/magazine/MArticleView.aspx?aid=23671

[5] http://securitydata.newamerica.net/world-drones.html

available source of information on international arms transfers."[6] I verified, compared, and refined all data from these two sources to draft this Appendix and form the dataset used in this research. I also complemented these two resources with information from other reliable sources, such as reports, books, and articles prepared by prominent governmental organizations and research companies, universities, think-tanks, task groups (such as NATO, the World Bank, United States Government Accountability Office, and CIA), and major new sources (the BBC, New York Times, Guardian, etc.).

Included in the NAF's documents was information on "Non-state Actors with Drones used in Combat," such as Hezbollah, the Libyan rebels, Hamas, and ISIS.[7] However, this information was limited to only those rebel groups, and therefore not sufficient to test the theories put forth in this research. Therefore, I restricted my interested to government UAV possession, and excluded rebel organizations. Finally, it is important to note that I am only interested in UAV possession in those countries that actively fight against rebels in a civil war context.

9.2.3 Countries with UAVs Engaged in Civil War

The drone market has become huge, especially in recent years. A Virginia-based defense consulting firm, the Teal Group, estimated in 2013 that "the global market for drones will almost double in the next decade, from $6.6 billion annually to $11.4 billion a year, and a 2011 study found that there were around 680 active drone development programs run by governments, companies and research institutes around the world, compared with only 195 six years earlier."[8] The World of Drones Project (WODP) offers maps of the countries, in seven categories. Countries:

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[6] http://www.sipri.org/databases

[7] http://securitydata.newamerica.net/world-drones.html

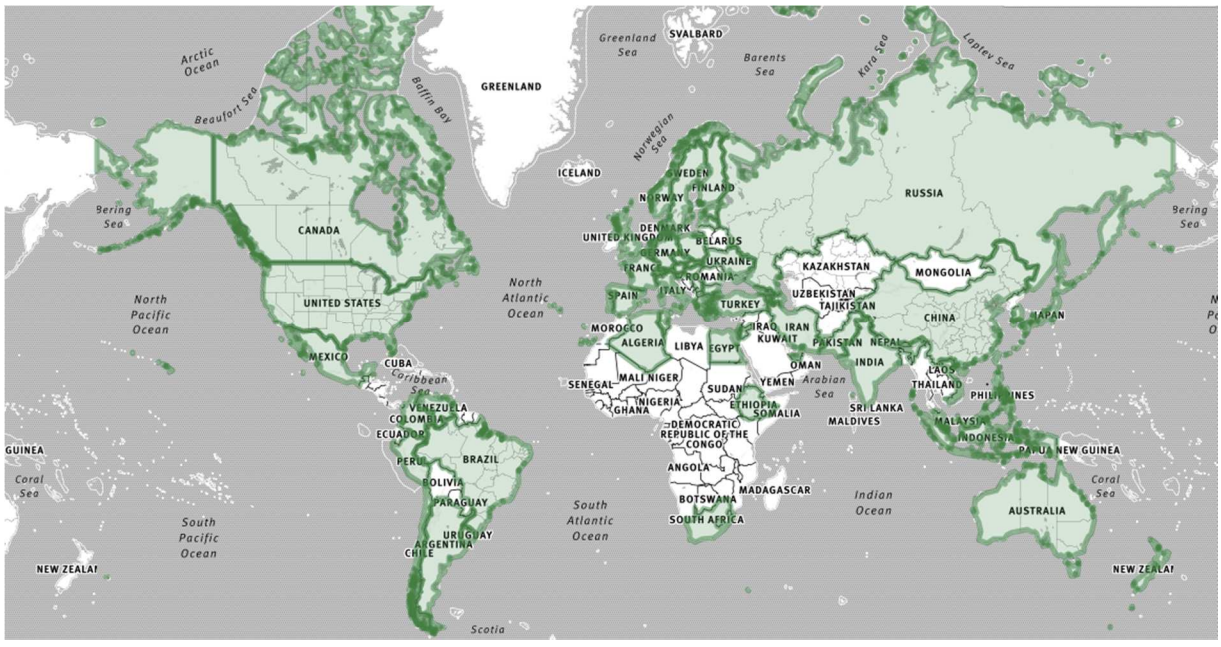
[8] http://securitydata.newamerica.net/world-drones.html

a. **Used drones in combat:** 5 (the US, Israel, the UK, Pakistan, Iraq)

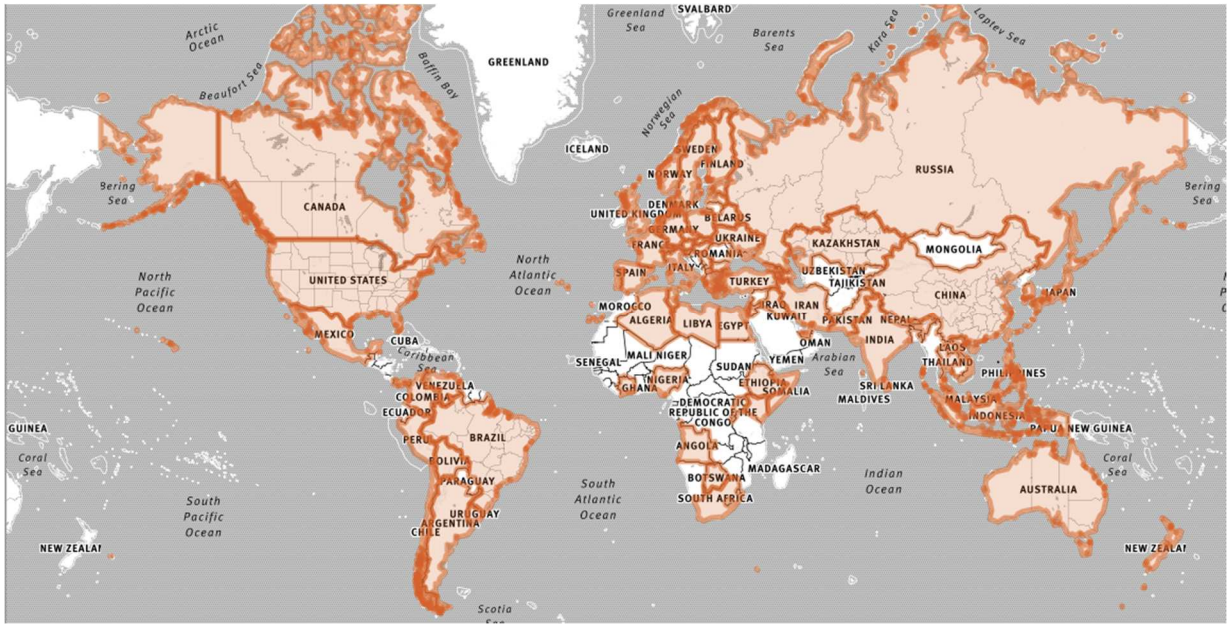
b. **Has armed drones:** 7 (the United States, Israel, the United Kingdom, Pakistan, Iraq, Nigeria, South Africa and Iran)

c. Developing armed drones

d. Domestically producing drones,



e. Tier I (Low altitude, long endurance),



f. Tier II (Medium altitude, long endurance)

g. Tier II+ (High altitude, long endurance).

Now I explain in the next section below how I coded UAV use of countries one by one. The countries are in alphabetical order.

Table 9.1 Drone Information on Countries at civil war (in Alphabetical Order)

Nu.	Countries	Source of Technology and UAV Coding
1	**Afghanistan**	Afghanistan has no domestic drone use or production. However, ISAF forces led by the US have been actively using UAVs since 2002 [9;10]. Therefore, I coded 1 as of year 2002. Source(s):): New America Foundation, SIPRI, Drone wars UK, CNN, thenation.com.

[9] http://www.cnn.com/2012/10/01/opinion/bergen-world-of-drones/

[10] http://www.thenation.com/article/brief-history-drones/

2	**Algeria**	Algeria has domestic drone production[11] and imported the medium-range Seeker II tactical drones from South Africa in 1998 (10 Seeker UAVs for 20 million $ deal) and they started to use these in 1998 on.[12]. Reports suggest Algeria operates Denel Dynamics Seeker drones and is interested in obtaining U.A.E.-based Adcom Systems Yabhon United 40 Block 5 drones[13]. The first use of Algerian–made tactical UAV is in 2013 with AMEL[14] and AL fajer L-10[15]. Therefore, I coded 1 as of 1998. Source(s):): New America Foundation, SIPRI, Morocco News Tribune, Institute for National Security Studies, Defense News: Defence Web: SIPRI Arms Transfers Database, Algeria-Focus.

[11] http://morocconewstribune.com/algerian-researchers-manufacture-algerias-first-unmanned-plane/

[12] SIPRI Arms Transfers Database". SIPRI. Retrieved 29 March 2016.

[13] http://securitydata.newamerica.net/world-drones.html

[14] http://www.algerie-focus.com/2013/07/premier-drone-algerien-amel-defi-releve-a-sidi-bel-abbes/

[15] http://www.algerie1.com/actualite/le-premier-drone-algerien-operationnel-avant-fin-2013/

3	**Angola**	Reports indicate that Angola imported Heron drones from Israel[16] in 2011. The Israeli company Aeronautics reports selling its Aerostar Tactical Unmanned Air Vehicle System to Angola. Angola has previously used another Israeli company to supply UAVs[17]. In 2003 Aeronautics Defense Systems supplied its Aerostar UAS to patrol oil installations for Chevron/Texaco over a two-year period. Since they are for patrolling oils stations, I excluded their use as of that year since there is no relation of use against rebels. Heron UAV sale from Israel was reported (unknown number) in 2011[18], therefore I coded 1 as of 2011. Source(s): New America Foundation, SIPRI, Drone wars UK.

[16] http://securitydata.newamerica.net/world-drones.html

[17] http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=15142

[18] https://dronewarsuk.files.wordpress.com/2014/01/israel-and-the-drone-wars.pdf

4	**Azerbaijan**	Azerbaijan has imported drones from Israel and began domestic production in partnership with Israeli firms.[19] Shipments of drones from Israel continued through 2013. Reportedly 4 Aerostar sale in 2008, 10 Aerostar sale in 2011, 10 Hermes 450 sale in 2011, 5 Heron sale in 2011, 5 Searchers in 2011, x Orbiter (year unknown)[20]. Therefore, I coded 1 as of 2011. Source(s): New America Foundation , SIPRI, Drone wars UK.
5	**Bangladesh**	Bangladesh at the present time has no UAV but has plans on acquiring by 2017[21]. Source(s): New America Foundation , SIPRI, Drone wars UK.

