Ph.D. Thesis

An Economic Analysis on Human Costs in Armed Conflicts

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Statement of Contribution

I, Uih Ran Lee, hereby declare that Chapter 1, 2 and 4 of this thesis are entirely my own research work. Chapter 3 is based on research conducted in collaboration with Madelyn Hsiao-Rei Hicks, Ralph Sundberg and Michael Spagat. .

Chapter 3 resulted in the following academic publication:

Hicks, M., Lee, U. Sundberg, R. and Spagat, M. (2011). "Global Comparison of Warring Groups in 2002–2007: Fatalities from Targeting Civilians vs. Fighting Battles", *PLoSONE*, vol. 6 (9).

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I confirm that the above statement is true.

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Abstract

This thesis seeks to analyse military and civilian loss from violence during contemporary armed conflict in order to facilitate understanding of the evolution of war and its impact on human behaviour. It comprises four chapters; the first two concentrate on the 2003 Iraq War whilst the last two are focused upon global armed conflict during the recent past. Chapter 1 explores how and to what extent military deaths during the Iraq war affect US domestic opinion, proxied by various poll questions concerning war-related issues. Having addressed irregular frequencies of poll data that restrict time series application, this chapter renders a fresh perspective on casualty-opinion research, suggesting that cumulative military casualties prior to the poll did not have an immediate effect on poll respondents' opinion regarding the continuation of military actions in Iraq. Instead, respondents are influenced by marginal casualty information from the previous time period, implying a slow adjustment in forming opinion through the Error Correction Mechanism (ECM). Chapter 2 presents a comparative analysis to gauge any different standards between the US Department of Defense and the media in counting violent civilian deaths during the Iraq war. In spite of substantial discrepancies during the initial period of the war, non-parametric tests corroborate that the US military authority and media reports had a non-differential approach towards counting violent civilian deaths during the war period across the spatial and spatiotemporal dimensions. However, the conspicuously conservative count by the US military authority during the initial stage of the war may have hindered the US forces' ability to predict and prepare for the subsequent escalation of violence that brought about large-scale human loss as well as the prolongation of the war which lasted more than 7 years. Chapter 3 analyses to what extent warring actors intentionally used lethal force against civilians, through the employment of a *Civilian Targeting Index* (CTI), a newly invented measure to indicate the intensity of civilian targeting for each actor. Building upon Chapter 3, Chapter 4 further examines factors that lead to warring actors targeting civilians as opposed to engaging in battle with war combatants. A dynamic panel approach shows that an increase in the degree of civilian targeting in the previous year further intensified civilian targeting in the current year for the actors involved in prolonged armed conflict.

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Introduction

The analysis of armed conflict has involved a multiplicity of approaches since conflict and its aftermath has affected human lives across many dimensions throughout history. Assessing human loss from violence, however, has been one of the dominant approaches to understanding the nature of armed conflict as it proxies the intensity of violence and its evolution. Since human loss is one of the most immediate and salient costs of armed conflict, it has been of direct interest to many parties that have a stake in conflict, including sovereign states, armed groups, academic scholars in different disciplines, and humanitarian organisations (Fischhoff et al. 2007). In addition, human loss itself has been a major contributing factor of public war support, thereby affecting policymaking with respect to state military strategies, as observed during the Vietnam War (Gelpi et al.2006).

This thesis which broadly locates itself in the field of conflict economics comprises of two parts, each containing two essays that focus their analysis upon military and civilian fatalities during contemporary armed conflict in order to further our understanding of war as well as to enhance human protection from violence. The thesis' contribution is three-fold; firstly, using the 2003 Iraq war data, chapter 1 provides a fresh perspective on casualty-opinion research, suggesting that military casualty information unconventionally affects poll respondents when they are asked their support for the continuation of military operations. Secondly, chapter 2 presents a comparative study on violent civilian deaths during the Iraq war, and concludes that the US military authority may not have counted war deaths comprehensively during the initial stage of the war, resulting in the US forces' inability to predict the subsequent scale of war escalation. Thirdly, chapters 3 and 4 provide an analysis from a different perspective by examining behavioural patterns of warring actors in order to determine which factors contribute towards actors employing lethal behaviour to target civilians as opposed to armed combatants.

Part I. Military and Civilian Fatalities during the 2003 Iraq War

The first two chapters analyse the nature of military and civilian fatalities during the 2003 Iraq War. The Iraq War is arguably the major political phenomenon in recent decades.

Although not everyone regards the war as either a 'terrible mistake'[1] or an 'illegal' intervention,[2] it is rarely considered as a success in terms of its prolonged duration and the considerable human cost it involved.

The Iraq war was initiated on 20 March 2003 when the US, allied with the UK, invaded the country with the purpose to prevent Saddam Hussein's development of Weapons of Mass Destruction (WMD). Without support from the UN Security Council, and in spite of strong disagreement with France, Germany and Russia, the US nevertheless rapidly took control of Baghdad, and the UK of Basrah, culminating in George Bush's declaration of the victory in major combats on 1 May, just 42 days after the onset of the war. However, one violent incident which involved mutilation of four US civilians working as Blackwater contractors by Iraqis in Falluja at the end of March 2004 ignited wider insurgency against the US forces. In April, organised insurgent groups, one of which was led by Abu Musab al-Zarqawi, took control of the Sunni Muslim city of Falluja. During the same month, the Al-Mahdi Army, led by a Shia Cleric Muqtada Al-Sadr, launched battles to take control of Najaf, a holy city for Shia Muslims. Furthermore, security in Iraq had rapidly declined as witnessed by a series of kidnappings of both foreign and Iraqi nationals between 2004 and 2005. In particular, the release of the video clip in April 2004 that showed the beheading of the US national Nick Berg, who had been taken hostage by an insurgent group, was a shock to US citizen. Although the US handed sovereignty back to Iraqis in June 2004, insurgencies against coalition forces increased, threatening the peace and stability in the daily lives of Iraqis. Sectarian violence between Sunni and Shia Muslims was also initiated by a bomb attack on a holy shrine for Shia Muslims in Samarra that brought about hundreds of violent deaths.[3] The escalation of violence consequently prevented the early exit of the US forces and led to the additional dispatch of more than 20,000 US troops in 2007. Since this surge, violent incidents conspicuously declined,[4] with

[1] Stiglitz and Bilmes (2008).
[2] Hans Blix, former UN Inspector, at the Iraq War Inquiry in July 2010. BBC News (http://www.bbc.co.uk/news/uk-politics-10770239).
[3] BBC News (http://www.bbc.co.uk/news/world-middle-east-14546763).
[4] General David Petraeus Report to the US Congress in September 2007. BBC News (http://news.bbc.co.uk/1/hi/world/americas/6986461.stm).

the last US combat brigade leaving Iraq in August 2010, thus officially ending a seven-and-a half years military operation.

The sequence of major events stated above during the Iraq war inevitably involved a significant number of military and civilian deaths. Chapter 1 and 2 analyse the nature of these war deaths to examine the war evolution or its impact on public support. Chapter 1 examines how and to what extent war deaths affect US domestic public opinion, proxied by 25 different poll questions concerning attitudes to the US military operations in Iraq. Whilst previous research on the casualty-opinion nexus has focussed on poll questions, which entail retrospective assessment such as beliefs on the justification of war or presidential job approval, this study centres upon questions that concern poll respondents' prospective judgement on the practical feasibility of war: Should US troops stay or withdraw? Having addressed irregular frequencies of poll data that restrict time series application, this study renders a fresh prospective on casualty-opinion research, suggesting that military casualty information unconventionally affects poll respondents when they are asked this Stay/Withdraw question. Specifically, cumulative military casualties prior to the poll did not have an immediate effect on poll respondents' opinion over the continuation of military actions in Iraq. Instead, respondents are influenced by marginal casualty information from the previous time period, implying a slow adjustment in forming opinion from the Error Correction Mechanism (ECM). However, general war support, presidential job approval ratings and public conviction on war success captured in various poll question types were severely aggravated as military casualties accumulated, conforming to conventional wisdom. This difference in attitudes of poll respondents implies, on the one hand that cumulative casualties immediately affect poll respondents' retrospective evaluations since they deem war incurring a large number of death tolls unjustifiable. On the other hand, mounting casualties have no direct effect on opinion regarding the prolongation of military actions since poll respondents are presumably more cautious in their prospective judgement.

Chapter 2 is a comparative analysis of the Pentagon archive and media-based records on war-related deaths during the 2003 Iraq War. The chapter provides a rare opportunity to gauge any differences between the US military authority and media reports

in acknowledging civilian loss in armed conflict. Non-parametric equality tests substantiate that violent civilian deaths recorded in the Pentagon and the media-based dataset are consistent along the spatial and spatiotemporal dimensions. This could provide some degree of assurance that the number of deaths recorded in both datasets is not totally arbitrary although neither may be a true count of the civilian death toll during the war. However, the US military authority and the media reports show a substantial difference in counting civilian deaths during the initial stage of the war. The civilian death toll recorded by the US military authority is 29% of the lower bound of the media reports in 2004, and 41% in 2005. The official figures of the US military authority, however, exceeded or were almost identical with those reported by media during the rest of the war period. The systematic and outstanding difference during the initial stage of the war may suggest either that media reports may have inflated the number of violent civilian deaths or that the US military authority may have undercounted them. Although there is no concrete evidence to ascertain who is closest to the truth, the chapter finds the US military authority's undercount is partially supported by the evolution of the intensity of violence during the subsequent period of the war. Furthermore, the chapter also discovers that US military authority and media exhibit substantial disagreement in counting violent deaths which occurred during the major military offensives against insurgents and anti-coalition forces in the city of Falluja, Najaf and Samarra in 2004. In particular, given the Iraqi government's official figures on violent civilian deaths, which include women and children, occurring in Falluja, the Pentagon appears to have been less mindful in distinguishing civilian loss from insurgent deaths during the all-out assaults in the city.

Part II. Civilian Targeting in Armed Conflict

Chapter 3 and 4 examine civilian loss from intentional attacks by warring actors, both sovereign states and organised armed groups, in contemporary armed conflict. Civilian targeting in any armed conflict is prohibited by the 1949 Fourth Geneva Convention, and by subsequent Associated Protocols I and II (Hicks and Spagat 2008, International Committee of the Red Cross 2010). Nevertheless, civilian targeting has been widely carried out in contemporary warfare as the alternative war strategy to battling combatants

(Arreguín-Toft 2001). According to the data compiled by the Uppsala Conflict Data Program (UCDP), almost 700,000 civilians, defined as non-combatants, were killed due to intentional and direct attacks by sovereign states or formally organised non-state groups in armed conflicts during 1989 and 2010.[5] Chapter 3 and 4 describe the degrees to which warring actors intentionally employed lethal behavior on civilians as opposed to engaging in battle with enemies. The chapters each make use of the *Civilian Targeting Index* (CTI), a newly invented measure for the intentional targeting of civilians. An actor's CTI value is defined as the proportion of civilian deaths resulted from warring actors' intentional and direct attacks among the total number of fatalities associated with the actor during armed conflict. A CTI of 100 therefore indicates the worst outcome, meaning that an actor absolutely employed lethal force to target civilians. In contrast, a CTI value of 0 implies that an actor refrained from targeting civilians and absolutely employed its lethal force on armed combatants in battles. By providing each actor's CTI value, the chapters introduce new information on relationships between fatalities that involved civilian targets and fatalities that involved armed combatants.

Chapter 3 presents CTI values of 226 formally organised actors participating in armed conflict during 2002-2007. Whilst approximately 60% of the actors refrained from killing civilians in intentional, direct targeting (CTI=0), 11% used civilian targeting as their sole form of lethal behaviour in armed conflict (CTI=100). The chapter also attempts to find the determinants to explain why warring actors intentionally target civilian in armed conflict. With the control of other variables, a panel and cross-sectional data analysis concludes that the scale of conflict was not correlated with the intensity of civilian targeting. However, there was an inverse correlation between the intensity of civilian targeting and the scale of conflict when only actors who carried out some degree of civilian targeting are taken into account (CTI>0). This implies that once actors have crossed the line to target civilians (CTI>0), actors involved in larger scales of armed conflict are found to concentrate less lethal force on civilians and more on armed combatants. Conversely, those

[5] The figure does not involve civilian deaths that occurred during battles as the UCDP separately compiles battle deaths.

that engaged in lower scales of armed conflict concentrated more lethal force on civilian targeting and less on armed combatants.

Finally, chapter 4 further explores behavioural patterns of warring actors in the intentional targeting of civilians in the context of global conflict using updated datasets documented by the same source and method from chapter 3. The datasets available in chapter 3 contains 226 actors who were involved in armed conflict at least one year between 2002 and 2007 whilst the updated datasets used for chapter 4 contain 536 actors during the 1989-2010 time period. In these updated datasets, the number of actors doubles and the maximum duration of conflict is approximately quadruple. The descriptive statistics of the updated datasets illustrate almost identical proportions of the actors distributed at the extremes with the datasets used in chapter 3; 63% of the actors refrained from targeting civilians while they were involved in armed conflict (CTI=0) whereas 10% used civilian targeting as their sole form of lethal force (CTI=100). Furthermore, chapter 4 adopts a dynamic panel approach to examine how and to what extent warring actors involved in prolonged armed conflict adjust their civilian targeting behaviour over time. A dynamic panel data analysis with the actors engaged in a uniquely long duration of armed conflict that covers 20 years or more shows warring actors who carried out some degree of civilian targeting in the previous year tend to increase their concentration on civilian targeting as opposed to battling with enemies in the current year. This suggests that warring actors, either sovereign states or armed groups, involved in longer-term conflict should be scrutinised more intensely by international civil society to prevent further unnecessary violence on civilians.

Part I

Military and Civilian Fatalities during the 2003 Iraq War

Chapter 1

US Military Casualties in Iraq and Public Opinion

-With CBS-NYT, ABC-WP and Fox News Polls-

1.1. Introduction

Following the initiation of military action in Iraq in 2003, US society was inundated with reports on hostilities and its concomitant national casualties for a considerable period of time.[6] Combat in Iraq was the most covered story on the prime evening news programmes of the three US major television networks[7] between 2003 and 2007 with the exception of 2005 when Hurricane Katrina took over.[8] The airtime given to the combat stories was overwhelming too. For instance, the three TV networks assigned 1,157 minutes in total to cover hostilities in Iraq in 2007. This is nearly 5 times as many minutes of airtime as the second most covered story: the Virginia Tech massacre. Furthermore, the annual average number of fatalities of US military members under the hostile circumstances[9] exceeded 700 between 2004 and 2007 due to the insurgency in Iraq,[10] and the number of days when hostile casualties occurred amounted to 250 days a year during this period.[11] It appears that Americans have been exposed to national casualty information approximately 5 days a week over this time.