[19] http://securitydata.newamerica.net/world-drones.html

[20] http://armstrade.sipri.org/armstrade/page/trade_register.php

[21] https://en.wikipedia.org/wiki/Forces_Goal_2030

6	**Bosnia and Herzegovina**	Bosnia and Herzegovina has no UAV. However, in 1995, 3 US Predator UAVs were deployed in Albania and another 3 Predators into Hungary in 1996 for use in the Bosnian War. Therefore, I coded 1 as of 1995. Source(s): New America Foundation , SIPRI, Federation Of American Scientists,
7	**Burundi**	Burundi has drones in the form of military aid from the United States, including 4 tactical drones in 2011. Thus, I coded 1 as of 2011. Source(s): New America Foundation , SIPRI, BBC, AP,
8	**Cambodia**	Cambodia has no drones. Source(s): New America Foundation, SIPRI.
9	**CAR**	Central African Republic has no drones. Source(s): New America Foundation, SIPRI.
10	**Chad**	Chad has no drones. Source(s): New America Foundation, SIPRI.

11	**Colombia**	Colombia began using US drones for counterterrorism in 2006.[22] There have been imports of Hermes drones from Israel and lastly purchased some other Hermes 900 drones in 2014[23]. Thus, I coded 1 as of 2006. Source(s): New America Foundation , SIPRI, UPI, Washington Post.
12	**Comoros**	Comoros has no drones. Source(s): New America Foundation, SIPRI.
13	**Congo-Brazzaville**	Congo-Brazzaville has no drones. Source(s): New America Foundation, SIPRI.

[22] https://www.washingtonpost.com/world/wikileaks-colombia-began-using-us-drones-for-counterterrorism-in-2006/2011/03/23/AB0nTjLB_story.html

[23] http://www.upi.com/Science_News/Technology/2012/01/23/Colombia-mulls-buying-more-Israeli-UAVs/27271327360725/

14.	**Cote D'Ivoire**	Cote D'Ivoire has imported Israeli UAVs (Aeronautics) in 2005 but a French unit gained control of Aeronautics equipment and destroyed them [24] and in 2012 purchased this time Herons from Israel[25]. Thus, I coded 1 as of 2012. Source(s): New America Foundation , SIPRI, Global Post , Haaretz.
15	**Croatia**	Croatia has no drones. Source(s): New America Foundation, SIPRI.
16	**Democratic Republic of Congo (Zaire)**	Democratic Republic of Congo (Zaire) has no drones. Source(s): New America Foundation, SIPRI.

[24] http://www.haaretz.com/print-edition/features/israeli-drones-under-african-skies-1.186516

[25] http://www.globalpost.com/dispatch/news/regions/middle-east/israel-and-palestine/121015/israels-drones-unmanned-and-unbound

17	**Djibouti**	Djibouti has no drones. Source(s): New America Foundation, SIPRI.
18	**Egypt**	Egypt has imported 48 R4E Sky Eye and 52 M324 Scarab tactical drones from the United States between 1988-1990[26] and 10 ANKA drones from Turkey in 2012. General Atomics, a U.S. company, received export licenses to sell an unarmed export version of the Predator to Egypt in 2010. Austria has exported 4 Schiebel Camcopter S-100 drones to Egypt in 2002[27]. Egypt has also domestically produced twelve ASN-209 drones in cooperation with a Chinese company in 2012[28]. Thus, I coded 1 as of 1988. Source(s): New America Foundation, Drone wars UK, SIPRI, Suasnews.
19	**El Salvador**	El Salvador has no drones. Source(s): New America Foundation, SIPRI.

[26] http://dronewars.net/6-who-has-drones/

[27] http://global-drone-trade.silk.co/page/Austria-Egypt

[28] http://www.suasnews.com/2012/05/egypt-nation-produces-uav-in-cooperation-with-china/

20	**Eritrea**	Eritrea has no drones. Source(s): New America Foundation, SIPRI.
21	**Ethiopia**	There opened a US drone base in Ethiopia to fight against al Kaida in 2011. As of 2011 US drones have been affectively used. Also, the Israeli manufacturer Blue Bird announced it has signed an agreement to supply a number of unmanned air vehicles (SpyLite mini UAV)[29] to Ethiopia. Lastly Ethiopia has built the first unmanned aerial vehicle (UAV) or drone which could be used for multiple purposes[30]. Thus, I coded 1 as of 2011. Source(s): New America Foundation, Washington Post, SIPRI.

[29] https://www.flightglobal.com/news/articles/ethiopian-army-to-get-bluebird-uavs-355404/

[30] http://www.sudantribune.com/spip.php?article45518

22	**Georgia**	Georgia has domestic production of drones and imported 2 Aerostar in 2004, 5 Hermes 450 and Skylark[31] drones in 2007 from Israel[32] and Swan drones from Estonia. Although Georgia announced in 2012 that it was producing drones domestically, it later emerged that these drones were actually replicas of Estonian models. In May 2015, a Georgian state-owned defense manufacturer introduced its first, domestically produced drone. This drone, though still unnamed, closely resembles Northrup Grumman's MQ-8b Fire Scourt, a drone used by the U.S. Navy. Source(s): New America Foundation, NYT, SIPRI
23	**Guatemala**	Guatemala has no drones. Source(s): New America Foundation, SIPRI.
24	**Guinea**	Guinea has no drones. Source(s): New America Foundation, SIPRI.

[31] http://forward.com/news/14193/israel-s-military-on-display-in-georgia-02514/

[32] http://global-drone-trade.silk.co/page/Israel-Aerostar-drones-to-Georgia-2004

25	**Guinea-Bissau**	Guinea-Bissau has no drones. Source(s): New America Foundation, SIPRI.

26	**Haiti**	Haiti has no drones. Source(s): New America Foundation, SIPRI.
27	**India**	India has domestic production of Lakshya (introduction 2000), Nishant (active), and Rustom (1999) drones[33]. In July 1999, for the first time the Indian army deployed its new Nishant UAV system in the fight against guerilla forces backed by Pakistan in Kashmir[34]. India has also imported Heron (12 in 2001, 22 in 2005, 16 in 2006, 11 in 2011, 16 in 2012, unknown number in 2014 and 2015), Searcher-II (36 in 1998 and 32 in 2001 and 30 in 2002, 8 in 2003, 2 in 2011) and Harpy Killer UCAV drones from Israel starting from year 1998[35]. The Defense Research and Development Organization, an agency of the Republic of A1:U91 is continuing development on the AURA drones combat designed drones set for release as late as 2020. Officials announced that they would soon be equipping drones with precision guided munitions. Thus, I coded 1 as of 1999. Source(s): New America Foundation, SIPRI, The Times of India, India Strategic,

[33] http://pib.nic.in/newsite/erelease.aspx?relid=30907

[34] http://aviationweek.com/aw/generic/story_generic.jsp?topicName=india

[35] http://www.indiastrategic.in/topstories1369_Unmanned_Aerial_Vehicle.htm

28	**Indonesia**	Indonesia has ordered Searcher-2 version via a Philippine company from Israel in 2006 and 4 drones were delivered in 2012 and obtained 4 Fox AT-1 drones from France in 2000. Officials announce that the domestically produced Wulung drones will be mass-produced[36]. Thus I coded 1 as of 2000. Source(s): New America Foundation, SIPRI, The Jakarta Globe, World Defense News.

[36] http://global-drone-trade.silk.co/page/France-Fox-drones-to-Indonesia-2000

29	**Iran**	Iran has domestic production of drones[37]. The first operational Iranian drone was the Ababil, which first saw service in 1986 during operations against Iraq. The Ababil is still in production today. The Mohajer, a medium size surveillance drone, followed soon after the Ababil and also saw service in the Iran-Iraq war. In August 2010, Iran unveiled the Karar drone, which President Mahmoud Ahmadinejad called an "ambassador of death",[38] [39] and which reportedly can carry up to four cruise missiles with a range of over 600 miles. Iranian-made Ababil drones[40] (which function more as cruise missiles) have been used by Hezbollah. According to the Iranian military, there is also domestic production of drones of short-range reconnaissance such as the Yasseer drones and Shahad-129 drones capable of 1,700 km range carrying up to 8 missiles. In November 2013, they released Fotros[41] drones[42] with a 2,000 km range[43]. In 2014, officials claimed to have reverse-engineered a RQ-170 U.S. drone that was downed in Iran in 2011. Unsubstantiated reports that Iran exports to Chile, China, Sudan, and Syria. Iran has demonstrated developments in drone capabilities in recent years. Most recently Iran unveiled a new self-control drone, named Basir[44], that moves accordingly to a pre-programmed flight plan[45]. Source(s): New America Foundation, SIPRI, The Guardian, Fars News, Tasnim News, NYT.

[37] http://dronecenter.bard.edu/irans-drones/

[38] http://www.nytimes.com/2010/08/23/world/middleeast/23iran.html

[39] http://www.theguardian.com/world/2010/aug/22/mahmoud-ahmadinejad-iran-bomber-drone

[40] https://medium.com/war-is-boring/sudans-drones-are-dropping-like-flies-ffa1be165291#.t8znrgd5u

[41] http://www.tasnimnews.com/en/news/2013/11/18/195195/iran-unveils-indigenous-fotros-drone

[42] http://www.channelnewsasia.com/news/specialreports/mh370/news/iran-unveils-attack-drone/890826.html

[43] http://en.farsnews.com/newstext.aspx?nn=13940129001323

[44] http://en.farsnews.com/newstext.aspx?nn=13940129001323

[45] https://medium.com/war-is-boring/like-it-or-not-iran-is-a-drone-power-e9899c954a3f#.8965w9gyf

30	**Iraq**	Iraq has imported drones from United States and armed CH-4B combat drones from China. Iraq's navy has purchased U.S. drones to protect the country's oil platforms in the south[46], and purchased 10 ScanEagle drones for surveillance against insurgents in 2014[47]. Additionally, as of 2003, just after the US invasion of Iraq, the US army effectively uses drones. Therefore, I coded 1 as of 2003. Source(s): New America Foundation, SIPRI, Bloomberg, US Department of Defense, Reuters.

[46] http://www.reuters.com/article/us-iraq-energy-idUSBRE84K0H120120521

[47] http://www.bloomberg.com/news/articles/2013-12-26/u-s-providing-drones-and-missiles-to-aid-iraq-in-terror-fight

31	**Israel**	Israel has domestic production of drones since 1970s. Israel is the largest exporter of drones in the world, responsible for 41 percent of all drones exported between 2001 and 2011, according to a database compiled by the Stockholm International Peace Research Institute (SIPRI)[48], though Israel refuses to release the full list of countries to which it has sold military arms totaling nearly $7 Billion. A partial list of recipients includes the United States, United Kingdom, Canada, France, Australia, Germany, Spain, Brazil, India, China, the Netherlands, Azerbaijan, Turkey and Nigeria. U.S. consulting firm Frost & Sullivan reported in 2013 that Israel exported nearly $4.6 billion worth of systems between 2005 and 2012. Therefore, I coded 1 as of 1989. Source(s): New America Foundation, SIPRI.
32	**Laos**	Laos has no drones. Source(s): New America Foundation, SIPRI.

[48] http://armstrade.sipri.org/armstrade/page/trade_register.php

33	**Lebanon**	Lebanon was given twelve Raven UAVs by the United States as part of a military aid package, and received Raven drones from France in April 2015 as part of a larger military equipment purchase. Source(s): New America Foundation, SIPRI.
34	**Lesotho**	Lesotho has no drones. Source(s): New America Foundation, SIPRI.
35	**Liberia**	Liberia has no drones. Source(s): New America Foundation, SIPRI.
36	**Macedonia**	Macedonia has no drones. Source(s): New America Foundation, SIPRI.
37	**Mali**	Mali has no drones. Source(s): New America Foundation, SIPRI.

38	**Mexico**	Mexico has domestic production of drones operating at least 100. A group of technology firms in Jalisco developed the first Mexican UAV in 2002 (80-kilometer range, top speed of 148 kilometers per hour and six-hour endurance). The S3 prototype evolved into the S4 Ehécatl (named for the Aztec god of the wind) in 2006. The S4 was in the Tactical UAS category: The S4 was developed for the Mexican military market, but its first buyer was a law enforcement agency. In 2007, the Federal Police bought a small fleet of S4 TUAS. They also acquired a mini-UAS also developed by Hydra, named E1 Gavilán (Sparrow). The Gavilán can be launched by hand; it has a range of 11 kilometers and can stay in the air between two and three hours. In 2009, an Israeli-sourced product, the Orbiter mini-UAS from Aeronautics Defense Systems (ADS), joined the Mexican inventory, when an undisclosed law enforcement agency (most likely, the Federal Police) bought four systems for $22 million dollars. The Orbiter's range was 15 kilometers and had a four-hour endurance. It could fly higher than the existing mini-UAS, with a ceiling of 18,000 feet. The prototype, named S3 Manta, led to the creation of a new company, Hydra Technologies, in 2005. The startup received public funds as seed money.[49] and has also imported 2 Hermes 4 In 2011, the Federal Police took a further step and procured a longer range UAS: the Hermes 900. 2 drones from Israel in 2009 and 2 Dominator drones in 2015[50]. Therefore, I coded 1 as of 2002. Source(s): New America Foundation, SIPRI, Flightglobal.

[49] http://www.eldailypost.com/news/2015/07/mexicos-drones-who-uses-them-and-why/

39	**Moldova**	Moldova has no drones. Source(s): New America Foundation, SIPRI.
40	**Morocco**	Morocco purchased 6 R4E Skyeye drones from the US in 1988[51] and 3 Israeli-made Heron drones from France. General Atomics received an export license to sell an unarmed Predator drones to Morocco. According to SIPRI, 3 Heron delivered in 2014. Therefore, I coded 1 as of 1988. Source(s): New America Foundation, SIPRI.
41	**Mozambique**	Mozambique has no drones. Source(s): New America Foundation, SIPRI.
42	**Myanmar**	Myanmar has no drones. Source(s): New America Foundation, SIPRI.

[50] https://www.flightglobal.com/news/articles/mexico-signs-for-unmanned-dominators-396365/

[51] http://global-drone-trade.silk.co/page/United-States-R4E-Skyeye-drones-to-Morocco-1986

43	**Nepal**	Nepal has no drones. Source(s): New America Foundation, SIPRI.
44	**Nicaragua**	Nicaragua has no drones. Source(s): New America Foundation, SIPRI.
45	**Niger**	Niger has no domestic drones. However, a status of force agreement was signed with the United States that allows U.S. troops to be in the country and use unarmed Predator drones would conduct surveillance in the region as of 2013[52]. Additionally, France has deployed EADS Harfangs to Niger since January 17, 2013 and twelve French MQ-9 Reaper unmanned aerial vehicles (UAVs) have also been delivered to Niger in 2014[53]. Therefore, I coded 1 as of 2013. Source(s): New America Foundation, SIPRI, NYT, Defenseweb.

[52] http://www.nytimes.com/2013/02/23/world/africa/in-niger-us-troops-set-up-drone-base.html?_r=0

[53] http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=33174:first-french-reapers-delivered-to-niger&catid=35:Aerospace&Itemid=107

46	**Nigeria**	Nigeria has imported Aerostar drones from Israel in 2006[54] and used them in 2007 and 2008, but later on grounded them due to maintenance problems. Then I code Nigeria 1 in 2007 and 2008, but 0 (zero) in 2009. The domestically produced GULMA drone was revealed in 2013[55]. The Nigerian Air Force Institute of Technology produced the GULMA drones, which barely meets the Tier II classification flying at a maximum altitude of 10,000 feet, reaching a top speed of 86 knots and possessing an endurance of 5.8 hours. According to the Stockholm International Peace Research Institute, 5 Chinese MALE CH-3 armed drones were imported by Nigeria in 2014. On February 3, 2016, Nigeria announced its first successful drone strike against the militant group Boko Haram, using a Chinese CH-3 model UAV[56]. Thus, I coded again 1 as of 2013. Source(s): New America Foundation, SIPRI, Globalpost, Popular Science, The Guardian.

[54] http://www.nonproliferation.eu/web/documents/other/siemontwezeman4f7dafb3c4a92.pdf

[55] http://www.popsci.com/article/technology/nigeria-shows-its-first-drone

[56] http://www.theguardian.com/news/datablog/2015/mar/16/numbers-behind-worldwide-trade-in-drones-uk-israel

47	**Pakistan**	Pakistan has highly active domestic production of drones, and first deployed in 2013[57] and has imported drones from China, Germany (30 Luna Drones delivered in 2008[58]), and United States (15 Scanegale delivered in 2015[59]). For example, in 2011 The United States provided Pakistan with 85 small "Raven" drones[60]. There has been reported co-production of drones with Italian (25 Falco delivered in 2011)[61] and Chinese manufacturers in separate projects[62]. Pakistan's domestic drones bear resemblance to Chinese armed Rainbow[63] CH-3 drones[64]. In March 2015, the army reported it had successfully test-fired an armed drone, named Burraq, capable of flying in all weather conditions and striking targets with pinpoint accuracy. Thus, I coded 1 as of 2008. Source(s): New America Foundation, SIPRI, Reuters, UPI, NYT, The Washington Post.

[57] http://www.nytimes.com/2013/11/26/world/asia/pakistan-domestic-drones-ready.html

[58] http://armstrade.sipri.org/armstrade/page/trade_register.php

[59] http://armstrade.sipri.org/armstrade/page/trade_register.php

[60] http://www.reuters.com/article/usa-pakistan-drones-idUSN2129161820110421

[61] http://armstrade.sipri.org/armstrade/page/trade_register.php

48	**Panama**	Panama imported at least four drones from the United States in 2011[65]. And also Panama planned on importing $300 million in drones from the United States and at one time was considering purchasing Heron drones from Israel[66]. Source(s): New America Foundation, SIPRI, Newsroom Panama, Jerusalem Post.

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[62] http://www.upi.com/Business_News/Security-Industry/2009/08/31/Pakistan-to-make-its-own-drones/UPI-71101251759880

[63] http://thediplomat.com/2014/05/pakistan-seeks-chinese-drones/

[64] https://www.washingtonpost.com/world/asia_pacific/pakistan-unveils-its-own-military-drones-as-protests-continue-against-us-attacks/2013/11/25/fae691cc-5607-11e3-bdbf-097ab2a3dc2b_story.html

[65] http://www.newsroompanama.com/news/panama/panama-looking-at-93-million-a-year-for-surveillance-drones

[66] http://www.jpost.com/Israel/After-Brazil-and-El-Salvador-Panama-to-test-Israeli-UAV

49	**Papua New Guinea**	Papua New Guinea has no drones. Source(s): New America Foundation, SIPRI.
50	**Paraguay**	Paraguay has no drones. Source(s): New America Foundation, SIPRI.
51	**Peru**	Peru has domestic production of three drone models and has imported 5 Israeli drones for both military and non-military purposes. Between 2008 and 2011, the air force produced three UAV models that are ready to be produced in series[67]. They were unveiled in 2012, with capabilities that range from radio transmissions to high-definition video[68]. In 2010, the Peruvian army purchased 5 Israeli-made drones to track the guerrilla group Shining Path. But those UAVs have not been used because they were found to be "inoperable."[69] Therefore, I coded 1 as of 2012. Source(s): New America Foundation, SIPRI, La Republica.

[67] http://peru.com/2012/07/12/actualidad/mi-ciudad/conozca-drones-peruanos-aviones-no-tripulados-fabricados-peru-noticia-74726

52	**Philippines**	The Philippines has domestic production of Raptor and Knight Falcon drones and has imported drones from Israel (2 Blue Horizon in 2001) and the United States (2 Hunter[70] in 2009)[71]. Drones have been used for military surveillance[72] since they can be equipped with cameras for reconnaissance duties. Therefore, I coded 1 as of 2001. Source(s): New America Foundation, SIPRI, Defense Studies, Gulf News.

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[68] http://peru.com/2012/07/12/actualidad/mi-ciudad/conozca-drones-peruanos-aviones-no-tripulados-fabricados-peru-noticia-74726

[69] http://larepublica.pe/30-04-2013/ejercito-reclama-por-compra-de-5-aviones-espia-que-no-funcionan

[70] http://www.militaryfactory.com/aircraft/detail.asp?aircraft_id=324

[71] http://defense-studies.blogspot.com/2009/04/philippines-to-acquire-israeli-uav-spy.html

[72] http://gulfnews.com/news/asia/philippines/philippines-admits-use-of-drones-against-anti-government-forces-1.1269439

53	**Romania**	Romania has imported Shadow 600 drones from the United States 5 in 2001 and 2 in 2005. Participating in NATO's Alliance Ground Surveillance program, a consortium of 15 countries that will maintain five Global Hawk high altitude long endurance drones[73]. Therefore, I coded 1 as of 2001. Source(s): New America Foundation, SIPRI, NATO.
54	**Russia/Soviet Union**	Russia uses the legacy of the Soviet period in almost all spheres as is in drones since 1970s. She has domestic production of drones and plans to invest an additional $9.2 billion in production. It is estimated that Russia has around 800 drones, mostly small. Russia purchased $150 million in Aerostar drones from Israel, and in 2010 signed an agreement to produce Heron MALE drones[74] in Russia but it is unclear whether that agreement has been fulfilled. Construction of a co-produced mini drone[75] with Vietnam was announced in 2012[76]. NBC News reported that Russia is developing a 20-ton attack drone whose prototype could be ready by 2020[77]. Therefore, I coded 1 as of 1989. Source(s): New America Foundation, SIPRI, The Diplomat, Jerusalem Post, Haaretz, UPI.