Considering the intensive media coverage on military operations and its casualties, the accumulation of deaths is conjectured to accelerate American's war-weariness and to have an adverse effect on presidential job approval ratings (Eichenberg 2005). This conventional wisdom, however, that wartime national casualties play a crucial role in

[6] Unless stated otherwise, the term 'casualties' refers to 'fatalities'.
[7] ABC World News, CBS Evening News and NBC Nightly News.
[8] Tyndall Report Review (www.tyndallreport.com). Combat in Iraq was the second most covered story by a narrow margin in 2005.
[9] Hostile casualties comprehend killed in action, died of wounds, died while missing in action and died while captured (US Department of Defense).
[10] 713 deaths in 2004, 673 in 2005, 704 in 2006 and 764 in 2007.
[11] 246 days in 2004, 264 in 2005, 269 in 2006 and 251 in 2007.

forming domestic opinion towards war and political leaders is a common speculation that still necessitates theoretical and empirical examination (Gelpi, Feaver and Reifler 2006). Indeed, the re-election of George W. Bush in November 2004, when the total number of hostile deaths of US forces in Iraq reached 850 and was precipitously increasing, is not elucidated by this conventionally accepted opinion-casualty nexus.

While ample studies have attempted to test the conventional wisdom, scholars differ over the magnitude and the direction of the casualty effect on public opinion. The seminal and oft-quoted research on the casualty-opinion link is Mueller (1971) that argues public support dropped in proportion to the number of casualties during the Korean and the Vietnam Wars. Formally, the overall casualty effect has shown that whenever American military casualties increased by 10 times (i.e., from 100 to 1,000 or from 1,000 to 10,000), support for both wars decreased by about 15 percentage points, suggesting a strong and direct link between casualty and opinion.

The noteworthy point in Mueller is that it takes the 'log of cumulative casualties' as an explanatory variable for opinion towards the two wars. The natural logarithm of the total number of casualties that have occurred at the time of the opinion survey serves well Mueller's hypothesis that increasing casualties result in decreased public support since war support tend to precipitously decline in the earlier phase of wars and slow down toward the end. The log of cumulative casualties becomes the dominant measure of wartime human cost in the relevant literature thereafter. Yet, although taking logs could be a potential solution to address nonstationarity of casualty data, further treatment is necessary in case time series data contain stochastic trends as is often the case.

Nonstationarity of the dependent variable and at least one independent variable in regressions could produce biased results. Log of cumulative casualties are apt to monotonically increase during a conflict while domestic support for the conflict decreases over time since support tends to be high at first owing to the rally effect[12] and eventually diminish as the initial fever disappears, even without reference to mounting casualties. Thus,

[12] The rally 'round the flag effect. Political terminology devised by Mueller (1971, 1973) to explain a phenomenon that a war tends to enjoy comparatively high domestic support in the beginning.

time itself is likely to generate spurious correlation (Yule 1926, Granger and Newbold 1974) between the log of cumulative casualties and opinion. Indeed, numerous time series contemporaneously trend upward or downward, and thus yield strong correlation. For instance, although nominal income and sunspots are not causally connected by construction, Plosser and Schwert (1978) find that the correlation coefficient between the log of nominal income in the US and the log of accumulated sunspots from 1897 to 1958 was 0.91, indicating a strong positive correlation between the two time series.[13] As Plosser and Schwert argues, regression analysis without redressing nonstationarity of time series trending upward for discrete reasons, could lead to a biased conclusion.

Building upon Mueller's work, Gartner and Segura (1998) attempt to control for nonstationarity by including a simple time trend in their regression models. Moreover, they also extend Mueller's bivariate model with the addition of a marginal casualty measure. With the same data perused in Mueller (1971), Gartner and Segura find that marginal casualties are more efficacious in capturing the effect of key events or salient exogenous shocks in war than monotonically increasing logged cumulative casualties. They also develop additional models to test their hypothesis that marginal casualties are the better predictor of opinion in periods of escalating hostilities, and cumulative casualties are better in periods of de-escalation.

Although marginal casualties are more reflexive of events or shocks in which opinion is shaped, Gartner and Segura do not take account of the likelihood of multicollinearity between the log of cumulative casualties and marginal casualties, defining the latter as the number of deaths incurred 120 days prior to the date of the opinion survey. Marginal casualties for 120 days, a third of a year, are likely to be highly correlated with cumulative casualties and its logarithm transformation as well, thereby engendering high multicollinearity, leading to the inflation of standard errors and less precise estimates. Furthermore, inclusion of a time trend could eliminate spurious correlation risk only if the data follows a trend-stationary process. In reality, many economic time series are not stationary even after the removal of a time trend since they contain a stochastic trend.

[13] Correlation coefficients are between -1 and 1. If the correlation coefficient between two variables is 1, it indicates the two series are perfectly and positively correlated.

Larson (1996) also builds upon Mueller's work but it goes a step further with its findings that the public shows casualty tolerance when the perceived benefits incurred from war outweigh the costs. Given the casualty data from 6 conflicts that the US had been involved with over the last 55 years between World War II and the military operations in Somalia in 1993, Larson found that the rate of decline of domestic support as a function of casualties varies considerably for each war or operation. In short, the public was willing to accept comparatively higher level of national casualties when US interests and principles were at stake (i.e. World War II), whereas support was drained by even a small number of casualties in case that US interests and principles are less compelling (i.e. military operations in Somalia). Despite the absence of thorough empirical efforts, Larson's contribution to the research of the casualty-opinion link remains important for its import of a cost-benefit framework in understanding the mechanism that casualties affect public support towards war. Larson assumes that the public (and political leaders) is economically rational enough to compute the costs and the benefits accrued from military action, and is willing to tolerate comparably high casualties in case that the perceived benefits exceed the costs. This cost-benefit analysis, a prevailing theoretical framework in research on the casualty-opinion nexus, will be dealt with in detail in the next section.

In the 21st century, research on the casualty-opinion link has evolved to show that the public evinces casualty tolerance when it sees favoured factors. Given the public surveys on the use of military forces concerning the 22 political episodes that the US had been associated with between 1981 and 2005, Eichenberg (2005) argues that a successful military intervention boosts public support regardless of the level of casualties. Furthermore, Eichenberg attempts to understand how differently poll respondents react to question wordings containing military and civilian casualties. In particular, mentioning military casualties in a question reduces support for the use of military force by about 8 percent, whereas mentioning civilian casualties abate support by 9.75 percent, signalling that the public might respond more sensitively to wartime civilian deaths than military casualties in forming its opinion towards war. Furthermore, Eichenberg argues that public opinion is considerably influenced by expected fatalities before war, and is subject to the possibility of success of war once it is initiated.

Similar to Eichenberg (2005), Gelpi, Feaver and Reifler (2006) hypothesise that military casualties have little effect on popular support for the US president when the public is fairly confident of victory. To test this hypothesis, they divide the initial 20 months of the Iraq war into three periods; the major combat (March and April 2003), the insurgency (May 2003 to June 2004) and the post sovereignty phase (June to November 2004), and examine the relations between the log of total US military casualties and the overall presidential job approval ratings in each phase.[14] Contrary to the conventional wisdom that increasing casualties depress war support, the impact of military casualties on presidential overall job approval ratings was slightly positive during the major combat phase when the US-led coalition swept the main cities in Iraq. On the other hand, casualties were negatively associated with approval ratings during the insurgency phase when the forecasting of success was loomed amongst US public. Furthermore, the casualty impact was not statistically significant during the post sovereignty phase. These shifts of casualty effects back Gelpi, Feaver and Reifler's hypothesis that the public manifests casualty tolerance when it sees preferred factors in war such as a strong likelihood of victory while casualties erode support when public confidence is undermined.

Most recent studies on the opinion-casualty link rigorously employ dynamic models to accommodate time series data. Voeten and Brewer (2006) attempt time series analysis with error correction models to capture the long-term equilibrium relationship between casualties and opinion during the recent Iraq War. Voeten and Brewer find that cumulative casualties have not affected war support or presidential approval ratings for the incumbent president, although a lagged casualty measure is negatively associated with war support and popular ratings. Consistently with Gelpi, Feaver and Reifler (2006), however, Voeten and Brewer's model fits the hypothesis that casualties have differential effects during the various periods of the war. It also builds on Larson (1996) with its findings that disaccord in elite toward the war leads to a decrease in war support amongst the public. On the other hand, Echenberg and Stoll (2006) find that presidential approval ratings had significantly

[14] The poll question of interest for Gelpi, Feaver and Reifler (2005) is the presidential overall job approval ratings, instead of the job approval ratings on a specific issue such as the handling of the Iraq War or the campaign against terrorism. The correlation coefficient between overall presidential approval and approval of the president's handling of Iraq is .95.

been damaged by cumulative military casualties over the war period between March 2003 and January 2006. It is also noticeable that macro-economic indicators such as disposable income and consumer confidence substantially affected popular support during the pre-war period (February 2001 to March 2003) but had little impact since the war broke out, suggesting that Americans had been heedless of economic performances during the war in Iraq in assessing president's overall accomplishment.

Finally, Geys (2010) brings another perspective for the research on casualty-opinion link, by including the US Department of Defense budget as a proxy for the changes in government's war-related expenditure between 1948 and 2008, as well as macroeconomic indices such as GDP growth and the unemployment rate in its model to calibrate how the public embraces economic cost of war when it forms opinion towards its leaders (e.g. approval ratings) during the Korean, Vietnam and Afghanistan/Iraq War. Inclusion of the financial cost of warfare makes the casualty variable statistically insignificant for the Korean and Afghanistan/Iraq War although its effect remains still significant for the Vietnam War.

While both the magnitude and the direction of the casualty effect on opinion towards war are still contentious as seen in the previous works, this chapter draws upon and expands these works by contemplating the casualty-opinion link using the data from the war in Iraq, arguably the most significant conflict in the recent decade. It has never been attempted to examine the casualty-opinion nexus with the entire period of the Iraq War since the conflict has recently finished when the last US combat troops left Iraq in August 2010, officially ending the seven-and-a half years military operation.[15] It appears, therefore, to be the pertinent time to evaluate the human cost of the war, as measured in combat deaths, and its impact, if any, on public opinion during the war as a whole. Whereas previous works concentrate on specific categories of poll questions such as 'right/wrong',

[15] In this chapter, the war period is defined between 20 March 2003 and 19 August 2010 when the last 'combat' troops left Iraq, ending Operation Iraqi Freedom. The remaining US service personnel for an advise-and-assist role left the country in 18 December 2011, ending Operation New Dawn that started from September 2010.

'worth' or 'approve' types[16] that require respondents' retrospective evaluation on the war and the president, attention of this chapter is paid on the question type that requires poll respondents' prospective judgement on the practical feasibility of war: Should the troops stay or withdraw? Overall, this chapter subsumes 25 different questions tipping public opinion towards the discrete war issues to examine how differently the public responds to the wide range of war issues. To my knowledge, no other work has attempted to embrace various poll questions to explore public's potential distinctive attitude to the different war-relevant subjects. In so doing, this chapter demonstrates that poll respondents remarkably differ in attitude towards retrospective and prospective questions, which most of scholarly works do not reckon the distinction between the two. Furthermore, the early studies on the casualty-opinion link including Mueller (1971) and Garter and Segura (1998) did not consider statistical problems such as irregular time intervals between poll observations that render time-series analysis ineffectual. By addressing the statistical issues, this chapter attempts to offer more comprehensive empirical examination of how and to what extent US military casualties during the Iraq war have impacted on public opinion towards the different types of question.

The rest of the chapter is outlined as follows. Section 2 lays out the theoretical framework and the testing strategies. The data analysis is presented in section 3, the empirical results are discussed in section 4 and then section 5 concludes.

1.2. Theoretical Background and Testing Strategies

1.2.1. Theoretical Background

Since Larson (1996) introduced the idea of using cost-benefit analysis to aid understanding of public casualty tolerance and aversion in recent past US military operations, this

[16] An example of the 'right/wrong' type question is "Looking back, do you think the United States did the right thing in taking military action against Iraq, or should the U.S. have stayed out"? (CBS-NYT survey), the 'worth' type is "All in all, considering the costs to the United States versus the benefits to the United States, do you think the war with Iraq was worth fighting, or not"? (ABC-WP survey), and the 'approve' type is "Do you approve or disapprove of the job George W. Bush is doing handling the situation with Iraq"? (Fox News survey).

microeconomic tool has been a broadly accepted theoretical framework in casualty-opinion research. Given this behavioural economic tool, an individual poll respondent is assumed to make a decision in the manner of a rational consumer who seeks profit maximisation on the basis of cost-benefit analysis. A consumer purchases a good if the benefits outweigh the costs otherwise he will not buy it. By the same token, a poll respondent is assumed to compute the perceived costs and benefits of wars, and eventually articulates an opinion through polling surveys based on the calculation.

More formally, the basic decision rule for casualty tolerance within a cost-benefit framework is:

$$\left[\sum_{i,t} B_{i,t}\frac{1}{(1+d)^t} - \sum_{i,t} C_{i,t}\frac{1}{(1+d)^t}\right] > 0$$

where $B_{i,t}$ and $C_{i,t}$ is benefits and costs of *i*th individual in a society at time *t*, and *d* denotes the discount rate. Assuming that social preferences are the aggregated preferences of all individuals, social benefit is the sum of all individuals' benefits and social cost is the sum of all individuals' costs (Little and Mirrlees 1974, OECD 2006). The discount factor, $1/(1+d)^t$, is included to net out the effect of inflation in such a way that the present value of a unit of benefit or cost has a higher weight than the future value of the same unit of benefit and cost. Under the circumstances of $\sum_{i,t} B_{i,t}(1+d)^{-t} > \sum_{i,t} C_{i,t}(1+d)^{-t}$ where the beneficiaries from military intervention could pay the inflation-adjusted aggregated costs to the losers in the society and still enjoy benefits, $\sum_{i,t} B_{i,t}(1+d)^{-t} - \sum_{i,t} C_{i,t}(1+d)-t$, the potential Pareto allocation is achieved. Cost-benefit analysis is nothing but an attempt to calculate $\sum_{i,t} B_{i,t}$ and $\sum_{i,t} C_{i,t}$ as precisely as possible. Although it is hard to believe that poll respondents make complicated cost-benefit calculations in assessing military operations due to imperfect information and non-monetary externalities, this chapter sticks to the cost-benefit appraisal to approach the casualty-opinion link since it is obvious that poll respondents absorb some of the war news via the media and other sources, and this information influence their evaluating military operations (Geys 2010).