[73] http://www.nato.int/cps/en/natolive/topics_48892.htm

[74] http://www.haaretz.com/print-edition/business/israel-signs-400-million-deal-to-sell-spy-drones-to-russia-1.318972

55	**Rwanda**	Rwanda has no drones. Source(s): New America Foundation, SIPRI.
56	**Senegal**	Senegal has three drones as for military intelligence operations. The drones were delivered to Senegalese soldiers before the visit of President Barack Obama in Dakar on June 26, 2013[78]. Thus, I coded 1 as of 2013. Source(s): New America Foundation, SIPRI, Seneweb.
57	**Sierra Leone**	Sierra Leone has no drones. Source(s): New America Foundation, SIPRI.

[75] http://rbth.com/defence/2015/11/30/eye-in-the-sky-rusian-drones-join-the-ranks-of-the-worlds-unmanned-craft_546019

[76] http://www.upi.com/Business_News/Security-Industry/2012/03/20/Russia-to-build-mini-uav-drones/UPI-67911332274228/

[77] http://thediplomat.com/2014/06/russias-coming-combat-drones/

[78] http://www.seneweb.com/news/S%C3%A9curit%C3%A9/terrorisme-le-senegal-acquiert-3-drones-_n_147663.html

58	**Somalia**	Somalia has no drones. But, the U.S. sent its drones to use in Somalia in 2011 and actively using since then.[79] Thus, I coded 1 as of 2011. Source(s): New America Foundation, SIPRI, NYT.
59	**Sri Lanka**	Sri Lanka has domestic production[80] of drones[81] and also imported Searcher II (4 in 2001)and 6 Scout (6 in 1998, 3 in 2007) and Blue Horizon (4 in 2007) drones from Israel[82]. Sri Lanka has operated UAVs in operations against Tamil Tiger rebels, with IAI supplying Scout (or apparently Super Scout) and Searcher II UAVs. The locally developed Superstar UAV (apparently a derivative of the Hobbico RC aircraft) has allegedly been put into Air Force service. Thus, I coded 1 as of 1988. Source(s): New America Foundation, SIPRI, Der Spiegel, Suasnews.

[79] http://www.nytimes.com/2011/07/02/world/africa/02somalia.html?_r=0

[80] http://www.suasnews.com/2010/12/sri-lanka-launches-its-own-uas/

[81] http://www.spiegel.de/international/world/messengers-of-death-are-drones-creating-a-new-global-arms-race-a-792590.html

[82] http://www.defencereviewasia.com/articles/195/Asian-region-UAV-capability-on-the-rise

60	**Sudan**	Sudan imported 5 Ababil drones from Iran in 2009[83]. Normally, Sudan is under an U.N. arms embargo, no lawful state should be sending the Sudanese regime drones—or any other weaponry. But Iran is becoming the UAV supplier of choice for embargoed states[84]. Thus, I coded 1 as of 2009. Source(s): New America Foundation, SIPRI, Medium.
61	**Tajikistan**	Tajikistan has no drones. Source(s): New America Foundation, SIPRI.

[83] http://armstrade.sipri.org/armstrade/page/trade_register.php

[84] https://medium.com/war-is-boring/sudans-drones-are-dropping-like-flies-ffa1be165291#.9uijr67s6

62	**Thailand**	Thailand imports Searcher (4 in 2007) and Aerostar (4 in 2011) drones Israel, Ravens from the United States, three Cyber Eye (3 in 2009) drones from Malaysia, and Silvertone Flamingo drones from Australia. Thailand's Royal Thai Air Force Commander in Chief announced plans to request funds to continue development of a drone developed domestically. Thus, I coded 1 as of 2007. Source(s): New America Foundation, SIPRI.
63	**Trinidad and Tobago**	Reports indicate that Trinidad & Tobago are trying to get drones, primarily for surveillance purposes[85]. Source(s): New America Foundation, SIPRI, Guardian.

[85] http://www.guardian.co.tt/news/2013-09-12/drones-go-action-next-year

64	**Turkey**	Turkey has domestic production of ANKA drones and has imported Heron (1 in 2007, 10 in 2010) and Aerostar (3 in 2008) Searcher (1 in 2008) drones from Israel and Gnat (22 in 1995) drones from the United States. The Turkish government signed a contract to acquire 10 MALE drones from Turkish Aerospace Industries to be delivered in 2016 and are capable of being armed[86]. Turkey has exported ten ANKA drones to Egypt[87]. Thus, I coded 1 as of 1995. Source(s): New America Foundation, SIPRI, Jerusalem Post, Guardian.
65	**Uganda**	Uganda has four Raven drones as part of military aid package from the United States to combat al Shabaab in Somalia in 2011[88]. Uganda also imported two Orbiter 2 drones from Israel[89]. Thus, I coded 1 as of 2011. Source(s): New America Foundation, SIPRI, BBC, Flight global.

[86] http://www.theguardian.com/news/datablog/2012/aug/03/drone-stocks-by-country

[87] http://www.jpost.com/Middle-East/Egyptians-to-purchase-Turkish-made-drones

[88] http://www.bbc.com/news/world-africa-13946702

[89] https://www.flightglobal.com/news/articles/ugandan-army-to-acquire-orbiter-uavs-352890/

66	**United Kingdom**	The United Kingdom has domestic production of small, MALE, and Watchkeeper drones, which is based on 35 imported Hermes 450 drone from Israel in 2012 (20 in 2007), and is the only country to import armed (3 Reaper in 2007, 2 in 2009, 5 in 2014), (5 Scaneagle in 2014) drones from United States. From 2010-2014, the United Kingdom was the largest importer of drones, importing 55 from Israel and 6 from the United States[90]. Thus, I coded 1 as of 2007. Source(s): New America Foundation, SIPRI, Guardian.
67	**Uzbekistan**	Uzbekistan has no drones. But , the US use its own drones for surveillance and attacking missions as of 2001 from its Karshi-Khanabad Air Base located in southeastern Uzbekistan[91]. Thus, I coded 1 as of 2001. Source(s): New America Foundation, SIPRI.

[90] http://armstrade.sipri.org/armstrade/page/trade_register.php

[91] https://understandingempire.wordpress.com/2-0-a-brief-history-of-u-s-drones/

68	**Venezuela**	Reported domestic production of drones with the help of Iran[92], Russia, and China and plans to export drones in the near future[93]. Source(s): New America Foundation, SIPRI, Reuters, Jerusalem Post, Global Post.
69	**Yemen**	Yemen has no drones. Source(s): New America Foundation, SIPRI.

[92] http://www.jpost.com/Iranian-Threat/News/Iran-admits-exporting-drone-tech-to-Venezuela

[93] http://www.globalpost.com/dispatch/news/regions/americas/venezuela/120615/venezuela-building-drones-iran-russia-china

9.3 Appendix B- Cell Phone Subscriptions Dataset

9.3.1 Cell Phone Technology

A cell phone is an electronic device used for mobile telecommunications, which is primarily designed for voice communication. However, new generation cell phones support many additional services such as SMS for text messaging, email, internet, camera and so on. As is simply seen from the Figure 1, which shows the increase of usage over years, it is needless to say that cellphones are everywhere and in every hand. In accordance with the figure for example, in 2017 the number of cellphone subscriptions is forecast to reach 4.77 billion, which corresponds nearly to two thirds of the world's population.[94]

As pointed earlier, one can share almost every news, information etc. with the cell phone technology using any services from voice, SMS to Internet. Since cellphones obviously improves communication among people, the amount of information produced and shared grows exponentially at every second. Therefore, one can claim that the spread of this relatively cheap and reliable mobile communication offers a lot of chances for gathering information and thereby enables political actors to know much more about others in a more efficient way. For example, with little or no effort, governments now can monitor cellphones and thus again gather valuable information about the civilians. Now, police or secret agencies like CIA, FBI, MOSSAD etc. can easily find out "where you are, where you have been, even where you are going" by simply tracking your cellphone with special equipment. Just recently, FBI has declared its right to use devices called "stingrays"[95] to monitor cell phone locations, calls and texts (Pagels, 2015, 7). And it is also worth to

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[94] http://www.statista.com/statistics/274774/forecast-of-mobile-phone-users-worldwide/

[95] The StingRay is an IMSI (International Mobile Subscriber Identity)-catcher, a cellular phone surveillance device, manufactured by Harris Corporation. Stingray has also become a generic name to describe these kinds of devices. http://arstechnica.com/tech-policy/2013/09/meet-the-machines-that-steal-your-phones-data/

note that for instance, the US police have not been "shy" about taking advantage of cell phone data. According to the American Civil Liberties Union (ACLU), U.S. law enforcement agencies made "1.5 million requests for user data from cellphone companies in 2011" (Bailey, 2013, 36). Thus, it can be said that it obviously seems more convenient to collect intelligence from a digitalized source such as cellphones than other sources. And also there have been many different devices such as "Cellbrite UFED", which is a comprehensive mobile equipment enabling investigators "to extract, decode and analyze evidentiary data in a forensically sound manner" from the widest range of mobile devices and typically get at the minimum "contacts, SMS messages & call logs (incoming, outgoing & missed), multimedia (videos, photos, ringtones) files etc." (Hacker5, 2013). These foregoing examples clearly show that while technology grows, it is now easier to collect information with the help of its productions such as cellphones, internet, its social media applications and so on.

Here in this research, I argue that because cellphones substantially make it easier for the population to share information with (counter)insurgents and create valuable opportunities for "intelligence collection" (Shapiro and Weidmann, 2015, 247), thereby they basically supply a kind of information on how much governments and rebel groups know the civilian population, who are their main point of interest in fighting against one another, which in the end also affects the magnitude and type of violence they initiate.

I mainly use World Bank Data to gather cell phone subscription information of countries in years and thus again code spatiotemporally a country's cell phone usage. I also compare this with the ITU (International Telecommunication Union), the United Nations' specialized agency for information and communication technologies, data. CPS is a continuous variable showing simply how many cell phone subscriptions exist per 100 people in a given year and a country. I only take 69 countries at civil war between 1989 and 2014 out of Worldbank's big dataset including almost all countries in the world. The current dataset includes CPS level from zero as the minimum to

180.69 percent as the biggest value of all. I tabulated all cell phone information of the 69 countries over the years, which can be seen in Table-9.2 below.

9.3.2 Country-Yearly Cell Phone Subscriptions (in Alphabetical Order)

Table 9.5- Cell Phone Subscriptions per 100 people for countries at civil war (1989-2014)

No.	Country Name	Country Code	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	Afghanistan	AFG	0	0	0	0	0	0	0	0	0	0	0	0	0	0.112598	0.865196	2.498055	4.826865	9.833164	17.71624	29.22037	37.89494	45.77817	60.32632	65.45219	70.66136	74.88284
2	Algeria	DZA	0	0.001791	0.017777	0.017363	0.016979	0.004688	0.016002	0.039202	0.05734	0.058403	0.230206	0.271127	0.31104	1.282262	4.38417	14.59121	40.22671	60.85091	78.53289	75.66462	89.95837	88.44488	94.31444	97.52089	100.7877	93.31075
3	Angola	AGO	0	0	0	0	0.009673	0.015532	0.016473	0.026486	0.055131	0.074748	0.177638	0.185322	0.521366	0.940445	2.269621	4.631741	9.738161	17.8399	28.01098	36.98369	42.84657	48.10121	58.82619	61.40628	61.8733	63.47921
4	Azerbaijan	AZE	0	0	0	0	0	0.006515	0.077212	0.216498	0.504939	0.814081	4.597452	5.17878	8.907407	9.592056	12.62937	17.20616	26.1812	38.35543	51.52722	73.7581	86.32195	100.0593	109.8721	108.7683	107.6134	110.9054
5	Bangladesh	BGD	0	0	0	0.000222	0.000435	0.000941	0.002086	0.003268	0.020809	0.058833	0.114645	0.210752	0.385959	0.794636	0.980702	1.969455	6.287762	13.20574	23.46763	30.16828	34.35334	44.94536	55.19257	62.82024	74.42965	75.92489
6	Bosnia and Herzegovina	BIH	0	0	0	0	0	0	0	0.043035	0.254525	0.69163	1.402104	2.435503	11.46354	19.21141	27.58858	36.21151	41.09375	48.71596	63.34033	82.33283	84.52795	80.87079	82.62008	87.57471	91.09531	91.27895
7	Burundi	BDI	0	0	0	0	0.00588	0.006184	0.009082	0.008913	0.009718	0.009616	0.012223	0.244521	0.488583	0.738875	0.881016	1.338877	1.969013	2.486765	3.241953	5.572454	10.31457	18.17474	20.06827	22.81446	24.96259	30.46201
8	Cambodia	KHM	0	0	0	0	0.047731	0.098166	0.130929	0.208266	0.294455	0.524974	0.745096	1.068055	1.791593	2.989928	3.853207	6.551637	7.95123	12.70117	18.79147	30.39342	44.31491	56.74071	94.18821	128.5272	133.8902	155.1115
9	Central African Republic	CAF	0	0	0	0	0	0	0.001343	0.031967	0.040003	0.046682	0.116598	0.136519	0.296873	0.334462	1.044486	1.540992	2.524681	2.728106	8.278756	13.61973	20.24358	22.51149	22.3714	25.26102	29.46658	31.35987
10	Chad	TCD	0	0	0	0	0	0	0	0	0	0	0	0.066256	0.255193	0.381698	0.698081	1.27263	2.096978	4.500299	8.587288	14.50507	20.06204	24.53168	30.34478	35.36488	35.56438	39.75098
11	Colombia	COL	0	0	0	0	0	0.241693	0.750781	1.404166	3.336886	4.667668	5.012309	5.656429	8.050715	11.15237	14.77407	24.45605	50.5974	67.88728	76.27493	91.61012	92.04641	95.76455	98.13425	102.8549	104.0845	113.0821
12	Comoros	COM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.350575	1.431185	2.58401	5.881418	9.815152	14.12941	18.40513	24.19596	30.91018	39.51356	47.28425	50.9012
13	Congo, Dem. Rep.	COD	0	0	0				0.020032	0.016697	0.020191	0.022242	0.02615	0.031949	0.311416	1.130926	2.444905	3.792769	5.082723	7.942802	11.52691	16.89525	15.63753	19.00648	24.47131	30.58009	41.81656	53.49322
14	Congo, Rep. (Congo-Bra)	COG	0	0	0	0	0	0	0	0.035745	0.08476	0.114475	0.164234	2.239137	4.679259	6.754537	9.811448	11.12403	15.75538	25.16003	34.25591	46.61451	73.79715	90.44275	91.9391	98.75683	104.7695	108.1496
15	Cote d'Ivoire	CIV	0	0	0	0	0	0	0	0.092596	0.238328	0.590886	1.627199	2.931884	4.43689	6.158273	7.573691	9.7661	13.50719	23.01735	41.60501	57.2235	70.87826	82.20152	89.44963	91.22863	95.44605	106.2476
16	Croatia	HRV	0	0.005007	0.042071	0.132007	0.238996	0.458153	0.718265	1.397272	2.616918	4.006694	6.53846	23.08276	39.46668	52.24918	57.51728	64.44749	83.15833	100.3791	115.2253	104.4643	107.4734	113.6081	118.3014	115.4136	110.0543	104.4313
17	Djibouti	DJI	0	0	0	0	0	0	0	0.016275	0.02951	0.031432	0.039345	0.031817	0.408869	2.014954	3.046015	4.500883	5.672657	5.69073	8.706632	13.93013	15.66875	19.85682	22.80162	24.71558	27.96587	32.38687
18	Egypt, Arab Rep.	EGY	0.006555	0.0071	0.007841	0.008417	0.011595	0.012238	0.012045	0.011862	0.10362	0.141666	0.738849	2.056199	4.157181	6.580539	8.349882	10.8272	18.98864	24.66217	40.54135	54.69017	72.09667	90.50319	105.0794	119.9164	121.5079	114.306
19	El Salvador	SLV	0	0	0	0	0.029157	0.085738	0.234429	0.400741	0.685834	2.32583	8.625088	12.47951	14.33148	14.79315	19.06983	30.28908	39.71573	63.17542	100.2357	112.9869	122.3622	123.8356	132.9256	137.3425	141.8179	144.0257
20	Eritrea	ERI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.428677	0.833075	1.231292	1.619011	2.018352	2.539273	3.227136	4.077954	4.979398	5.602975	6.385997
21	Ethiopia	ETH	0	0	0	0	0	0	0	0	0	0	0.010505	0.026895	0.040467	0.072009	0.071294	0.209993	0.539116	1.107029	1.502346	2.365649	4.77581	7.869542	15.80286	22.37452	27.25469	31.59388
22	Georgia	GEO	0	0	0	0	0	0	0.00296	0.046091	0.609448	1.234099	2.773982	4.10535	6.435462	10.89651	15.58015	18.61778	26.23973	38.32379	58.7363	62.4382	64.46126	90.64793	101.2829	107.8091	115.0251	124.9355
23	Guatemala	GTM	0	0.003296	0.01342	0.02299	0.031366	0.107232	0.300475	0.425087	0.614318	1.04241	3.087212	7.647421	9.987304	13.40405	16.86814	25.61697	35.57138	55.24077	89.33492	109.5274	123.722	125.9832	132.4516	137.8195	140.3935	106.6338
24	Guinea	GIN	0	0	0	0	0.000589	0.010806	0.012122	0.011736	0.034569	0.255013	0.292783	0.481493	0.625832	1.003477	1.211353	1.651453	1.973616		19.90651	26.66104	32.93607	36.77812	43.5477	48.76925	63.31504	72.09875
25	Guinea-Bissau	GNB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.093711	2.836587	6.95209	10.83048	19.95659	32.97181	36.13019	42.69222	45.1066	63.06922	55.15073	63.48369
26	Haiti	HTI	0	0	0	0	0	0	0	0	0	0.12069	0.296442	0.641158	1.049282	1.580001	3.557046	4.381193	5.401215	12.7814	26.27786	33.20103	37.35733	40.41874	41.86242	59.90841	69.39886	64.70746
27	India	IND	0	0	0	0	0	0	0.008023	0.033702	0.089033	0.118621	0.183833	0.343205	0.617272	1.207387	3.080125	4.701852	7.987207	14.52388	20.15538	29.53104	44.12009	62.39006	73.19804	69.92239	70.78318	74.48377
28	Indonesia	IDN	0.007368	0.01013	0.013493	0.019223	0.028422	0.040832	0.108516	0.2854	0.457971	0.525058	1.078419	1.756174	3.076348	5.440892	8.478397	13.70875	20.89709	28.01944	40.43198	60.01372	68.92042	87.79014	102.4626	114.2181	125.3581	126.1806
29	Iran, Islamic Rep.	IRN	0	0	0	0	0	0.01542	0.026298	0.097601	0.382047	0.612075	0.756225	1.460446	3.122087	3.365178	5.033143	7.319761	12.13147	21.67657	41.45707	59.17902	71.46164	72.58942	74.30366	76.09809	84.2461	87.79273
30	Iraq	IRQ	0	0	0	0	0	0	0	0	0	0	0	0	0	0.079245	0.308172	2.151946	5.599582	33.3001	48.7854	59.56202	66.69344	75.13766	80.15513	81.62785	96.10477	94.91279
31	Israel	ISR		0.33873	0.495519	0.751074	1.293392	2.583802	8.354981	19.09479	29.70555	37.24717	48.88595	73.16614	89.73881	100.9785	104.2462	111.6506	117.4649	124.3388	128.4547	126.3855	124.0341	122.7837	121.9783	120.6844	122.8478	121.4507
32	Lao PDR	LAO	0	0	0	0.006448	0.00735	0.013155	0.031582	0.076004	0.096434	0.124075	0.227967	0.235344	0.540111	0.994726	1.998107	3.582856	11.355	17.12308	24.58574	32.93845	51.60591	62.59498	84.04519	64.70226	68.13586	66.99333
33	Lebanon	LBN	0	0	0	0	0	0	3.955949	6.447445	12.08969	16.22665	19.86248	22.96484	22.83637	22.04753	21.55654	22.95124	24.92076	27.11958	30.43616	34.08911	56.28349	65.96644	77.19002	80.80708	80.56367	88.34778
34	Lesotho	LSO	0	0	0	0	0	0	0	0.070931	0.194263	0.539688	0.652312	1.163652	3.045685	7.316571	6.633287	10.26207	12.97021	18.4452	24.66811	30.07891	33.2182	49.15315	60.72157	75.30008	86.30153	101.8984
35	Liberia	LBR	0	0	0	0	0	0	0	0	0	0	0	0.051868	0.066694	0.162831	1.512377	2.963283	4.893287	8.372298	15.9839	23.26963	28.39406	39.69965	49.52909	56.79363	59.40317	73.35345