Benefits from war or military intervention may be comparatively elusive and sometimes hard to quantify whereas costs such as human victimisation and infrastructure damage are rather tangible. Moreover, benefits of war have conspicuously varied across time and space. For instance, the perceived benefits of the World War II from the Allied Powers' side were securing their order and stability from the threat of the Axis Powers. Similarly, principal policy objectives at stake of the Korean and Vietnam Wars from the US perspective were ensuring the security and hindering the spread of Communism although these perceived benefits were less convincing than those of the World War II (Larson 1996). On the other hand, small size conflicts including the Falklands War or the Invasion of Kuwait tend to involve disputes over territorial control or natural resources. Furthermore, perceived benefits could change in the course of war as observed in the 2003 Iraq War or the UN Operation in Somalia in 1993. Initially, the vast benefits of eliminating the Weapons of Mass Destruction (WMD) in Iraq garnered the high levels of public support, and then the US foreign policy objects shifted to the War against Terrorism and building security in Iraq after the WMD threat was revealed to be a nothing but an intelligence fallacy. In Somalia, the perceived benefits changed to bringing peace and reconciliation amongst warring factions after the initial benefits of protecting Somali lives from violence were achieved with the UN operations (Larson 1996). In addition, post-war foreign aid and investment with a purpose of reconstruction may be also considered as benefits from war.

Given the assumption that the benefits of war such as territory, economic power or certain government policy is exogenous (Bennett and Stam 1996), the next query of interest is how the public measure the costs of war. War costs undoubtedly include spending on military operations, current and future costs of medical care for the wounded soldiers, macroeconomic damage and many other features (Stiglitz and Bilmes 2008). The important assumption of this chapter, however, is that combat casualties are the core cost of the war. Although combat casualties are not the only cost, they are the most salient and visible one since nothing can surpass shocks from deaths of family members, friends or neighbours from battlegrounds (Gartner, Segura and Wilkening 1997, Stiglitz and Bilmes 2008). Due to this reason, most previous studies on the casualty-opinion link explicitly or implicitly

assume that casualties are the key costs of war as far as public opinion formation is concerned.

This assumption, however, leads to the following question: how is human sacrifice in war valued? Cost-benefit analysis has roots in pricing, and prices are usually formed in markets but some of the most important features in war such as human costs might not have a market price (Arrow et al. 1996). Moreover, it could be rather elusive or immoral to measure the human sacrifice in war. Despite that human cost is immeasurable, the Department of Defense (DoD)'s compensation scheme could be a proxy for human cost in Iraq. The DoD is paying 500,000 dollars for a military member's death, with 100,000 dollars of death benefit and 400,000 of life insurance although Stiglitz and Bilmes (2008) recalculate this amount to 7.2 million dollars according to the "value of statistical life (VSL)" that the US government and insurance companies broadly applied in determining compensation for human loss. Poll respondents are unlikely to identify all tangible and intangible costs of war but it is expected that they still do ends-means calculus based on information they absorbed.

1.2.2. Testing Strategies

With the assumptions in the previous subsection, this chapter attempts to test the conventional wisdom that the accumulation of military casualties induces a decrease in support towards war. In particular, this chapter extends the regression models coined by the previous scholarly works by adding the US unemployment rate and various control variables to look at the overarching effect of wartime casualties on public preferences over the war-relevant issues captured in the 25 different poll questions[17] during the US invasion of Iraq between March 2003 and August 2010.

The unemployment rate, out of other major macro-economic indices, is included in the regression model for the two prime reasons. Firstly, it corresponds to monthly time series data used in this chapter. Unlike other economic indices such as the GDP (quarterly released) or federal fund rate (announced 8 times a year), the unemployment rate, as well as

[17] Twenty-three in twenty-five questions are of use in regression analysis. See Table 1-1.

the inflation rate, is made public on a monthly basis. Secondly, while the US monthly inflation rate had changed rather stably between -2 and 4 percent during the war period,[18] the unemployment rate had fluctuated over the same period, better reflecting the change in economy to political and economic events including the War in Iraq and the financial crisis initiated in 2008. For instance, the seasonally adjusted unemployment rate soared up to 10.1 percent in October 2009, hitting double digits for the first time since the early 1980s recession.[19] Inclusion of *unemployment* in the regression model is expected to net out the negative effect in the labour market on formation of poll respondents' opinion towards the war. The basic time series regression model is given by,

$$R_t = \alpha + \beta Cumulative\ Casualty_t + \gamma Marginal\ Casualty_t + \delta Unemployment_t + \theta X_t + \varepsilon_t. \quad (1.1)$$

The dependent variable, R_t, is the percentage of American poll respondents signifying either a positive or negative opinion concerning the war in Iraq, depending on the type of question asked at time t.[20] The first independent variable, *cumulative casualty*$_t$, is the natural logarithm of cumulative casualties that have occurred at the time of opinion surveys. Thus, the coefficient of cumulative casualties, β, captures the effect of hostile deaths of US military members on each opinion towards the war. *Marginal casualty*$_t$ denotes US military casualties occurred for 7 days prior to the date of the poll.[21] *Unemployment*$_t$, a proxy of the overall economic outcomes, is coded as 1 if the most recently released US unemployment rate prior to the polls decreased compare to that of the previous month, 0 otherwise. Finally, X_t is a set of controlling regressors that apprehend a time trend to eliminate a time effect as well as binary variables to capture political circumstances under which poll respondents might face as of the date of opinion surveys. The binary variables are discretionally used in consideration of the characteristics of time series data of each question.

[18] Inflation measured by the consumer price index. US Bureau of Labor Statistics (http://www.bls.gov/)
[19] US Bureau of Labor Statistics (http://www.bls.gov/).
[20] The positive and negative responses are separately regressed.
[21] Although some take a longer duration for *marginal casualty* such as 120 days (Gartner and Segura 1998), and 3 months (Gey 2010), I take 7 days in consideration of multicollinearity between *cumulative* and *marginal casualty*. Furthermore, marginal casualties for 7 days are stationary in most of the 25 poll questions.

Although the regression results estimated with the original poll data is presented in this chapter, there are several econometric concerns to be aware of in using the original poll data. Firstly, time series data for each poll question has not a regular interval since the polls had not been systematically commissioned during the war.[22] This is mainly because that opinion surveys relevant to war issues had been frequently carried out until mid-2007 but sparsely conducted since then as the US political interest rapidly shifted to the presidential election, the war in Afghanistan or the economic meltdown. Statistical methods for time series, therefore, may not be applicable for the original poll data with irregular frequency. Secondly, the original data could be nonstationary by nature, following a unit root process (I(1)). For instance, the presidential approval ratings, depicted by 'approval' type poll questions,[23] had consistently decreased during the Bush administration. This trend may be stochastic, not deterministic that can be easily addressed with an inclusion of a time dummy in the regression model. Without converting the data into stationary series (I(0)), the estimates will be biased due to spurious regression. Finally, many of the poll questions have small samples, impeding asymptotic time series analysis. As seen in the next section, 17 in 25 questions have less than 30 observations during the sample period.

In order to mitigate these concerns, the poll data is newly constructed with the following procedure. Firstly, similar poll questions are aggregated regardless of institutions that conducted opinion surveys. Secondly, when aggregating similar questions, the time intervals of poll observations are adjusted to make them have a regular frequency. When more than one poll observation is available in a month, I take the average value while I linearly interpolate for missing observations (Geys 2010). If the dependent and all explanatory variables in modified time series data are stationary, I test them with the model (1.1) with the inclusion of an autoregressive term (R_{t-1}) as an explanatory variable. If they are nonstationary but have common stochastic trend (cointegrated), I employ an Error Correction Model (ECM).

[22] For instance, 'right/wrong' type question of CBS-NYT (Q1 in Table 1-1) had been asked 68 times during the war period which lasted for 90 months; it was asked more than one time in some months, but was skipped in other months.
[23] The examples of the 'approve' type questions are question 9-10, 20-21 and 24-25 in Table 1-1.

Although the variables follow a unit root process (I(1)), their linear combination could render I(0) variables with cointegrated parameters (Engle and Granger 1987). This error correction mechanism is easily extended from the first-order autoregressive distributed lag model (ADL) below.[24]

$$Y_t = \alpha_0 + \alpha_1 X_t + \alpha_2 X_{t-1} + \alpha_3 Y_{t-1} + \nu_t$$

where ν_t is white noise. If Y_t and X_t are nonstationary but have a long-run equilibrium in a way of $Y=\lambda+\rho X$, where λ and ρ are cointegrated parameters, the equation above can be reformulated to give

$$\Delta Y_t = \alpha_1 \Delta X_t + (\alpha_3 - 1)(Y_{t-1} - \rho X_{t-1} - \lambda) + \nu_t$$

where Δ signifies the first difference operator. Whilst α_1 captures the immediate effect of a change in X_t on a change in Y_t, the error correction term $(\alpha_3 - 1)(Y_{t-1} - \rho X_{t-1} - \lambda)$ shows the speed to restore the equilibrium. For instance, if the error correction term is non zero, it means the model is out of equilibrium, and there must be a movement back to the equilibrium relationship given that $|\alpha_3| < 1$. In this chapter, I use a simple form of the single equation error correction model (Voten and Brewer 2006, Eichenberg and Stoll 2006) as below.

$$\Delta R_t = \alpha + \lambda R_{t-1} + \eta \Delta Cumulative\ Casualty_t + \rho Cumulative\ Casualty_{t-1} + \delta Unemployment_t + \theta X_t + \varepsilon_t. \quad (1.2)$$

Model (1.2) states that the first difference of the percentage of poll respondents for each aggregated question (ΔR_t) depends on the previous poll response (R_{t-1}), the first difference of *cumulative casualty* as the logarithm form (Δ*Cumulative Casualty*$_t$), one lag of *cumulative casualty* (*Cumulative Casualty*$_{t-1}$), *unemployment* and a group of controlling regressors (X_t). This error correction mechanism allows us to estimate contemporaneous changes in cumulative casualties and the speed in returning to re-equilibrium after the

[24] Hendry (1995), Kennedy (2008).

deviation from the long-run equilibrium. The marginal casualty measure is excluded from the error correction model since it may be redundant in the presence of the first difference of the cumulative casualty measure.

1.3. Data Analysis

The data for this chapter are largely classified into two categories: the US poll data and the casualty data from the initiation of the Iraq War in 20 March 2003 up to 19 August 2010 when the last US combat brigade left Iraq, ending Operation Iraqi Freedom.

1.3.1. Public Opinion Data

As a proxy for public opinion, poll data collected from three survey organisations tied to the leading US media; CBS-New York Times, ABC-Washington Post, and Fox News, is used for this chapter.[25] [26] The first two polling institutions are the combination of the US major TV networks and newspapers that are thought to be rather liberal by conservative parties, whereas Fox News is deemed to have a conservative bias by liberal parties, in favour of the Bush administration in going to the war. Interestingly, all three polling institutions, CBS-NYT, ABC-WP and Fox News, have the same question concerning the public's preferences in approving the president's handling of the Iraq situation, leaving a room for a comparative analysis between the polling surveys commissioned by media institutions which have somehow opposite inclinations.

Amongst the polls commissioned by the three polling institutions during the war period, I performed a search using the following keywords: Iraq, war, troop, military, and terrorism. Given the numerous poll questions obtained from this search, only the questions that satisfied the following five thresholds remain as part of the analysis of this chapter. Firstly, the polls are commissioned nationwide. Secondly, respondents are randomly or

[25] From time to time, CBS and ABC independently conducted the polls without being associated with NYT or WP.
[26] The polls were conducted via telephone interviews, and the time window of a single poll is usually within a week. The sampling error is plus or minus 3 percentage points in most poll surveys.

quasi-randomly selected adults or voters.[27] A nationwide random sample ensures that opinion surveys are extrapolated in order to give a measure of public opinion. Thirdly, the poll question taps generalised support for the war or relevant issues to the invasion of Iraq. Fourthly, the poll questions are main, not the sub-questions. Finally, the questions are recursively asked during the sample period without much variation in wording.[28] The final requirement is to eliminate the ambiguity incurred by a frame effect from different wordings or question structures. From this filtering process, the 25 different poll questions were selected for the analysis; 14 questions from CBS-NYT surveys, 9 from the ABC-WP, and 2 from Fox News as shown in Table 1-1. These three media polling outlets committed fairly considerable number of opinion surveys concerning various war issues during the military operation in Iraq, and repeatedly asked the same questions that allows independent analysis for each question.

From the top of Table 1-1, the 'right/wrong' and the 'worth' type questions (Q1-3 and 15-16) ask of respondents if they think the Iraq war is the right decision or worth doing.[29] These two retrospective question types are of principal interest in most previous scholarly works on the casualty-opinion relations since they are regarded as directly related to public support towards the war, tapping generalised preferences of the public (Mueller 1971).

The 'stay/withdraw' type questions (Q4-8 and 17-18) are still highly relevant to public war support, questioning whether respondents want the troops to be stationed in Iraq or to be withdrawn. Furthermore, while the 'right/wrong' or the 'worth' type questions are somehow relevant to the justification or the moral aspects of the war that require the retrospective evaluation, the 'stay/withdraw' type is straightforward questions that asks respondents' prospective judgement on the continuance of military actions.

[27] There are cases that a certain number of a specific group of people (i.e. aged more than 65 or African American) is included in the samples, but these groups are weighted to reflect the proper proportion of the population.
[28] There is variation in wording in some poll questions but this is a small change, such as the 'US' becoming the 'United States' or 'George Bush' becoming 'G.W. Bush'.
[29] The classification of the poll question types follows the method of Dr. Andrew Hossack, principal analyst in Defence Science and Technology Laboratory of the UK Ministry of Defence.

The ‘approve’ types (Q9-10, 20-21 and 24-25) draws political attention in particular by signifying the approval ratings of the president’s handling of the Iraqi situation or the campaign against terrorism. In addition, the casualty type (Q19) might also attract political interests since it offers a direct measure of public tolerance against the accumulation of military casualties by questioning respondents on whether the total number of military deaths up to the date of the poll is acceptable or not.

The ‘success to date’ (Q11-12 and 22-23) and the ‘expected success’ type (Q13) questions are comparatively less relevant to generalised war support. Specifically, the ‘success to date’ type questions query how respondents think of the process of reconstructing Iraq since the collapse of the Saddam Hussein government or whether they think that the US is safer from terrorism as a result of the military intervention in Iraq. The ‘expected success’ type asks about the prospect of the war, inferring public consensus on the outlook of the military action.

Finally, the ‘reinforce’ type (Q14) focuses on respondents’ preferences towards the then president Bush’s plan in the beginning of 2007 to send more than 20,000 troops to Iraq to redress the severe insurgency in the country. This ‘surge’ plan engendered a huge debate on its effect in the US society.

Given the above 25 questions, I categorised each choice in the responses into positive and negative answers. The positive (+) and negative (-) signs in the ‘choices in response’ column in Table 1-1 indicate that the answer is labelled as a positive or negative response respectively. Tagging the signs is skipped when it is not straightforward to categorise the choices into the positive or negative responses (i.e. Q6 and 8). The trends of positive and negative responses for all 25 questions over time are presented in Figure 1-1.

As seen in Figure 1-1, some questions (i.e. Q1, 9, 10 and 12) had been asked over the whole period of the war, with most of them for a certain period of time only. Furthermore, positive responses, illustrated with triangle shapes, appear to decrease over time for most questions while negative responses, hollow circles, tend to increase. For instance, the first plot in Figure 1-1 displays that the proportion of poll respondents

signifying that the US did the right thing in taking military action against Iraq (i.e. positive response) was 64 percent at the beginning of the war but it gradually decreased to end up with 37 percent at the last poll commissioned in 2010. On the other hand, the proportion of respondents exhibiting that the US should have stayed out (i.e. negative response) has increased over time, from 28 to 59 percent.[30] Whilst many of the questions display a moderate increase or decrease over time, the 'approve' type questions spanning the two administrations that experienced the Iraq war (Q9, 10 and 20) show a steady decrease in presidential approval ratings under the Bush administration and a sudden increase with the outset of the Obama's in the beginning of 2009. The 'right/wrong' and 'worth' type questions spanning the two governments (Q1 and 15), however, are not seemingly affected by the change in regime, implying that poll respondents' belief on the justification of the war had been neither aggravated nor improved by the administrative shift. Whilst the 'approve' type questions show a dramatic change due to the shift in administration in 2009, the 'success to date' type questions (Q12 and 23) display a conspicuous change in poll respondents' retrospective judgment on the US efforts to bring stability and order in 2007, indicating that respondents might be affected by the surge that led a rapid decrease in daily military casualties in mid-2007. Finally, the 'stay/withdraw' type questions give ambiguous information; the ABC-WP poll questions (Q17-18) show a steep decline in opinion in favour of troop stationing but one cannot find a common trend in the CBS-NYT polls (Q4-8).

One other noteworthy point in Figure 1-1 is that each question has not been asked with a regular time interval. For instance, question 3 was often asked at the beginning, and then rarely commissioned since 2007. In addition, the 'approve' type questions (Q9, 10 and 20-21 and 24-25) were scarcely or never asked in 2008 when the presidential election was held. As discussed in section 1.2, I firstly carry out separate regressions for each question without modifying the original poll data shown in Figure 1-1, then I aggregate similar questions and adjust poll observations since time series methods such as a nonstationarity or cointegration test have been limited to the data with a regular time intervals (Seong, Ahn and Zadrozny 2007).

[30] The descriptive statistics of poll responses for each question are presented in Table 1-A-2 in appendix.

1.3.2. Casualty Data

The US military casualty data for this chapter is obtained from the US Department of Defense website.[31] In particular, the chapter utilises hostile deaths instead of total deaths since daily news reports mainly cover hostile deaths in battle, comprising killed in action, died of wounds, died while missing in action and died while captured, than non-hostile deaths such as died in accident, illness, homicide or self-inflicted. Hostile deaths and total deaths (sum of hostile and non-hostile deaths) reached 3483 and 4408 respectively at the end of the war (August 2010).[32]

Figure 1-2 illustrates cumulative and marginal hostile deaths having substantially different tendencies over the war period. The dotted line displays the time-series of cumulative military casualties as a common logarithm plot and the solid line shows marginal casualties defined here as incurred over the preceding 7 days. While the log of cumulative casualties monotonously increase over the war period, marginal casualties fluctuate until mid-2007 and have steeply decreased since then, helped by the surge that brought about an additional dispatch of more than 20,000 troops in Iraq during the first half of the year. The arrows in Figure 1-2 indicate the months corresponding to the critical events such as the transfer of Iraqi sovereignty, an announcement of the surge plan, and armed attacks that caused a large number of military or civilian casualties during the war period. As shown in the descriptions for the events, the two major battles between the US forces and anti-coalition forces in Falluja in April and November 2004 brought about a considerable number of military fatalities.

1.4. Regression Analysis

Given the models illustrated in section 1.2.2, this section first presents OLS regression results obtained from separate regressions for each question without concerning nonstationarity or irregular time intervals of poll data, then shows time series analysis after

[31] Casualty Analysis System (http://siadapp.dmdc.osd.mil/personnel/casualty/castop.htm).
[32] The correlation coefficient between cumulative hostile deaths and cumulative total deaths over the whole war period is .9997. The correlation coefficient of daily hostile deaths and daily total deaths is .9043.

addressing these econometrics issues. The OLS results of the first experiment are displayed in Table 1-2.

Table 1-2 only presents the results for the positive responses.[33] The first three columns of Table 1-2 contain the media institutions that had commissioned the polls chosen for this chapter, question numbers and question types for each question. The explanatory variables including the two casualty variables are presented in the first row in Table 1-2. Specifically, c*umulative* and *marginal casualty* indicate the natural logarithm of the total number of hostile military deaths that have occurred at the time of the polls and marginal casualties for 7 days prior to the polls respectively. *Time* is the number of days between the start of the war and the date of the polls to net out the possible time effect. *Unemployment* is coded as 1 if the most recently released US unemployment rate prior to the poll decreased compared to that of the previous month, 0 otherwise. *Administration*, coded as 1 if a poll was commissioned during the Obama administration, 0 otherwise, is to capture the effect of the change in administration on opinion towards the war.[34] *Period* is used for several questions to isolate certain periods that may be systematically different from other periods of the war such as the surge (Q4) or the initial stage of the war (Q1 and 7) when war support was high due to the rally effect. The rest of the table exhibits the coefficients of the explanatory variables when the dependent variable is percentage of positive responses. I mainly attempt to interpret the coefficients of the two casualty variables, and cope with the rest of the explanatory variables in the regression results with the data fitted for time series analysis later in this section.

Cumulative Casualties Do Matter

Looking at the primary variables of interest in Table 1-2, we see the coefficients for the two casualty measures. One of the noteworthy points is that many of the coefficients on cumulative casualties are significant at the 5% level whereas *marginal casualty* is significant only for question 12 and 19. For instance, *cumulative casualty* in question 1 ('right/wrong' type of CBS-NYT polls) implies that, holding all other variables constant,

[33] The regression results for the negative responses, as presented in Table 1-A-1 in appendix, are symmetric with those for the positive responses.
[34] 0 is for the G.W. Bush administration.

every time American military casualties increased by a factor of 10 (i.e., from 100 to 1,000 or from 1,000 to 10,000) the proportion of poll participants who responded that the war was the right decision has dropped by 10.23 percentage points. The marginal casualty measure, however, is not statistically significant although it is also negative. Furthermore, the estimated effect of cumulative casualties in the 'worth' type questions of CBS-NYT and NBC-WP polls (Q2-3 and 15-16) indicates that whenever American casualties increased by 10 times, the proportion of respondents signifying that the war was worth doing remarkably dropped, by between 7-16 percentage points. The effect of cumulative casualties in the 'right/wrong', and the 'worth' type questions are not substantially different from the Mueller's findings that the percentage support towards the Korean and the Vietnam Wars dropped by about 15 percentage points as casualties increased by 10 times (Mueller 1971).[35] The effect of cumulative casualties is still strong and direct in many of the questions.

Figure 1-3 visually shows the estimated effect of cumulative casualties presented in Table 1-2.[36] The estimated effect of cumulative casualties for each question is indicated by the figures next to the square shapes of the bar graphs. The triangles and the circles above and below the squares represent the upper and the lower limits of the 95% confidence intervals for the estimates. The hollow squares in the right side of the figure imply that the estimates for the questions (Q4-5, 11, 17, 24-25) are not statistically significant at the 5% level.

Looking at the significant estimates (solid squares) first, we see expected negative signs suggesting a negative association between cumulative casualties and positive responses for each poll question. As stated, the 'right/wrong' and the 'worth' type questions (Q1-3 and 15-16) that tap the generalised support towards the war were significantly aggravated as military casualties accumulated. Moreover, the estimates for the 'approve'

[35] Mueller pools the 'right/wrong' and the 'worth' type questions in regression analysis. Also, the log of cumulative casualties is used as a sole explanatory variable in the Mueller's model whilst marginal casualties, a time trend, and other political and economic explanatory variables are contained in the model specification for this chapter.

[36] Question 7, 13, 14, 18 and 22 are not presented since the estimates for these questions are too large to be shown in the figure. The coefficients for these questions are not statistically significant as shown in Table 1-2.

type questions of CBS-NYT and ABC-WP (Q9-10 and 20-21) may be interpreted as follows: controlling for other factors, the presidential approval ratings on handling the Iraqi situation or the campaign against terrorism decreased by about 14-16 percentage points whenever US military casualties increased by 10 times. In addition, the coefficient for the 'success to date' type question of CBS-NYT (Q12) implies a negative association between cumulative casualties and positive view on the outcome of the war. Finally, the estimate for the 'casualty' type question (Q19) is the greatest in magnitude amongst the questions with significant estimates.[37] [38] [39]

Interestingly, all the questions with significant coefficients ask of respondents' retrospective assessment, requiring them to evaluate the justification of the war ('right/wrong' and 'worth' types; Q1-3 and 15-16), president's accomplishment in the war

[37] Estimated effects of cumulative casualties in some questions are greater in magnitude than those of other questions. For instance, the estimate of the 'casualty' type question (Q19) is the greatest (-33.33) amongst the questions with significant estimates as presented in Table 1-2. Furthermore, the estimates of the 'approve' and 'success to date' type questions of CBS-NYT polls (Q9-10 and Q12) are greater in magnitude than those for other CBS-NYT poll questions such as the 'right/wrong' and 'worth' types (Q1-3) by about 5-10 percentage points. It may suggest that respondents are more susceptible to certain types of questions. It is, however, not necessarily true that the estimates are significantly different across the question types as indicated by the overlapping confidence intervals. The confidence interval at the 95% level of the 'casualty' type question is (-49.54 and -17.11), which is largely overlapped with that of other questions with significant estimates. For example, the confidence intervals of the two 'approve' type questions of ABC-WP polls (Q15-16) are (-19.82, -9.31) and (-24.32, -6.46) respectively. Moreover, the confidence intervals for the two 'worth' type questions of ABC-WP polls (Q15-16) are (-21.96, -10.37) and (-22.75, -5.64). The confidence intervals for the CBS-NYT poll questions with significant estimates (Q1-3, Q9-10 and Q12) are also overlapped with those of the 'casualty' type question except Question 2; 95% CI of Q1 (-18.21, -2.25), Q2 (-12.97, -2.33), Q3 (-18.04, -2.23), Q9 (-21.18, -10.53), Q10 (-26.54, -8.64), Q12 (-27.21, -5.63). These overlapping confidence intervals for each question imply that the estimates are not significantly different from each other although each of them is significantly different from zero.

[38] The negative casualty effect on public support towards the 2003 Iraq War is also observed in the UK although it is less straightforward compared to that in the US. Given the 179 UK hostile deaths during the war and the data of the opinion surveys committed by three different polling organisations, a Populus poll question that asks the justification of the war shows a statistically significant effect of cumulative British military fatalities on war support at the 1 percent level. Another poll question from the YouGov opinion surveys produces a significant estimate of cumulative fatalities at the 10 percent level whereas the ICM surveys render an insignificant estimate. The detailed regression results and the question wording are presented in Table 1-A-4 in appendix.

[39] The negative casualty effect on war support is rather elusive when it comes to small size military operations. During the US military intervention in Somalia in 1993, the approval ratings for then-President Clinton was slightly higher than 50 percent in June but plummeted to about 30 percent in October, just after the Battle of Mogadishu which resulted in 18 deaths of US soldiers (Baum 2004). The casualty-opinion link, however, cannot be quantified due to the limited number of opinion surveys that hinders a thorough empirical analysis. Furthermore, the link is reversed in other small size military operations undertaken by the US forces in Panama and Lebanon between the late 1980s and early 1990s as public support had slightly increased with the accumulation of military casualties (Larson 1996).

and anti-terrorism campaign ('approve' type; Q9-10 and 20-21), or the level of military casualties up to the date of the poll surveys ('casualty' type; Q19). Furthermore, the 'success to date' type 2 of CBS-NYT polls (Q12) also queries respondents' retrospective evaluation on the US efforts to re-establish security and order in Iraq.

Continuation of Military Operations and Casualties

When looking at the questions with insignificant coefficients on the casualty variables in Table 1-2 and Figure 1-3, we find that neither the cumulative nor the marginal casualty measure is statistically significant in affecting poll respondents' opinion on the continuation of military stationing, proxied by the 'stay/withdraw' type questions (Q4-5, 7 and 17-18). This may be due to the small sample size varying between 15 and 26, otherwise it may be interpreted that poll respondents take no account of casualty information in shaping their opinion on whether the US military forces should keep staying in or leave Iraq.

To test this hypothesis, firstly I select *similar* questions categorised under the same type. Secondly, I aggregate poll responses of the selected questions within each type to give the following 6 categories: Worth Type, Approve Type I and II, Stay/Withdraw Type, Success to Date Type, and Right/Wrong Type.[40] [41] The aggregated positive responses for each type are displayed in Figure 1-4.[42] Positive responses for the questions categorised under Worth Type (Q2, 3, 15 and 16) consistently decrease over time as displayed in the first plot of Figure 1-4. Approve Type I and II also show declining trends until the

[40] Worth Type comprises question 2, 3, 15 and 16, Approve Type 1 question 9, 20 and 24, Approve Type II question 10 and 21, Stay/Withdraw Type question 4-5, 7 and 17-18, and finally Success to Date Type question 12 and 23. The selected questions under each type have different wordings but contain similar concern. The questions under Worth Type ask poll respondents whether they think the war contributed to the long-term security of the US (Q16), was worth fighting (Q15), or was worth the loss of American life and other costs (Q2-3). Approve Type is divided with two categories. The first question type is for the presidential job approval ratings on the situation with Iraq (Q9, 20 and 24) whilst the second on the campaign against terrorism (Q10 and 21). The questions under Stay/Withdraw Type ask poll respondents whether US troops should leave or stay in Iraq (Q4-5 and 17-18), or should have a time table for the withdrawal (Q7). Question 6 and 8 are excluded due to the ambiguity in categorising the choices into positive and negative responses. The questions under Success to Date Type ask whether US efforts to bring stability and order to Iraq are going well or badly (Q12), or the US is making significant progress toward restoring order in Iraq (Q23).

[41] Positive and negative responses are aggregated separately.