36	Macedonia, FYR	MKD	0	0	0	0	0	0	0	0.053564	0.62068	1.494548	2.395346	5.640086	10.81184	17.61178	37.29217	47.25448	54.11398	60.36108	85.58694	93.74691	92.50951	102.436	105.1967	106.1686	106.1738	109.1002
37	Mali	MLI	0	0	0	0	0	0	0	0.012871	0.030035	0.046055	0.064015	0.101339	0.227185	0.422452	2.203465	3.515625	6.38112	12.2749	19.88814	26.17209	32.89657	53.19894	75.06504	98.37927	129.0669	149.0239
38	Mexico	MEX	0.01008	0.074266	0.183067	0.348322	0.421294	0.608554	0.721767	1.051321	1.758957	3.32689	7.556566	13.55289	20.65463	24.29477	27.85372	35.15322	42.56116	49.40875	58.6273	65.49948	71.45818	77.51826	79.24118	83.35071	84.81948	82.54325
39	Moldova	MDA	0	0	0	0	0	0	0.000323	0.021355	0.051537	0.165809	0.431908	3.384314	5.568509	8.521582	12.21462	20.55824	28.92959	36.55328	51.26642	66.64126	59.27755	71.38469	90.80797	101.989	106.0114	107.9952
40	Morocco	MAR	0.002891	0.003664	0.005968	0.012581	0.025865	0.052208	0.10998	0.15766	0.26951	0.416387	1.30109	8.157401	16.44228	21.14761	24.8754	31.27323	41.13733	52.65563	65.31204	73.70565	80.92564	101.0743	114.0193	119.9722	128.5252	131.7131
41	Mozambique	MOZ	0	0	0	0	0	0	0	0	0.01478	0.038759	0.068788	0.279416	0.812596	1.318636	2.192658	3.463985	7.158097	10.83653	13.89079	19.35201	25.55873	30.14185	31.9565	34.93571	48.00422	69.67187
42	Myanmar	MMR	0	0	0	0	0.00146	0.004297	0.006102	0.015785	0.018198	0.017996	0.023764	0.027649	0.046367	0.097403	0.134169	0.185367	0.256471	0.424186	0.487205	0.717919	0.974001	1.14382	2.375551	7.064027	12.82859	49.47176
43	Nepal	NPL	0	0	0	0	0	0	0	0	0	0	0.02424	0.044108	0.073075	0.090782	0.333803	0.468576	0.898764	4.513927	12.59689	16.00036	21.08831	34.25299	49.17623	60.45131	76.8498	82.48729
44	Nicaragua	NIC	0	0	0	0	0.00728	0.047903	0.094432	0.107219	0.1559	0.370849	0.880866	1.770151	3.177883	4.520235	8.77617	13.71302	20.51941	33.12659	44.71926	54.83436	58.23387	68.05402	81.68357	97.66328	111.9802	114.5656
45	Niger	NER	0	0	0	0	0	0	0	0	0.000985	0.013205	0.020687	0.018708	0.018655	0.486922	0.672146	1.356685	2.456447	3.530778	6.339238	12.87584	16.98366	23.08219	28.72477	31.44796	39.29221	44.43749
46	Nigeria	NGA	0	0	0	0	0.008773	0.012104	0.01199	0.012594	0.01316	0.017113	0.020863	0.024415	0.211469	1.214203	2.376062	6.725826	13.31582	22.55327	27.44503	41.65683	47.95841	54.66095	57.96066	66.79812	73.29196	77.84155
47	Pakistan	PAK	0	0.0018	0.007441	0.01151	0.013296	0.019977	0.032334	0.052303	0.10107	0.14299	0.188941	0.213091	0.505666	1.134674	1.577484	3.237424	8.084503	21.44519	38.34402	52.70388	55.46464	57.28342	61.81346	67.06361	70.13038	73.33219
48	Panama	PAN	0	0	0	0	0	0	0	0.24871	0.816873	2.928062	7.779309	13.43457	15.24643	16.54407	21.36525	38.1417	51.95416	63.42264	86.23906	110.1806	167.7805	180.6992	180.0781	163.4167	162.9743	158.0543
49	Papua New Guinea	PNG	0	0	0	0	0	0	0	0.047201	0.077593	0.108884	0.13469	0.159131	0.193877	0.265005	0.301552	0.81216	1.230323	1.601077	4.689242	13.34173	21.14216	27.83341	34.22237	37.79819	40.97654	44.92846
50	Paraguay	PRY	0	0	0	0.03355	0.073995	0.163267	0.329187	0.669015	1.677663	4.512424	8.312678	15.34152	21.05988	29.92115	31.15516	30.19072	31.96046	53.74829	76.63906	92.86008	88.51898	91.65811	99.32994	101.5902	103.69	105.6045
51	Peru	PER	0	0.007579	0.02566	0.095145	0.157267	0.22202	0.307207	0.824806	1.701559	2.946195	3.956483	4.899435	6.799862	8.630568	10.82372	14.93425	20.13959	32.53577	54.42327	73.19257	85.26705	99.49533	109.6118	98.00011	98.08298	102.9158
52	Philippines	PHL	0	0	0.054508	0.086226	0.153945	0.25261	0.709505	1.347233	1.846116	2.330392	3.749085	8.311919	15.33355	19.00323	27.24974	39.10169	40.52494	49.06786	64.5226	75.37479	82.26097	88.98362	99.09141	105.4511	104.5023	111.2187
53	Romania	ROU	0	0	0	0	0.003449	0.012022	0.039489	0.074424	0.884784	2.865613	6.02848	11.16205	17.23487	22.9694	31.70898	46.10214	60.38973	72.4709	92.66015	111.4047	114.5423	111.4289	107.3872	104.9886	105.5829	105.9142
54	Russian Federation	RUS	0	0	0.000202	0.004032	0.006719	0.01865	0.059572	0.150296	0.327447	0.50581	0.930655	2.22345	5.302378	12.10051	24.94149	51.07845	83.37214	104.8422	119.1766	138.8686	160.1019	165.5011	142.0484	145.3276	152.8354	155.1442
55	Rwanda	RWA	0	0	0	0	0	0	0	0	0	0.069738	0.140074	0.46453	0.742009	0.916726	1.432365	1.483309	2.364696	3.25228	6.397339	12.93791	23.07055	32.74752	39.89652	49.66704	56.80079	64.02469
56	Senegal	SEN	0	0	0	0	0	0.001156	0.0014	0.015794	0.075753	0.292795	0.913639	2.53761	2.982582	5.326721	7.330495	10.22391	15.3503	25.75017	30.49821	44.03321	54.83107	64.42744	70.16017	83.56862	92.92798	98.84218
57	Sierra Leone	SLE	0	0	0	0	0	0	0	0	0	0	0	0.288423	0.626096	1.491193	2.402285				14.32788	18.23526	20.56307	34.77066	36.43344	36.96439	65.65907	76.65604
58	Somalia	SOM	0	0	0	0	0	0	0	0	0	0	0	1.083216	1.117059	1.277804	2.488272	6.060632	5.905323	6.330811	6.733364	6.859762	6.833067	6.726737	18.16732	22.55978	49.38268	50.89929
59	Sri Lanka	LKA	0	0.00583	0.010266	0.01491	0.081953	0.161302	0.281311	0.386704	0.621895	0.937792	1.372851	2.282675	3.507159	4.835731	7.144935	11.20278	16.84991	26.87762	39.32383	54.1866	79.14612	83.62395	87.54591	91.63311	95.49632	103.1578
60	Sudan	SDN	0	0	0	0	0	0	0	0.007113	0.011975	0.026421	0.038959	0.067276	0.296684	0.53266	1.43882	2.795883	4.758981	11.89555	20.3551	28.9543	36.1123	41.54403	68.77724	74.36036	72.85231	72.19899
61	Tajikistan	TJK	0	0	0	0	0	0	0	0.00174	0.00539	0.006985	0.010255	0.018752	0.025917	0.206117	0.729247	2.025832	3.893821	30.91514	29.99244	50.49337	65.79481	77.88892	80.92286	81.5084	91.82812	95.12606
62	Thailand	THA	0.071527	0.111736	0.216057	0.434581	0.712175	1.260504	2.200303	3.096979	3.66055	3.246073	3.796303	4.901884	11.971	27.35185	33.52065	41.42975	46.46198	60.90324	80.17018	93.4303	99.5096	108.0178	116.3311	127.2921	140.0512	144.4387
63	Trinidad and Tobago	TTO	0	0	0.034637	0.103193	0.134923	0.207867	0.506215	0.75765	1.358587	2.08365	3.056577	12.76519	20.12863	20.56565	26.19833	50.46494	71.25272	116.519	115.2484	137.1964	139.6083	142.6284	136.9908	140.8425	144.9407	147.3378
64	Turkey	TUR	0.029409	0.058911	0.087101	0.109997	0.148444	0.303365	0.746946	1.356502	2.666465	5.718855	13.04792	25.53785	30.5348	35.86941	42.2934	51.92194	64.37408	76.73832	89.1783	93.54864	88.12269	85.62758	89.41002	91.46375	92.96497	94.7933
65	Uganda	UGA	0	0	0	0	0	0	0.008423	0.018685	0.02264	0.131692	0.239742	0.5228	1.130101	1.516029	2.892006	4.195756	4.578959	6.761102	13.65262	26.92006	28.55295	37.74438	47.50473	45.00206	48.08193	52.42924
66	United Kingdom	GBR	1.708755	1.94706	2.196367	2.619946	3.932425	6.812778	9.889762	12.46096	15.15255	25.41757	46.28415	73.70813	78.20218	82.83089	90.88456	99.5062	108.592	115.6003	121.1018	122.1865	123.9547	123.6255	123.6042	124.7618	124.6098	123.5811
67	Uzbekistan	UZB	0	0	0	0	0.00227	0.004009	0.016256	0.040674	0.072435	0.110985	0.164732	0.213979	0.510036	0.737743	1.255443	2.110191	2.76451	9.606295	21.34114	45.795	59.93518	75.45031	90.37375	71.03391	74.30678	73.79116
68	Venezuela, RB	VEN	0.019137	0.037597	0.082102	0.37967	0.862938	1.475035	1.827799	2.578819	4.656349	8.558458	15.80585	22.31757	26.02521	25.82297	27.18332	32.06609	46.7551	69.10208	86.13027	97.48959	98.39051	95.99511	97.56403	102.0507	101.6144	98.952
69	Yemen, Rep.	YEM	0	0	0	0.011886	0.037663	0.050895	0.054933	0.056552	0.076113	0.097475	0.162466	0.182862	0.819951	2.623391	3.538343	7.525737	11.30882	14.41207	20.53143	29.69557	37.39604	48.69743	50.06822	58.27504	69.01478	68.48627