[42] Plots for negative responses are presented in Figure 1-A-1 in appendix. I also include Right/Wrong Type in the aggregated analysis since it has comparatively large observation (68) although it has only one question in it.

inauguration of Barack Obama in February 2009, indicating presidential job approval ratings on the Iraq situations (Approve Type I), and on the campaign against terrorism (Approve Type II) surged up with the change in administration from Bush to Obama. Aggregated positive responses for Stay/Withdraw Type appear to have diminishing patterns while the range in variation for each question is similar during the overlapping periods. The responses for the two questions included in Success to Date Type (Q12 and 23) exhibit almost identical tendency over the war period. Finally, Right/Wrong Type containing only one question (Q1) shows poll respondents who think the Iraq War was right decision has steeply decreased in the initial stage of the war, then slowly declined towards the end.

While aggregating the similar questions under each type, I attempt to redress the problems that the original data retains such as irregular time intervals as well as a stochastic trend. To obtain a time series data with a monthly frequency, as described in section 1.2.2, I take the average value of poll responses if more than one poll observation is available in a month while I linearly interpolate for missing months.[43]

With this monthly data fitted for time series analysis,[44] I test stationarity of all variables for each question type.[45] If the dependent variable and all explanatory variables are stationary, I regress them with a simple dynamic model containing a lagged dependent variable as stated in section 1.2.2 whilst I employ an error correction mechanism if they are nonstationary but cointegrated with order one assuming that there is a long-term

[43] The number of missing months is presented in Table 1-A-3 in appendix.
[44] For the time series analysis, I excluded some of the polls commissioned at the last stage of the war to minimise the modification of the original data. As shown in Figure 1-4, questions concerning the war issues were not frequently asked since late 2008. Thus, if the sample period of the time series analysis with the modified data is spanned to include this later period of the war, there would be more missing values and subsequently, more observations would have to be created by linear interpolation, making the modified time series data further away from the original data. Specifically, the two poll observations are excluded from Right/Wrong Type. These observations were commissioned during the twenty two month period between November 2008 and August 2010. Also, the three poll observations are excluded from Worth Type. They were commissioned during the eighteen month period between March 2009 and August 2010. Furthermore, the three poll observations, which were commissioned during the eleven month period between October 2009 and August 2010, are excluded from Success to Date Type. For Approve Type I and II, I only use the poll observations obtained during the Bush administration. The questions on the presidential approval ratings were scarcely asked in 2008 when the presidential election was held. Therefore, if the sample period includes the Obama administration, there would be more missing values, and subsequently, it requires creating more observations causing further modification of the original data.
[45] Augmented Dickey-Fuller tests and Phillips-Perron tests are used in detecting unit root.

relationship between the dependent and independent variables. Specifically, all variables of Right/Wrong, Worth and Approve Type are stationary, so tested with a dynamic model in which the current value of the dependent variable (positive or negative responses) is a function of a past value of the dependent variable itself, the current value of independent variables (cumulative and marginal casualties) and other control variables. On the other hand, Stay/Withdraw and Success to Date Type adopt the error correction model in which a contemporaneous change in the dependent variable (ΔY_t) is a function of a past value of the dependent variable (Y_{t-1}), the first difference of the explanatory variable (ΔX_t), the past value of the explanatory variable (X_{t-1}), and a group of controlling regressors. The regression results with the aggregated data fit to time-series analysis are presented in Table 1-3.

The first column of Table 1-3 includes the list of the independent variables. *Cumulative and marginal casualty* are the same as the previous regressions with the original data presented in Table 1-2. The other forms of the casualty measure such as the first difference and the lagged value of cumulative casualties, and the lagged dependent variable are newly introduced for the dynamic model and the error correction model. *Unemployment*, as in the previous regressions with the original data, is coded as 1 if the most recently released US unemployment rate prior to the poll decreased compared to that of the previous month, 0 otherwise. The rest of the variables are period dummies discretionally applied to each question in consideration of the structure of the time series data or characteristics of each questions type. For instance, *sovereignty*, coded as 1 if a poll was commissioned after 28 June 2004 when the US transferred sovereignty to Iraqis, 0 otherwise, is included for Worth Type to identify whether the transfer of sovereignty reinforced justification of the war.[46] Furthermore, *insurgency* and *withdrawal* are used for Stay/Withdraw Type to figure out whether support for the continuation of military operation has been changed in accordance with a change in public confidence of victory.[47]

[46] A regression without *sovereignty* does not change statistical significance of estimated effects of *cumulative casualty* and other explanatory variables at the 5% level of significance.
[47] These period dummies are also similarly used in Gelpi, Feaver and Reifler (2005). A Regression without *insurgency* and *withdrawal* does not change statistical significance of estimated effect of *cumulative casualty* and other explanatory variables at the 5% level of significance.

Insurgency is coded as 1 if a poll was commissioned between April 2004 and August 2007 when prospects for victory were loomed because of severe insurgency such as sectarian movements, kidnaps, and ambush attacks against the coalition forces, 0 otherwise.[48] *Withdrawal* is coded as 1 if a poll was carried out between September 2007 and August 2010 when the US military operation officially ended in Iraq without a consensus of victory, 0 otherwise.[49] Moreover, *surge* and *president* are used for Success to Date Type to identify how and to what extent a dramatic decrease of military casualties after the surge that brought about an additional dispatch of more than 20,000 troops in Iraq during the first half of 2007, and a change in president from Bush to Obama affect poll respondents' retrospective assessment on US efforts to bring stability to Iraq.[50] *Surge* is coded as 1 if a poll was commissioned between July 2007 and October 2008 when military casualties steadily decreased as shown in Figure 1-2, 0 otherwise.[51] Finally *president* is coded as 1 if a poll was commissioned after Barak Obama was elected as the US president in November 2008, 0 otherwise.

When looking at the question types tested with a simple dynamic model (Right/Wrong, Worth, and Approve Type I and II), *cumulative casualty* has a strong and direct effect on poll responses, suggesting the accumulation of military deaths severely exacerbates war support or presidential approval ratings. Specifically, *cumulative casualty* has a negative effect on positive responses, and a positive effect on negative responses for these question types. Furthermore, the estimated effects of cumulative casualties are

[48] I set the starting point of the insurgency phase at April 2004, just after four US civilians having worked as Blackwater contractors, were killed and mutilated by Iraqis in Falluja, at the end of March 2004. The video clip showing the cheering Iraqi crowd over the bodies gave a shock to America, warning of the possibility of an Iraqi uprising against US forces. Indeed, Shia militias led by Muqtada al-Sadr seized Falluja in April, fighting against the coalition forces. Since then, Iraqis have been threatened by insurgency and sectarian violence, and suffered large death tolls. Military casualties, however, fell rapidly from September 2007 due to the surge effect.

[49] The starting point of the withdrawal phase is September 2007 when Gen. David Petraeus, the then-top US military commander in Iraq, testified that the objective of the surge in Iraq was largely being met in the Congress. The US started the first major withdrawal in November 2007.

[50] *Cumulative casualty* in a regression without *surge* and *president* is marginally significant at the 10 percent level of significance. As seen in the plot in Figure 1-4, the time-series for the Success to Date Type contains structural changes that may require dummy variable to address nonstationarity caused from breaks (Stock and Watson 2007).

[51] *Surge* is differently coded with the ones in the previous regressions with the original data presented in Table 1-2. *Surge*, used for the 'stay/withdraw' type question (Q4) is coded as 1 if a poll commissioned between January and April 2007 when the debate on the surge effect was growing in the US.

symmetric between positive and negative responses in general. The lagged dependent variable is also statistically significant, implying that poll respondents are partially affected by the poll responses in the previous month. On the other hand, *marginal casualty* is not statistically significant in any question type, similarly to the regression results with the original data presented in Table 1-2. Moreover, *unemployment* is also not significant except in the positive responses of Approve Type II. This implies that poll respondents are not strongly influenced by the level of unemployment in shaping their opinion towards the various war-relevant issues. They may filter economic circumstances when asked war-relevant poll questions since there are, in general, economically-specialised questions in the same polls.[52] Moreover, *sovereignty* in Worth Type indicates that poll responses that the war was worth fighting (positive responses) were about 7 percentage points higher in average after the US and its allies' Coalition Provisional Authority (CPA) handed over Iraqi sovereignty to the country than those during the pre-sovereignty period.[53] It may imply that the transfer significantly reinforced justification of the war.

The last two question types, Success to Date and Stay/Withdraw Type, are tested with the error correction models that take the first difference of dependent variable as an explanatory variable. Looking at the positive responses first, both the change in cumulative casualties (Δ*Cumulative casualty*), and its lagged value negatively and significantly affect opinion that the war is going well (Success to Date Type) whilst only the lagged value affects poll responses that the US troops should keep staying in Iraq (Stay/Withdraw Type). The regression results with negative responses provide the same but symmetric implications. These findings from Stay/Withdraw Type may be interpreted as follows: cumulative casualties do not have an immediate effect on opinion in favour of continuation of military operations, but casualty information in the previous month is taken into account for current judgements on withdrawal. This is contrary to the findings that poll respondents sensitively react to the contemporaneous accumulation of military deaths in retrospective assessment, captured in Right/Wrong, Worth, Approve and Success to Date Type. Together,

[52] Such questions are "Do you approve or disapprove of the way George W. Bush is handling the economy?" in CBS-NYT polls or "Do you approve or disapprove of the way Bush is handling the economy?" in ABC-WP surveys.
[53] Iraqi sovereignty was handed over to the Iraqi Interim Government in 28 June 2004.

this suggests that poll respondents retract their support for the war or the president as military casualties grow, implying that incurring a large number of deaths cannot be justifiable. On the other hand, poll respondents shape opinion apart from the contemporary casualty information in judging whether the military action should be ceased or proceed. Yet, there is still a long-term equilibrium relationship between cumulative casualties and opinion on withdrawal, given the significant coefficient on lagged cumulative casualties in Stay/Withdraw Type. One of the possible explanations for respondents' attitudes towards Stay/Withdraw Type question is that they are likely to be more cautious in prospective judgement since the withdrawal of the troops from Iraq could bring severe instability to the country. Indeed, *insurgency* in Stay/Withdraw Type suggests that poll responses that the troops should stay in Iraq are about 7 percentage points higher during the period that insurgency was acute than that of the initial period of the war when a victorious mood was prevailing in the US. Furthermore, *withdrawal* indicates that the poll responses were even higher (by approximately 9 percentage points) when the US prepared the pullout than the initial stage of the war. It may imply that the number of respondents who do not want the withdrawal in the midst of uncertainty were higher in spite of American loss and financial costs in Iraq. Looking at the other explanatory variables in Stay/Withdraw and Success to Date Type, *marginal casualty* and *unemployment* are consistently insignificant. The period dummies, however, are powerful in explaining opinion. For instance, *surge* in Success to Date Type is statistically significant, suggesting that positive view on the outcome of the war had substantially been high since the surge in the first half of 2007 that brought a rapid decrease in military fatalities as shown in Figure 1-2. Moreover, *president* also indicates that Obama's win in the presidential election at the end of 2008 raised the proportion of positive responses, and dropped negative responses on the outcome of the war.

Liberal or Conservative Bias across Media Institutions

Another hypothesis to be tested is that poll respondents for the three media institution might express different attitudes towards same questions. Approve Type I and II are the rare categories that include almost same questions in them. Approve Type I, asked by all three

polling institutions examined in this chapter,[54] query the same question concerning the public's preferences in approving the president's handling of the Iraq situation,[55] leaving a room for a comparative analysis between the polling surveys commissioned by media institutions which have somehow opposite inclinations.[56] Furthermore, Approve Type II, asked by both CBS-NYT and ABC-WP, contains almost identical questions on the presidential approval ratings on the campaign against terrorism.[57]

I plotted positive and negative poll responses for Approve Type I and II again in Figure 1-5 for comparison. Poll responses of each media institutions for the two question types are entwined, making it hard to see any differences. In the first plot, however, positive responses for the CBS-NYT polls, illustrated with triangle shapes, look slightly lower compared to those for the ABC-WP or Fox News polls commissioned in a similar time period. To examine this difference is statistically significant, I carry out regressions with the original data using model (1.1) in section 1.2.2. In the analysis of media bias, two dummies are newly included; (i) *ABC-WP*, coded as 1 if a poll was commissioned by ABC-WP, 0 otherwise; (ii) *Fox*, coded as 1 if commissioned by Fox News, 0 otherwise. Yet, the irrelevant variables including *marginal casualty* and *unemployment* are excluded from the regression.

Table 1-4 present the OLS regression results. Looking at the primary variables of interest, we see that *ABC-WP* is not significant in Approve Type I, implying that there is no meaningful difference between the CBS-NYT and ABC-WP polls on the presidential job approval ratings in relation to the war. Instead, poll respondents for Fox News shows more unsparing attitude towards the president as *fox* is interpreted that the presidential approval

[54] CBS-NYT, ABC-WP and Fox News.
[55] Question 9 (CBS-NYT) is "Do you approve or disapprove of the way George W. Bush is handling the situation with Iraq?". Question 20 (ABC-WP) is "Do you approve or disapprove of the way Bush is handling the situation with Iraq?". Question 24 (Fox News) is "Do you approve or disapprove of the job George W. Bush is doing handling the situation with Iraq?". The choices in response are; 1. Approve 2. Disapprove 3. Don't know or NA.
[56] CBS CBS-NYT and ABC-WP are regarded to be rather liberal by conservative parties, whereas Fox News is thought to have a conservative bias by liberal parties, in favour of the Bush administration in going to the war.
[57] Q21 (CBS-NYT): Do you approve or disapprove of the way George W. Bush is handling the campaign against terrorism? Q25 (ABC-WP): Do you approve or disapprove of the way Bush is handling the US campaign against terrorism? (Choices: 1. Approve 2. Disapprove 3. Don't know or NA).

ratings in the Fox News polls are 3.43 percentage points higher than those of the CBS-NYT polls while disapproval ratings are 4.63 percentage points lower. In Approve Type II, *ABC-WP* indicates the proportion of positive responses for the ABC-WP polls are slightly higher than that of the CBS-NYT polls whilst the proportion of negative responses are lower than that of CBS-NYT. It implies that respondents for ABC-WP polls have more positive attitude in evaluating president's achievement on campaign against terrorism. It is a hasty conclusion that respondents for the Fox News polls are less parsimonious in favour of the president than those for CBS-NYT polls since even a small variation in question wordings or sampling techniques could substantially change poll responses. Moreover, it makes the regression results less reliable that questions categorised under each type had not been asked at the exact same points in time. Nonetheless, the results should not be taken with small regard. Especially, the magnitude of *fox* in Approve Type I is not trifling, leading to the presumption that there may be a significant difference in poll respondents' attitude towards the president achievement in handling the Iraq War across polling institutions that have polar policy preferences.

1.5. Conclusion

This chapter sought to examine how and to what extent different measures of war casualties affect domestic opinion, as proxied by 25 different poll questions concerning the 2003 Iraq War. The principal findings of the regression analysis are as follows.

Firstly, the empirical investigation suggests that the poll respondents reacted more sensitively to the cumulative casualty information rather than marginal casualties during the recent week prior to the poll, confirming that the Mueller model (1971) fits better even after addressing econometrics concerns for nonstationarity of time series variables and irregular time intervals of poll observations. These results reconcile with the conventional wisdom that increasing national casualties result in decreasing domestic support. Secondly and more importantly, the empirical results suggest that the respondents were not affected by contemporaneous casualty information in forming their opinion over military withdrawal;

arguably the most directly and substantially connected issue with the continuance of US military operations in Iraq. Given the estimates obtained from the error correction mechanism, the effect of casualties is less direct in affecting opinion throughout the process of returning to re-equilibrium after a deviation of the long-run equilibrium. Whilst the respondents rather enthusiastically responded to national casualty information when they were asked 'worth' or 'right/wrong' type questions that require retrospective evaluation, the conventional wisdom was not applicable when they were required the prospective judgement on whether they wanted the military forces to keep staying or to withdraw. It implies that the respondents showed different attitudes while responding to national casualty information. They retracted their support for the war as military casualties grew since the accumulation of death toll makes the war unjustifiable. Poll respondents, however, shaped their opinion on the continuation of the military operation without reference to the contemporary death toll. Yet, the long-run equilibrium relationship still exists between the accumulation of casualties and poll respondents' opinion towards the withdrawal matter.

The political implications of these findings are straightforward; political rhetoric for the justification of war will be quickly washed out as military casualties grow. Along with this, public conviction on success in war will be severely aggravated in the vortex of mounting casualties. This casualty based approach, however, should be reconsidered in decision making on the military forces' stationing/withdrawal. While general support for war is aggravated as lump-sum casualties are increasing, public consensus towards the continuation of military operations is shaped without reference to the contemporary accumulation of death tolls. Thus, it appears that although Americans believe the war in Iraq is not justifiable in consideration of its unexpectedly tremendous human costs, they deem the withdrawal of the troops should be approached on the basis of other issues, including, for example, the level of security in Iraq. Finding the detailed reasons to explain this differential attitude will be left for future research.

Table 1-1: Poll Question Types and Choices in Response

Q*	Question Type	Questions	Choices in response	N*	Poll period
CBS-NYT Polls					
1	Right/Wrong	Looking back, do you think the United States did the right thing in taking military action against Iraq, or should the U.S. have stayed out?	1. Right (+) 2. Stay out (-) 3. Don't know/NA	68	Dec 2003-Aug 2010
2	Worth 1	Do you think removing Saddam Hussein from power is worth the potential loss of American life and other costs of attacking Iraq, or not?	1. Worth (+) 2. Not worth (-) 3. Don't know/NA	22	Mar 2003-Sep 2007
3	Worth 2	Do you think the result of the war with Iraq was worth the loss of American life and other costs of attacking Iraq, or not?	1. Worth (+) 2. Not worth (-) 3. Don't know/NA	29	Sep 2003-Aug 2010
4	Stay/Withdraw 1	From what you have seen or heard about the situation in Iraq, what should the United States do now-should the U.S. increase the number of U.S. troops in Iraq, keep the same number of U.S. troops in Iraq as there are now, or decrease the number of U.S. troops in Iraq, or remove all its troops from Iraq?	1. Increase (+) 2. Keep same (+) 3. Decrease (-) 4. Remove all troops (-) 5. Don't know/NA	26 26 26 21 26	Aug 2003-Sept 2007
5	Stay/Withdraw 2	Should U.S. troops stay in Iraq as long as it takes to make sure Iraq is a stable democracy, even if that takes a long time, or should U.S. troops turn over control to Iraqis as soon as possible, even if Iraq is not completely stable?	1. Stay as long as it takes (+) 2. Leave (or Turn over control) ASAS (-) 3. Don't know/NA	17	Nov 2003-Jun 2006
6	Stay/Withdraw 3	How long do you think the United States troops will have to remain in Iraq--for less than a year, one to two years, two to five years, or will U.S. troops have to stay in Iraq for longer than five years?	1. Less than a year 2. One to two years 3. Two to five years 4. More than five years 5. Don't know/NA	11	Jul 2003-Feb 2007
7	Stay/Withdraw 4	Do you think the United States should or should not set a time-table for the withdrawal of U.S. troops from Iraq?	1. Timetable (-) 2. No timetable (+) 3. Don't know/NA	15	Jul 2005-Sep 2007

Table 1-1 continued

8	Stay/Withdraw 5	From what you know about the U.S. involvement in Iraq, how much longer would you be willing to have large numbers of U.S. troops remain in Iraq -- less than a year, one to two years, two to five years or longer than five years?	1. Less than a year 2. One to two years 3. Two to five years 4. As long as it takes 5. More than 5 years 6. Should leave now 7. Don't know/NA	7	Sep 2007-May 2008
9	Approve 1	Do you approve or disapprove of the way George W. Bush (or Barack Obama) is handling the situation with Iraq?	1. Approve (+) 2. Disapprove (-) 3. Don't know/NA	90	Mar 2003-Aug 2010
10	Approve 2	Do you approve or disapprove of the way George W. Bush (or Barack Obama) is handling the campaign against terrorism?	1. Approve (+) 2. Disapprove (-) 3. Don't know/NA	74	May 2003-Aug 2010
11	Success to Date 1	As a result of the U.S. military action against Iraq, do you think the threat of terrorism against the United States has increased, decreased, or stayed about the same?	1. Increased (-) 2. Decreased (+) 3. Stayed same 4. Don't know/NA	15	May 2003-Oct 2006
12	Success to Date 2	How would you say things are going for the U.S. in its efforts to bring stability and order to Iraq? Would you say things are going very well, somewhat well, somewhat badly, or very badly?	1. Very well (+) 2. Somewhat well (+) 3. Somewhat badly (-) 4. Very badly (-) 5. Don't know/NA	85	May 2003-Aug 2010
13	Expected Success	Regardless of whether you think taking military action in Iraq was the right thing to do, would you say that the U.S. is very likely to succeed in Iraq, somewhat likely to succeed, not very likely to succeed, or not at all likely to succeed in Iraq?	1. Very (+) 2. Somewhat (+) 3. Not very (-) 4. Not at all (-) 5. Don't know/NA	15	Jul 2005-Sep 2007
14	Reinforce	As you may know, the U.S. is sending more than 20,000 additional troops to Iraq. From what you have heard or read, would you say this troop increase is making the situation in Iraq better, making it worse, or is it having no impact on the situation in Iraq so far?	1. Better (+) 2. Worse (-) 3. No impact (-) 4. Don't know/NA	16	Apr 2007-Sep 2008

Table 1-1 continued

ABC-WP Polls					
15	Worth 1	All in all, considering the costs to the United States versus the benefits to the United States, do you think the war with Iraq was worth fighting, or not?	1. Worth (+) 2. Not worth (-) 3. Don't know/NA	67	Apr 2003-Jul 2009
16	Worth 2	Do you think the war with Iraq did or did not contribute to the long-term security of the United States?	1. Contributed (+) 2. Not contributed (-) 3. Don't know/NA	32	Jul 2003-Dec 2007
17	Stay/Withdraw 1	Do you think the US should keep its military forces in Iraq until civil order is restored there, even if that means continued U.S. military casualties; or do you think the US should withdraw its military forces from Iraq in order to avoid further U.S. military casualties, even if that means civil order is not restored there?	1. Keep troops (+) 2. Withdraw (-) 3. Don't know/NA	21	Jul 2003-Jun 2008
18	Stay/Withdraw 2	Do you think the number of U.S. military forces in Iraq should be increased, decreased, or kept about the same?	1. Increased (+) 2. Decreased (-) 3. Keep same (+) 4. Don't know/NA	15	Mar 2005-Oct 2007
19	Casualty	Again thinking about the goals versus the costs of the war, so far in your opinion has there been an acceptable or unacceptable number of U.S. military casualties in Iraq?	1. Acceptable (+) 2. Unacceptable (-) 3. Don't know/NA	23	Apr 2003-Dec 2006
20	Approve 1	Do you approve or disapprove of the way Bush (or Obama) is handling the situation with Iraq (and Saddam Hussein)?**	1. Approve (+) 2. Disapprove (-) 3. Don't know/NA	55	Mar 2003-Apr 2009
21	Approve 2	Do you approve or disapprove of the way Bush (or Obama) is handling the US campaign against terrorism?	1. Approve (+) 2. Disapprove (-) 3. Don't know/NA	42	Apr 2003-Dec 2007
22	Success to Date 1	Do you think the United has gotten bogged down in Iraq, or do you think the United States is making good progress in Iraq?	1. Bogged down (-) 2. Good progress (+) 3. Don't know/NA	10	Apr 2004-Jun 2005
23	Success to Date 2	Do you think the United States is or is not making significant progress toward restoring civil order in Iraq?	1. Significant (+) 2. Not significant (-) 3. Don't know/NA	21	Jun 2004-Dec 2008

Table 1-1 continued

Fox News Polls					
24	Approve 1	Do you approve or disapprove of the job George W. Bush (or Barack Obama) is doing handling the situation with Iraq?	1. Approve (+) 2. Disapprove (-) 3. Don't know/NA	14	Mar 2003-Jun 2006
25	Approve 2	Do you support or oppose the United States taking military action to disarm Iraq and remove Iraqi President Saddam Hussein? Is that strongly support/oppose or only somewhat support/oppose?	1. Strong support (+) 2. Somewhat support (+) 3. Somewhat oppose (-) 4. Strong oppose (-) 5. Don't know/NA	11	Mar 2003-Sep 2006

** Q: Question Number, N: Number of observations*

*** The words in parenthesis were included in the question only in March 2003.*

Table 1-2: Casualty Effects on Positive Opinion towards the 2003 Iraq War

	Q	Question Type	Cumulative Casualty (Log)	Marginal Casualty	Time (Days)	Unemployment	Administration	Period Dummies	Constant	N	Adjusted R^2
CBS—NYT	1	Right/Wrong Type	-10.23* (3.99)	-.02 (.04)	-.002 (.002)	.56 (.73)		6.40** (1.76)	79.02** (10.63)	68	.83
	2	Worth Type 1	-7.65** (2.53)	.01 (.08)	-.01 (.004)				74.47** (5.02)	22	.86
	3	Worth Type 2	-10.13* (3.83)	-.05 (.08)	-.002 (.002)	.82 (1.29)			65.37** *8.97)	29	.74
	4	Stay/Withdraw Type 1	-11.15 (7.94)	.06 (.12)	-.01 (.007)	.76 (1.95)		6.56** (2.20)	83.60** (18.44)	26	.76
	5	Stay/Withdraw Type 2	-9.89 (23.15)	-.0003 (.26)	.003 (.02)	-1.19 (3.20)			75.69 (54.55)	17	-.18
	7	Stay/Withdraw Type 4	-63.00 (95.42)	.08 (.09)	.03 (.04)	-1.36 (1.13)		5.46** (1.74)	210.70 (265.45)	15	.64
	9	Approve Type 1	-15.86** (2.68)	-.03 (.07)	-.01** (.003)	1.85 (1.20)	36.08** (3.20)		94.05** (6.34)	90	.87
	10	Approve Type 2	-17.59** (4.49)	-.07 (.05)	-.004 (.003)	-.99 (.92)	15.36** (3.42)		110.82** (10.90)	74	.79
	11	Success to Date Type 1	2.95 (6.14)	.24 (.19)	-.01 (.007)	1.58 (1.62)			10.91 (13.56)	15	.18
	12	Success to Date Type 2	-16.42** (5.42)	-.44** (.08)	.001 (.004)	-.77 (1.53)	17.48** (3.15)		97.07** (12.99)	85	.68
	13	Expected Success Type	43.77 (183.94)	-.04 (.13)	-.05 (.08)	-1.19 (2.29)			-30.84 (508.35)	15	.71
	14	Reinforce Type	-131.99 (164.27)	-.52 (.31)	.05* (.02)	1.84 (2.90)			-131.99 (415.01)	16	.78

Table 1-2 continued

	Q	Question Type	Cumulative Casualty (Log)	Marginal Casualty	Time (Days)	Unemployment	Administration	Period Dummies	Constant	N	Adjusted R^2
ABC | WP	15	Worth Type 1	-16.17** (.2.90)	-.06 (.04)	-.001 (.002)	1.29 (.80)			94.40** (7.13)	67	.90
	16	Worth Type 2	-14.20** (4.17)	-.02 (.05)	.001 (.003)	2.07* (.90)			93.15** (9.98)	32	.77
	17	Stay/Withdraw Type 1	-7.67 (5.59)	.07 (.08)	-.01* (.004)	.43 (1.50)			84.35** (12.55)	21	.89
	18	Stay/Withdraw Type 2	-80.65 (97.28)	.09 (.12)	.02 (.04)	2.12 (2.52)			287.49 (267.93)	15	.65
	19	Casualty Type	-33.33** (7.72)	.21* (.09)	.01 (.01)	-2.22 (1.96)			115.39** (16.20)	23	.84
	20	Approve Type 1	-14.57** (2.62)	.001 (.06)	-.004 (.002)	-.09 (1.28)	42.33** (1.92)		88.91** (6.53)	55	.84
	21	Approve Type 2	-15.39** (4.41)	.02 (.07)	-.004 (.004)	-.13 (1.08)			104.39** (10.23)	42	.84
	22	Success to Date Type 1	112.43 (119.03)	.27 (.29)	-.10 (.11)	.45 (3.35)			-237.03 (287.30)	10	-.47
	23	Success to Date Type 2	-32.71 (29.76)	-.35 (.19)	.009 (.01)	-1.42 (3.80)			-145.68 (80.23)	21	.26
FOX	24	Approve Type 1	-20.33 (10.75)	.01 (.14)	.0001 (.01)	-3.03 (3.38)			105.18** (22.57)	14	.77
	25	Approve Type 2	-9.03 (7.09)	.12 (.12)	-.009 (.009)	-2.66 (2.59)			3.94 (13.13)	11	.82

*Note: ** p<.01, *p<.0.05.Standard errors in parentheses .Since Breusch-Pagan and White tests detected heteroskedasticity in Q9, 15 and 20, standard errors in these questions were corrected to be robust to the unknown form of heteroskedasticity.*
In Q2, 'unemployment' is dropped due to high multicollinearity with 'cumulative casualty' (ρ=.509, p<.05).
Q6 and 8 are excluded from regression due to the ambiguity of categorisation of the choices into positive and negative responses.
In Q1 and 7, the 'period' dummy is coded as 1 if a poll commissioned during the first year of the war, 0 otherwise.
In Q4, the 'period' dummy is coded as 1 if a poll commissioned between January and April 2007, 0 otherwise. This is to capture a surge effect accompanied with the announcement of the then president Bush to dispatch additional troops to Iraq.