9.4 Appendix C- Internet Users Dataset

9.4 Internet Technology

The Internet is the global system of interconnected networks that uses the Internet protocol suite (TCP/IP) and links billions of devices worldwide. Though the origins of the Internet go back to "research commissioned by the United States federal government in the 1960s to build robust, fault-tolerant communication via computer networks" (Stewart, 2000), it has become nearly universal, especially in recent years. The Internet has "revolutionized the computer and communications world like nothing before" and it is "a world-wide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location" (Leiner et al., 2012). Then monitoring and controlling it should offer a good deal of advantages to the governments. Then, there is no doubt that its expansion therefore is good for the governments that aim to acquire information in their fights against rebel groups. I argue that the more Internet expands its scope, the more governments have a chance to obtain information via monitoring it. If a government needs information, then she can make use of tools that helps monitor it. The Internet brings information within many people's reach. In doing so, it opens up significant opportunities for states to gather intelligence.

The World Bank dataset supplies certain details regarding Internet usage, such as the number of cell phone subscriptions per 100 people, the number of secure internet servers operating, and so on. I tabulated all Internet users information of the 69 countries over the years, which can be seen in Table-9.3 below.

9.4.2 Country-Yearly Internet Usage (in Alphabetical Order)

Table 9.6- Internet Usage per 100 people for countries at civil war (1989-2014)

Nu.	Country Name	Country Co	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	Afghanistan	AFG			0										0.00472257	0.0045614	0.08789125	0.10580903	1.22414808	2.10712365	1.9	1.84	3.55	4	5	5.45454545	5.9	6.39	
2	Algeria	DZA			0			0.00036067	0.00176895	0.00173853	0.01026846	0.02023855	0.19952384	0.49170568	0.64611402	1.59164126	2.19535973	4.63447509	5.84394209	7.37598496	9.45119063	10.18	11.23	12.5	14	15.2280268	16.5	18.09	
3	Angola	AGO			0					0.00077593	0.00567375	0.01845372	0.07196409	0.10504556	0.13601387	0.27037675	0.37068207	0.46481462	1.14336683	1.90764751	3.2	4.6	6	10	14.776	16.9372101	19.1	21.26	
4	Azerbaijan	AZE			0			0.00143142	0.00205556	0.00635458	0.02518793	0.03748511	0.09922894	0.14775758	0.30556464	4.99971368			8.03037536	11.9921773	14.54	17.08	27.4	46	50	54.2	58.7	61	
5	Bangladesh	BGD			0						0.00075105	0.00368481	0.03617041	0.07103942	0.12980797	0.13992029	0.16387767	0.19903633	0.24163733	1	1.8	2.5	3.1	3.7	4.5	5	6.63	9.6	
6	Bosnia and Herzegovina	BIH			0					0.01512556	0.05942556	0.14367106	0.1943742	1.08296075	1.20052695	2.64826791	3.96503683	15.4689716	21.326701	25.1223857	27.92	34.66	37.74	42.75	47.77	52.78	57.79	60.8	
7	Burundi	BDI	0	0	0	0	0	0	0	0.00080359	0.00797944	0.01584278	0.03920447	0.07724845	0.10600125	0.11822841	0.2012732	0.34906046	0.54214287	0.65759259	0.7	0.81	0.9	1	1.11	1.21999994	1.3	1.38	
8	Cambodia	KHM			0						0.00584491	0.01632499	0.03196958	0.04702264	0.07695606	0.22698324	0.2605702	0.30043664	0.31732178	0.46835672	0.49	0.51	0.53	1.26	3.1	4.94	6.8	9	
9	Central African Republic	CAF			0				0.0058495	0.01427088	0.0278782	0.04089429	0.05339417	0.07854343	0.12853712	0.15156334	0.2234014	0.26819561	0.31115917	0.37581596	1	1.8	2	2.2	3	3.5	4.03	
10	Chad	TCD			0					0.00065817	0.0042685	0.01232173	0.03570708	0.04593413	0.16606966	0.32030856	0.36092011	0.3992577	0.58104576	0.84722452	1.19	1.5	1.7	1.9	2.1	2.3	2.5		
11	Colombia	COL			0			0.10717395	0.18804679	0.33001777	0.55052102	1.12622524	1.69773079	2.20753299	2.85419997	4.6	7.38892371	9.1186903	11.0072639	15.3416745	21.8	25.6	30	36.5	40.3509158	48.98	51.7	52.57	
12	Comoros	COM			0					0	0.03787097	0.14816296	0.27174061	0.44306837	0.55486967	0.84818937	1.32732718	2	2.2	2.5	3	3.5	5.1	5.5	5.97529631	6.5	6.98		
13	Congo, Dem. Rep.	COD			0					0.00010821	0.00021121	0.00041307	0.00100908	0.00590211	0.01147578	0.0927907	0.13491484	0.19620838	0.2380378	0.29605361	0.37	0.44	0.56	0.72	1.2	1.67996101	2.2	3	
14	Congo, Rep.	COG			0					0.00352686	0.0034691	0.00341514	0.01679105	0.02635473	0.03222362	0.15724952	0.46001419	1.07750493	1.46342006	2.00799008	2.75970437	4.2875099	4.5	5	5.6	6.10669502	6.6	7.11	
15	Cote d'Ivoire	CIV			0				0.00020026	0.00840978	0.01882836	0.06097444	0.11868592	0.23146167	0.3957477	0.49792936	0.75866963	0.84928241	1.03923821	1.52490079	1.8	1.9	2	2.7	2.9	5	8.4	14.6	
16	Croatia	HRV			0		0.09721339	0.268319	0.51402859	0.85898237	1.72960931	3.27322028	4.40535912	6.64488254	11.5585732	17.76	22.75	30.91	33.14	37.98	41.44	44.24	50.58	56.55	57.789979	61.9399732	66.7476	68.57	
17	Djibouti	DJI			0				0.01603083	0.03116624	0.0829415	0.094696	0.10576191	0.19450053	0.34352626	0.4869717	0.62594023	0.78131718	0.95361145	1.27004116	1.62	2.26	4	6.5	7	8.26723289	9.5	10.71	
18	Egypt, Arab Rep.	EGY			0		0.00097579	0.00638327	0.03131964	0.0614669	0.09048024	0.14798738	0.29044528	0.64126504	0.83894561	2.71999971	4.03788511	11.92	12.75	13.66	16.03	18.01	20	21.6	25.6	26.4	29.4	31.7	
19	El Salvador	SLV			0					0.08638958	0.25696068	0.42525367	0.84542874	1.17739727	1.5	1.9	2.5	3.2	4.2	5.5	6.11	10.08	12.11	15.9	18.9	20.3213877	23.1093	29.7	
20	Eritrea	ERI			0			0	0	0	0.00901772	0.00877424	0.02549503	0.13671194	0.15781529	0.22709014					0.41	0.47	0.54	0.61	0.7	0.8	0.9	0.99	
21	Ethiopia	ETH			0				1.7549E-05	0.00170345	0.00496672	0.00966352	0.0125416	0.01526377	0.03716238	0.07240226	0.10581166	0.15533452	0.21965982	0.31059266	0.37	0.45	0.54	0.75	1.1	1.48281014	1.9	2.9	
22	Georgia	GEO			0				0.01183689	0.04006542	0.06093033	0.10283096	0.41634357	0.4847463	0.99234444	1.58787563	2.55881648	3.88622135	6.07945763	7.52687684	8.26	10.01	20.07	26.9	31.52	36.94	43.3	48.9	
23	Guatemala	GTM			0				0.00299801	0.01953487	0.09547602	0.46659044	0.59265295	0.7123329	1.73820178	3.39174627	4.54885491	5.1	5.7	6.5	7.3	8.3	9.3	10.5	12.3	16	19.7	23.4	
24	Guinea	GIN			0			0.00013832	0.00066859	0.00194894	0.00380311	0.00620337	0.06080892	0.09542492	0.17554187	0.40202275	0.45096037	0.50881933	0.54225418	0.63749212	0.78002528	0.92	0.94	1	1.3	1.49014437	1.6	1.72	
25	Guinea-Bissau	GNB			0					0.01638906	0.02406042	0.11770245	0.23010317	0.29956914	1.02299323	1.35419748	1.8081422	1.90136532	2.0571967	2.20630224	2.35488871	2.30328059	2.45	2.672	2.89399062	3.1	3.32	
26	Haiti	HTI			0					0.00748425		0.02399948	0.07065848	0.23127071	0.34083233	0.89343299	1.64735835	5.40126191	6.37620164	6.79600048	7.2	7.6	8.1	8.37	9	9.8	10.6	11.4	
27	India	IND			0		0.00011131	0.00021818	0.00106956	0.02622888	0.04633398	0.07076785	0.13902733	0.27322428	0.52753245	0.66014638	1.53787558	1.68648997	1.97613649	2.388075	2.80549987	3.95	4.38	5.12	7.5	10.07	12.5800609	15.1	18	
28	Indonesia	IDN			0				0.00105974	0.02610948	0.05662399	0.19491026	0.25530665	0.44441594	0.92556386	2.01861386	2.13413573	2.38701978	2.60028588	3.60202476	4.76481313	5.78627473	7.91747938	6.92	10.92	12.28	14.52	14.94	17.14	
29	Iran, Islamic Rep.	IRN			0				0.00040833	0.00417975	0.01582608	0.04675609	0.09981522	0.37856909	0.93419002	1.48422133	4.62617511	6.93372195	7.49	8.1	8.76	9.47	12.02	13.8	15.9	19	22.73	29.95	39.35	
30	Iraq	IRQ			0										0.1	0.5	0.6	0.9	0.9	0.95234424	0.93	1	1.06	2.5	5	7.1	9.2	11.3	
31	Israel	ISR		0.11077387	0.2146241	0.3105792	0.39883333	0.57696646	0.93042297	2.1683676	4.39940548	10.3070699	13.4361219	20.87379	17.3786239	17.7645991	19.5933937	22.7704855	25.1940424	27.8810745	48.1280622	59.39	63.12	67.5	68.873878	70.8	70.8	71.45	
32	Lao PDR	LAO			0							0.00965781	0.03778071	0.11104403	0.18166446	0.26789924	0.33391247	0.36143449	0.85035749	1.16989343	1.64	3.55	6	7	9	10.7476762	12.5	14.26	
33	Lebanon	LBN			0					0.07161799	0.14016694	1.24107974	2.7223522	5.3768095	7.95274374	6.78321978	7	8	9	10.14	15	18.74	22.53	30.14	43.68	52	61.2497857	70.5	74.7	
34	Lesotho	LSO			0						0.00284594	0.00558443	0.01095653	0.05380446	0.21180607	0.26115006	1.08394314	1.53249659	2.17552434	2.58024548	2.97970819	3.44543126	3.58	3.72	3.86	4.2248	4.58961763	5	11	
35	Liberia	LBR			0							0.00448944	0.00409939	0.01132873	0.01770271	0.03381223	0.03271331	0.03186893	0.03101118			0.55137658	0.53	2	2.3	2.5	2.6	3.2	5.41	
36	Macedonia, FYR	MKD			0				0.04074384	0.07599573	0.50398501	1.00286167	1.49733026	2.48556632	3.46818461	17.33	19.07	24.44	26.45	28.62	36.3	46.04	51.77	51.9	56.7	57.4499473	65.24	68.06	
37	Mali	MLI			0					0.00205523	0.01008592	0.01979389	0.06090987	0.14254576	0.18589741	0.22704558	0.31036444	0.43281964	0.50706314	0.72962728	0.81	1.57	1.8	2	2.2	2.8	3.5	7	
38	Mexico	MEX		0	0.00588069	0.01730781	0.02830504	0.04333917	0.10256419	0.20040628	0.62731154	1.26578328	1.85743622	5.08138415	7.03802312	11.9	12.9	14.1	17.21	19.52	20.81	21.71	26.34	31.05	37.1762954	39.75	43.46	44.39	
39	Moldova	MDA			0			0.00082539	0.00345722	0.0046439	0.02812881	0.26081821	0.60069527	1.28284642	1.48781295	3.7872428	7.40754458	10.6293908	14.6302705	19.6206477	20.45	23.39	27.5	32.3	38	43.37	45	46.6	
40	Morocco	MAR			0				0.00371049	0.00567544	0.0216352	0.14230077	0.17559534	0.69379124	1.3714381	2.37325319	3.35336668	11.6079348	15.0844445	19.7711916	21.5	33.1	41.3	52	46.1074826	55.4160532	56	56.8	
41	Mozambique	MOZ			0					0.00304298	0.01184261	0.02019706	0.05625063	0.10959253	0.16003195	0.25961261	0.41953884	0.67944784	0.85435712	0.84295449	0.91	1.56	2.68	4.17	4.3	4.8491	5.4	5.94	
42	Myanmar	MMR			0								0.00015171		0.00028928	0.00042649	0.02406415	0.02433739	0.06523886	0.18204833	0.21712845	0.22	0.22	0.25	0.98	1.0691	1.6	2.1	
43	Nepal	NPL	0	0	0	0	0	0	0	0.00092488	0.00451047	0.02199886	0.0643936	0.14666887	0.20465168	0.2400153	0.31295606	0.38281092	0.44984365	0.82655127	1.14138916	1.41	1.73	1.97	7.93	9	11.1493	13.3	15.44	
44	Nicaragua	NIC			0			0.01316623	0.03004648	0.08409329	0.20621682	0.30380897	0.49790164	0.98021649	1.44879943	1.71472958	1.88041253	2.32066461	2.56635118	2.80557306	3.9	5.3	7.3	10	10.6	13.5	15.5	17.6	
45	Niger	NER			0					0.0010393	0.00200877	0.0029115	0.02813602	0.03626129	0.10518543	0.12715247	0.1556987	0.18993373	0.22134135	0.29403398	0.39039062	0.7	0.76	0.83	1.3	1.4077	1.7	1.95	
46	Nigeria	NGA			0					0.00883298	0.0172374	0.02523146	0.04103872	0.06408081	0.08990137	0.32046198	0.55857624	1.28613764	3.54915572	5.54503608	6.77	15.86	20	24	28.43	32.8	38	42.68	
47	Pakistan	PAK			0				0.0001227	0.00299173	0.02754924	0.04394772	0.05535724		1.31855078	2.57742674	5.04115813	6.16432099	6.3323291	6.5	6.8	7	7.5	8	9	9.96	10.9	13.8	
48	Panama	PAN			0			0.0076369	0.05612304	0.21999853	0.53906554	2.75064807	3.83686451	6.55479648	7.26839988	8.51807782	9.98742408	11.1408625	11.4840093	17.3495662	22.29	33.82	39.08	40.1	42.7	40.3018952	44.03	44.92	
49	Papua New Guinea	PNG			0					0.00206702	0.01058832	0.23495854	0.66711331	0.8352493	0.90410355	1.32165693	1.37440467	1.50791277	1.71619048	1.75448726	1.79055936	1.15	1.61	1.28	2	3.5	6.5	9.38	
50	Paraguay	PRY			0					0.02035961	0.09957672	0.19490495	0.38165732	0.74763071	1.09879384	1.7949696	2.11194208	3.45243843	7.90700786	7.96207388	11.21	14.27	18.9	19.8	24.7635159	29.34	36.9	43	
51	Peru	PER			0			0.00850458	0.0334123	0.24623258	0.4034297	1.19038044	1.95249761	3.07643061	7.57876296	8.96694917	11.6	14.1	17.1	20.7	25.2	30.57	31.4	34.77	36.01	38.2	39.2	40.2	
52	Philippines	PHL			0			0.00584425	0.0285857	0.05594603	0.13691296	1.10340599	1.4316088	1.9822532	2.52400566	4.33227575	4.85767227	5.24362845	5.39763633	5.74058633	5.97	6.22	9	25	29	36.2351	37	39.69	
53	Romania	ROU			0		0.00370321	0.02630016	0.07495276	0.22162265	0.44544468	2.23764947	2.69758022	3.61371729	4.53866903	6.58	8.9	15	21.5	24.66	28.3	32.42	36.6	39.93	40.0099968	45.8799943	49.7645	54.08	
54	Russian Federation	RUS			0	0.00067253	0.01344724	0.05381749	0.14815104	0.26975293	0.47296376	0.81274445	1.01898461	1.9772011	2.94436779	4.12827182	8.29886062	12.8593889	15.2266732	18.0232775	24.66	26.83	29	43	49	63.8	67.97	70.52	
55	Rwanda	RWA			0					0.00088337	0.00162579	0.01176357	0.06717648	0.06283146	0.24067241	0.29278472	0.35691847	0.43085424	0.55604116		2.11538718	4.5	7.7	8	7	8.02385428	9	10.6		
56	Senegal	SEN			0				0.00069285	0.01123822	0.02734744	0.07987138	0.31109095	0.40396749	0.98379406	1.00645454	2.10143643	4.38602398	4.78668408	5.61173865	6.89	7.12	7.5	8	9.8	10.8	13.1	17.7	
57	Sierra Leone	SLE			0			0	0	0	0.00250612	0.00498783	0.01480507	0.04849066	0.11825425	0.16026445	0.17619896	0.19017328	0.20300768	0.21539161	0.22766947	0.2398347	0.25	0.26	0.58	0.9	1.3	1.7	2.1	
58	Somalia	SOM			0				0	0.00150955	0.00294871	0.00716442	0.01391039	0.02	0.07903918	0.11561421	0.376198	1.05345474	1.07732784	1.10021637	1.12223562	1.14268737	1.16061054		1.25	1.3767	1.5	1.63	
59	Sri Lanka	LKA			0			0.00276545	0.00548444	0.0544645	0.16246455	0.2963511	0.34841442	0.64741001	0.79382186	1.05042271	1.45858023	1.44615998	1.79204679	2.53756613	3.88	5.8	8.78	12	15	18.2854	21.9	25.8	
60	Sudan	SDN			0				0	0	0	0.00123182	0.00480507	0.00879458	0.02578503	0.14018522	0.43947764	0.5384717	0.79156162	1.29204068		8.66		16.7	17.3039132	21	22.7	24.64	
61	Tajikistan	TJK			0								0.03279186	0.04859959	0.05125913	0.05546283	0.06458378	0.07747991	0.29869002	3.77240621	7.19761952	8.78	10.07	11.55	13.03	14.51	16	17.49	
62	Thailand	THA	0	0	5.2233E-05	0.00034372	0.01358097	0.03861432	0.07482534	0.11547214	0.36052218	1.09121899	2.24262443	3.68904128	5.55632612	7.53125033	9.29902724	10.6773033	15.0260044	17.1607147	20.03	18.2	20.1	22.4	23.6699256	26.46	28.94	34.89	
63	Trinidad and Tobago	TTO			0				0.1581499	0.39308052	1.17317466	2.72482534	5.81425096	7.72141147	15.3846272	21.9986755	25.9717641	27.0242701	28.9767124	30.0037486	32.3	34.8	44.3	48.5	55.2	59.5162	63.8	65.1	
64	Turkey	TUR			0		0.00845773	0.04986918	0.08169121	0.19272494	0.47369543	0.69880513	2.29211769	3.76168504	5.18948146	11.38	12.33	14.58	15.46	18.24	28.63	34.37	36.4	39.82	43.0657104	45.13	46.25	51.04	
65	Uganda	UGA			0				0.00286347	0.00462595	0.01031934	0.06528947	0.10554394	0.16371406	0.23794509	0.3840935	0.46484984	0.71997068	1.7422055	2.52936304	3.67196535	7.9	9.78	12.5	13.0135433	14.6896	16.2	17.71	
66	United Kingdom	GBR	0.08735532	0.17423092	0.26061516	0.519762	1.03660917	1.89516828	4.12365034	7.38539896	13.6689831	21.2936383	26.8217544	33.4810949	56.48	64.82	65.61	70	68.82	75.09	78.39	83.56	85	85.3799985	87.4799984	89.8441	91.61	
67	Uzbekistan	UZB			0				0.00152709	0.00428507	0.01053693	0.02075444	0.03068834	0.48434731	0.59756799	1.08193974	1.91259518	2.59372542	3.34350989	6.38832197	7.49060468	9.08011452	17.0582162	20	30.2	36.5213	38.2	43.55	
68	Venezuela, RB	VEN			0	0.01208213	0.04158723	0.05548698	0.12221485	0.24826058	0.39095932	1.38399039	2.83982577	3.35959746	4.63600095	4.91044633	7.49996347	8.40446959	12.5529979	15.2247115	20.83	25.88	32.7	37.37	40.22	49.0500831	54.9	57	
69	Yemen, Rep.	YEM			0					0.00062108	0.0150253	0.02332324	0.05662868	0.08250039	0.09080246	0.51879603	0.6047341	0.88122299	1.04859793	1.24782405	5.01	6.89	9.96	12.35	14.905	17.4465	20	22.55	