Table 1-3: Dynamic Effect of Casualties on Public Opinion

Dependent Variables	Positive Responses (R_t)				ΔPositive Responses (ΔR_t)		Negative Responses (R_t)				ΔNegative Responses (ΔR_t)	
Question Type	Right/Wrong	Worth	Approve I	Approve II	Stay/ Withdraw	Success to Date	Right/Wrong	Worth	Approve I	Approve II	Stay/ Withdraw	Success to Date
Cumulative Casualty (Log_{10})	-10.44** (2.63)	-16.72** (3.33)	-9.36** (3.07)	-8.99** (3.07)			10.42** (2.77)	16.33** (3.22)	8.38* (3.14)	12.60** (3.22)		
Marginal Casualty	-.02 (.04)	-.02 (.04)	-.07 (.05)	-.004 (.04)			.01 (.04)	.03 (.04)	.06 (.05)	-.01 (.05)		
Δ Cumulative Casualty (Log_{10})					-8.81 (38.00)	-88.56* (39.04)					21.65 (34.37)	98.26* (40.82)
Lagged Dependent Variable (R_{t-1})	.33** (.13)	.31** (.11)	.56** (.11)	.57** (.12)	-.66** (.13)	-.37** (.09)	.33* (.13)	.35** (.11)	.61** (.11)	.40** (.13)	-.63** (.13)	-.41** (.09)
Lagged Cumulative Casualties (Log_{10})					-18.62** (5.00)	-9.13** (3.11)					18.16** (4.88)	10.55** (3.28)
Unemployment	.48 (.70)	-1.23 (.88)	-.44 (.86)	-1.73* (.79)	-.81 (1.11)	-.61 (1.08)	-.58 (.74)	.50 (.72)	.58 (.88)	.87 (.87)	.11 (.99)	.29 (1.13)
Sovereignty		7.09** (2.31)						-5.54** (1.89)				
Insurgency					6.75** (2.95)						-5.53* (2.65)	
Withdrawal					9.67** (4.00)						-7.66* (3.60)	
Surge						3.47* (1.67)						-4.44* (1.73)
President						9.60* (2.88)						-12.51** (3.26)
Constant	62.92** (13.66)	83.63** (15.00)	46.21** (13.70)	50.53** (15.66)	82.72** (18.72)	45.11** (12.96)	.65 (4.60)	-16.98** (6.26)	-3.82 (4.27)	-13.68** (4.89)	-21.13* (9.99)	-11.33 (8.15)

Table 1-3 continued

Dependent Variables	Positive Responses (R_t)				ΔPositive Responses (ΔR_t)		Negative Responses (R_t)				ΔNegative Responses (ΔR_t)	
Question Type	Right/Wrong	Worth	Approve I	Approve II	Stay/ Withdraw	Success to Date	Right/Wrong	Worth	Approve I	Approve II	Stay/ Withdraw	Success to Date
Adjusted R^2	.77	.81	.91	.92	.31	.20	.77	.89	.91	.89	.25	.23
N	58	71	61	56	59	76	58	71	61	56	59	76
Sample Period	Dec 2003-Oct 2008	Mar 2003-Feb 2009	Mar 2003-Apr 2008	Apr 2003-Dec 2007	Jul 2003-Jun 2008	May 2003-Sep 2009	Dec 2003-Oct 2008	Mar 2003-Feb 2009	Mar 2003-Apr 2008	Apr 2003-Dec 2007	Jul 2003-Jun 2008	May 2003-Sep 2009

*Note: ** p<.01, *p<.05. Standard errors in parentheses. Breusch-Godfrey tests suggest the residuals of all specifications do not contain serial correlation*

Table 1-4: Liberal and Conservative Bias across the Media

Question Type		Approve Type1 (Q9, Q20, Q24)		Approve Type 2 (Q10, Q21)	
Dependent Variable		Positive Response	Negative Response	Positive Response	Negative Response
Cumulative Casualties (Log_{10})		-15.67** (2.39)	15.15** (2.53)	-14.70** (4.00)	15.73** (3.23)
ABC-WP		1.59 (1.19)	1.85 (1.19)	1.67* (.71)	2.90** (.69)
	Confidence Interval (95%)	-.76 to 3.94	-.52 to 4.21	.26 to 3.09	1.53 to 4.27
Fox		3.43* (1.65)	-4.63** (1.63)		
	Confidence Interval (95%)	.17 to 6.69	-7.86 to -1.40		
Time (Days)		-.007 (.004)	.01* (.004)	-.005 (.003)	.004 (.002)
Constant		91.74 (4.92)	3.07 (5.22)	101.75** (9.89)	-11.18* (7.82)
Adj. R^2		.79	.81	(.82)	.83
N		109		106	
Sample Period[58]		Mar 2003-Jun 2006		May 2003-Dec 2007	

*Note: ** p<.01, *p<.0.0.5. Standard errors in parentheses.*
^ Standard Errors are robust to heteroskedasticity for Approve Type I and positive responses in Approve Type II.

[58] The sample period for each question type is the overlapping period when the questions were contemporarily commissioned. For instance, question 9, 20 and 24 in Approve Type I had been asked between March 2003 and August 2010, March 2003 and April 2009, and March 2003 and June 2006 respectively. The sample period of Approve Type I, therefore, is between March 2003 and June 2006, when the time periods of the three questions are overlapped each other.

Figure 1-1: Positive and Negative Responses for Poll Questions during the 2003 Iraq War

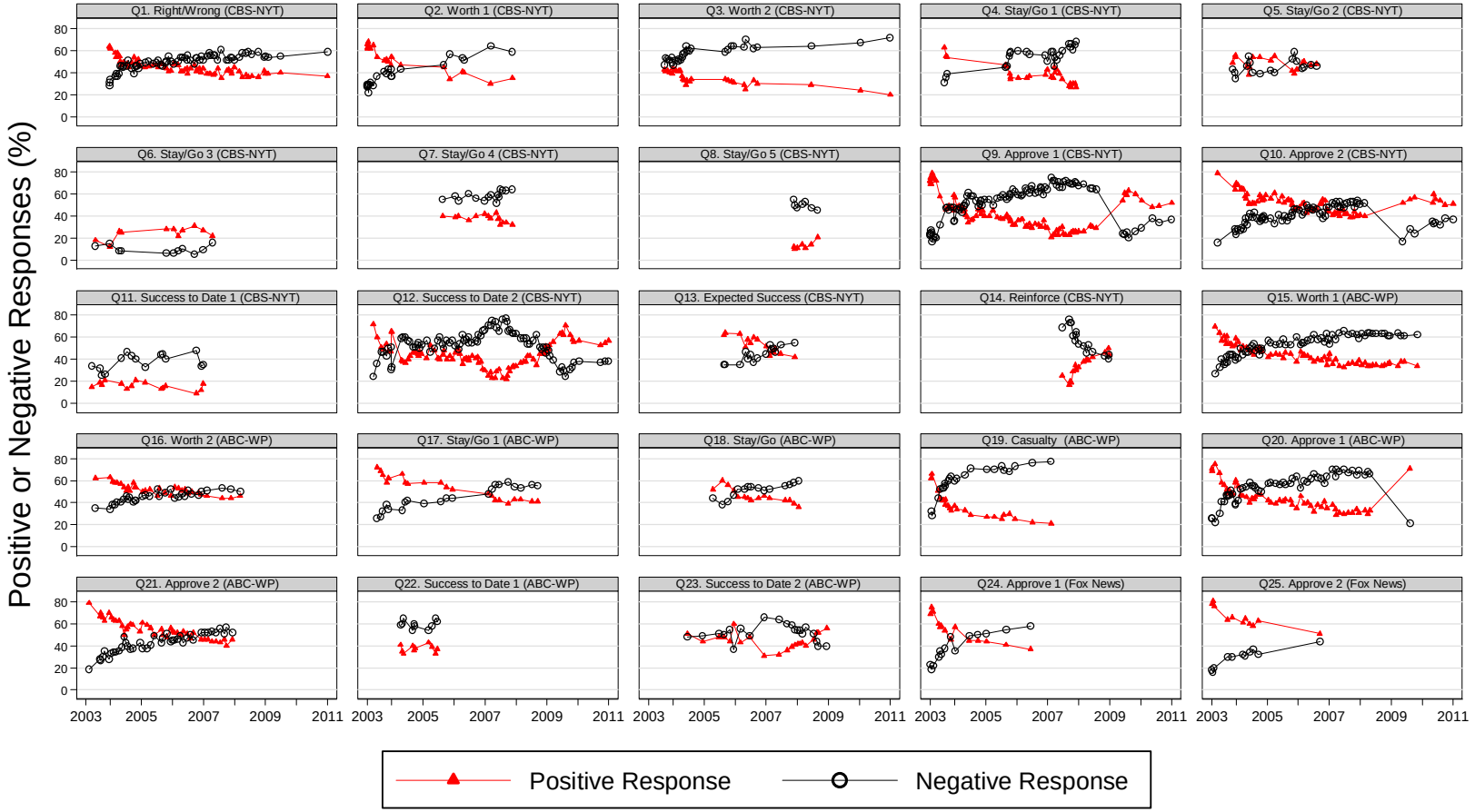


Figure 1-2: Cumulative Casualties Vs. Marginal Casualties during the 2003 Iraq War