9.5 Conclusion to the Appendices

Throughout this research, I basically argue that the spread of mobile communication offers a lot of chances for producing and gathering information and thereby helps political actors to know much more about others (non combatants as well) in a more efficient way. By knowing people more closely, which is a Panopticonish condition as explained above, each actor will tend to use violence less and as a second step be more successful in distinguishing between violence types, thus use more selective and less indiscriminate violence since 'information' gives them no way out.

Practically, means such as cellphones, Internet and so on make communication routine for us. When it comes to link their ability to civil war and violence, we can argue that each political actor, especially governments, can get more and easy information with their tremendous helps. First of all, thanks to them, people now can more easily contact all actors and more efficiently convey their messages and information. And secondly and equally importantly, governments and rebels can legally or illegally track the cell phone communication much easier with the help of recent technological developments and thus get more information about their opponents and civilian people in the middle. And having more information inevitably would affect the actor's actions on civilian victimization. As illustrated in detail above, ICT technologies can make the world more like a Panopticon where each political actor (government, rebel and civilians) would feel if they were in fact being observed all the time and thus assume constant surveillance and eventually be in the situation of "watching themselves" together with auto-censoring its actions. And the result would be civilians' support [or staying neutral] and combatants' abstinence from civilian victimization under these Panoptic conditions.

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