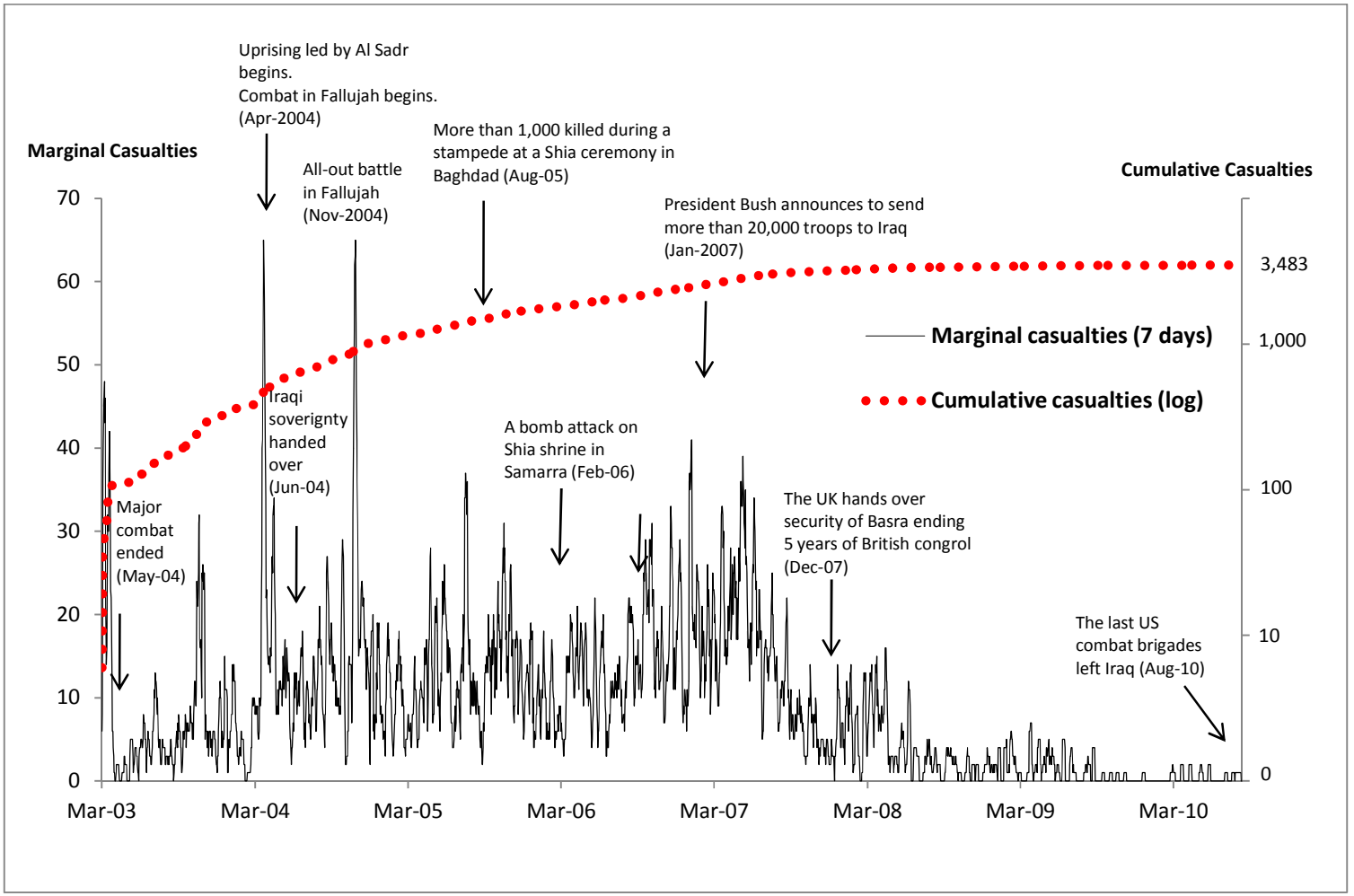


Figure 1-3: Estimated Effects of Cumulative Casualties on War Support

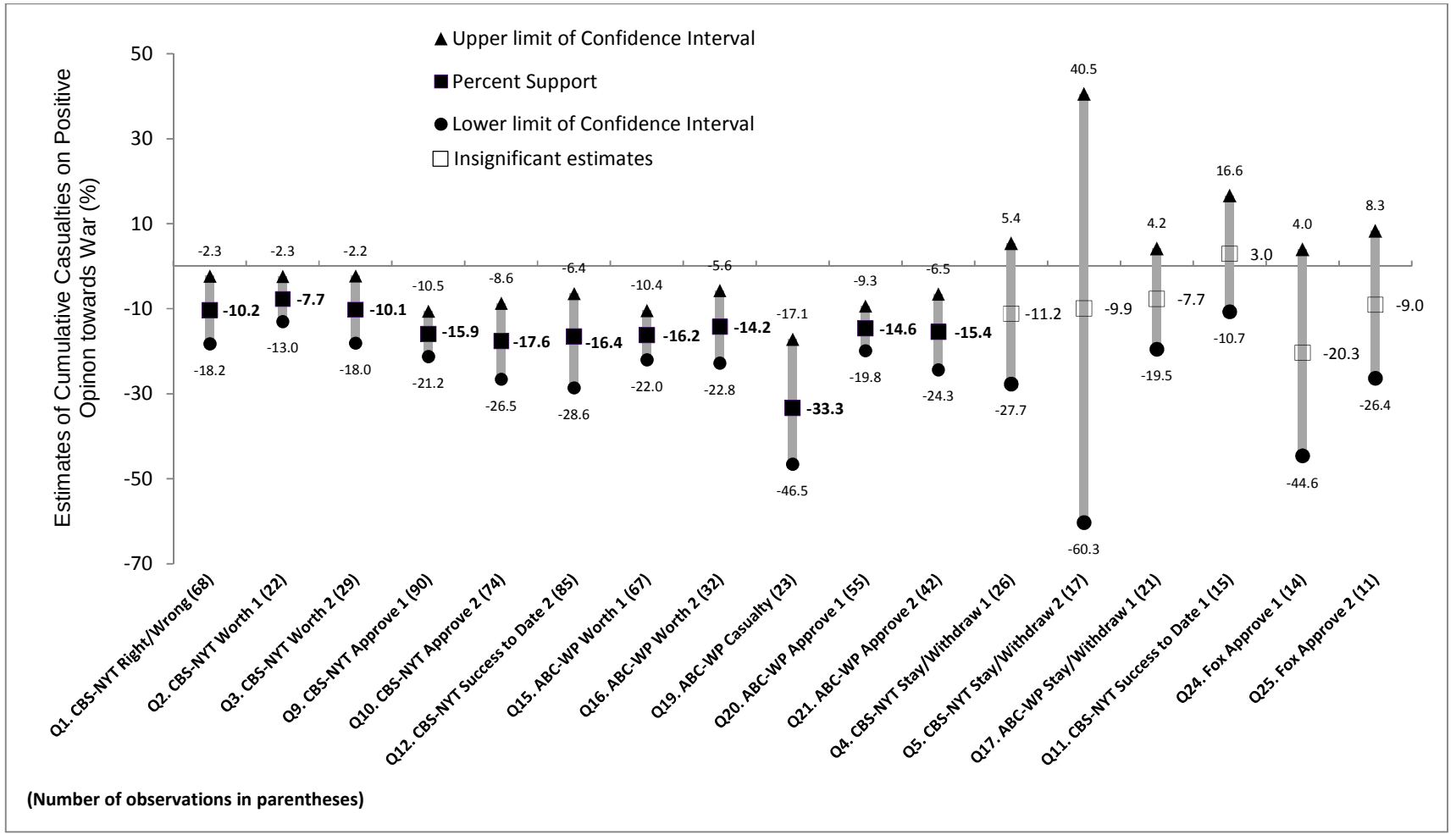


Figure 1-4: Aggregated Positive Responses for Selected Questions Types

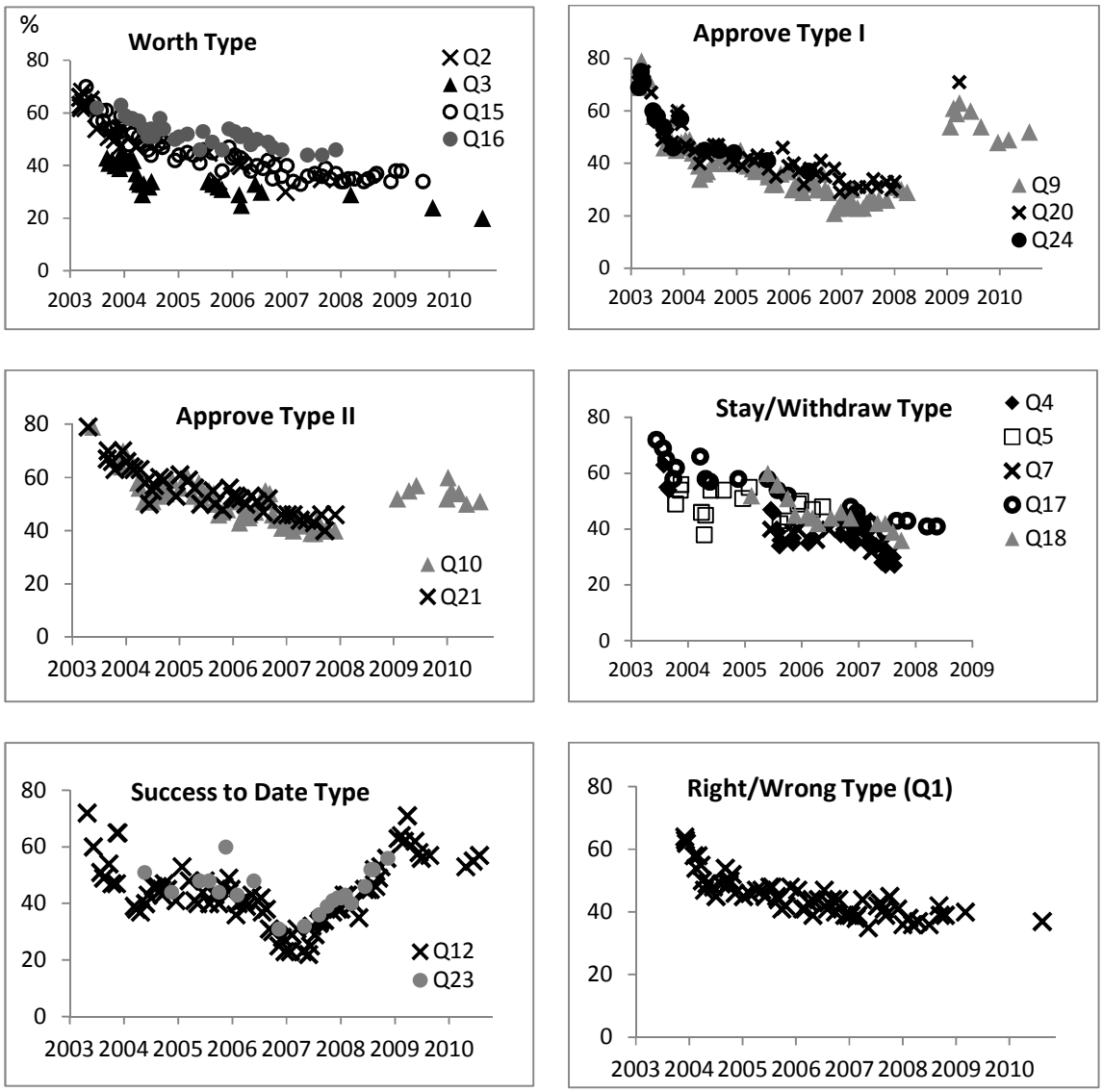
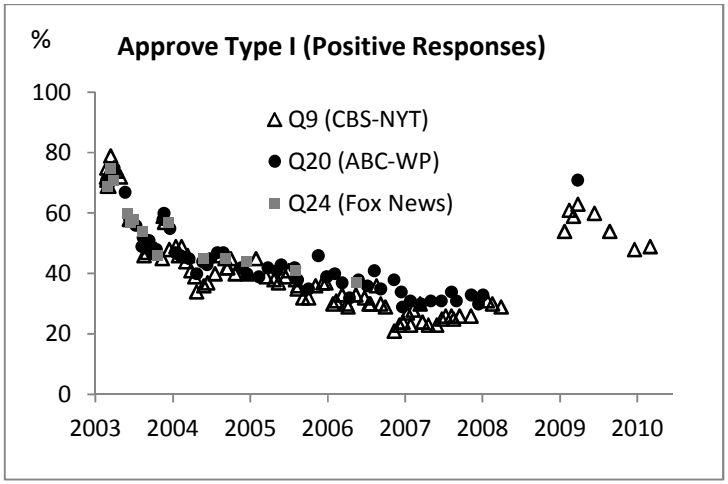
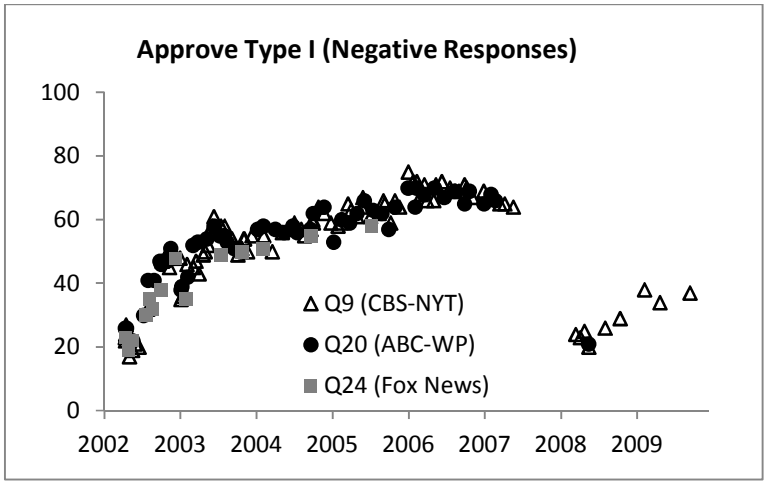
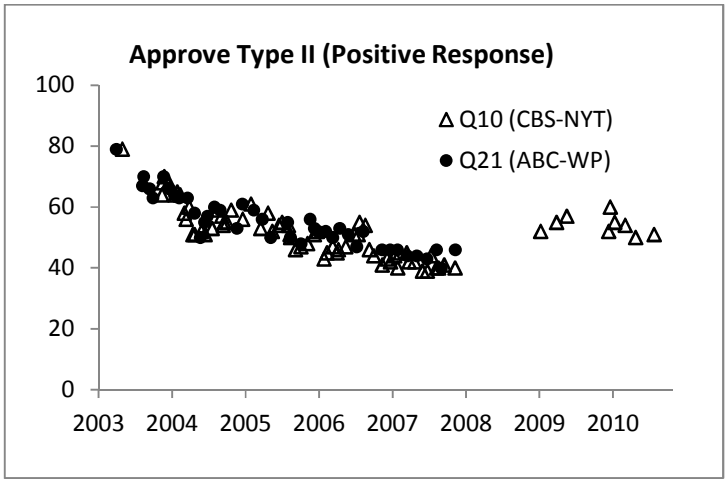
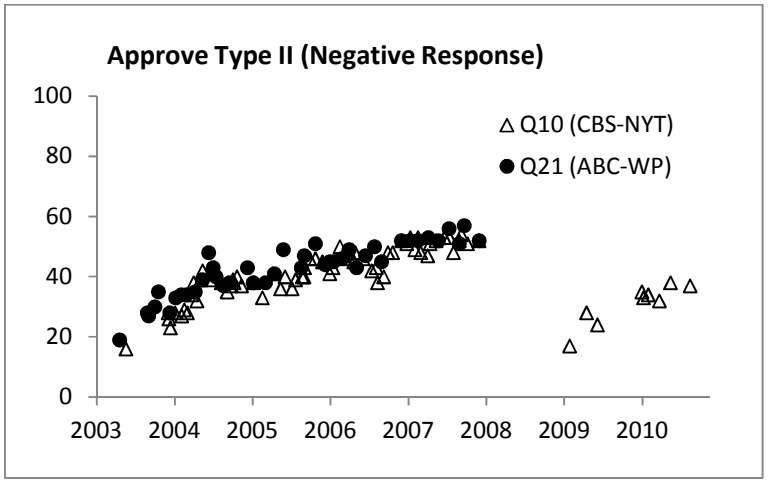


Figure 1-5: Poll Responses towards Similar Questions









Appendix 1

Table 1-A-1: Casualty Effects on Negative Opinion towards the 2003 Iraq War

	Q	Question Type	Cumulative Casualty (Log)	Marginal Casualty	Time (Days)	Unemployment	President	Period	Constant	N	Adjusted R^2
CBS | NYT	1	Right/Wrong Type	10.70* (4.21)	.02 (.04)	.002 (.002)	-.63 (.76)		-6.92** (1.85)	14.54 (11.21)	68	.82
	2	Worth Type 1	5.84* (2.46)	-.025 (.08)	.01* (.004)				20.54** (4.87)	22	.87
	3	Worth Type 2	15.00** (4.07)	.03 (.09)	-.0002 (.003)	-.89 (1.38)			15.69 (9.53)	29	.75
	4	Stay/Withdraw Type 1	11.83 (8.84)	-.05 (.14)	.01 (.01)	-1.42 (2.17)		-6.69* (2.45)	8.22 (20.56)	26	.74
	5	Stay/Withdraw Type 2	17.06 (4.43)	-.004 (.28)	-.007 (.02)	2.51 (3.38)			-1.33 (57.57)	17	-.06
	7	Stay/Withdraw Type 4	53.32 (119.28)	-.02 (.11)	-.02 (.05)	.92 (1.42)		-6.55* (2.18)	-86.53 (331.83)	15	.55
	9	Approve Type 1	15.16** (2.89)	.06 (.07)	.01** (.003)	2.13 (1.23)	-47.4** (3.34)		1.27 (6.81)	90	.88
	10	Approve Type 2	9.41* (5.73)	.09 (.05)	.01** (.004)	1.16 (.89)	-28.4** (4.66)		1.57 (13.96)	74	.83
	11	Success to Date Type 1	27.98* (12.09)	-.33 (.37)	-.02 (.01)	-.88 (3.18)			-27.15 (26.67)	15	.28
	12	Success to Date Type 2	20.02** (5.50)	.44** (.09)	-.004 (.004)	.90 (1.55)	-19.68** (3.19)		-8.20 (13.18)	85	.72
	13	Expected Success Type	-17.87 (172.45)	.03 (.12)	.03 (.08)	1.39 (2.15)			59.30 (476.61)	15	.71
	14	Reinforce Type	61.33 (206.21)	.40 (.40)	-.05 (.02)	.37 (3.64)			-72.09 (694.13)	16	.75

Table 1-A-1 continued

	Q	Question Type	Cumulative Casualty (Log)	Marginal Casualty	Time (Days)	Unemployment	President	Period	Constant	N	Adjusted R^2
ABC | WP	15	Worth Type 1	19.55** (2.79)	.05 (.04)	-.001 (.002)	-1.67* (.81)			-5.03 (6.76)	67	.91
	16	Worth Type 2	17.48** (3.95)	.01 (.05)	-.004 (.003)	-2.09* (.85)			-3.80 (9.44)	32	.80
	17	Stay/Withdraw Type 1	10.85 (5.65)	-.06 (.08)	.007 (.004)	-.78 (1.51)			5.88 (12.70)	21	.89
	18	Stay/Withdraw Type 2	113.03 (85.16)	-.11 (.11)	-.03 (.04)	-2.16 (2.21)			-279.17 (234.55)	15	.71
	19	Casualty Type	35.53** (8.63)	-.01 (.21)	-.02 (.01)	.30 (2.41)		-10.24 (7.76)	-22.76 (18.38)	23	.85
	20	Approve Type 1	15.38** (3.12)	.01 (.08)	.005 (.003)	.57 (1.32)	-49.9** (2.26)		6.19 (7.54)	55	.86
	21	Approve Type 2	17.22** (4.39)	-.03 (.07)	.003 (.004)	-.44 (1.07)			-10.93 (10.20)	42	.85
	22	Success to Date Type 1	-198.63 (121.82)	-.31 (.30)	.18 (.11)	-.75 (3.43)			-536.03 (294.04)	10	-.17
	23	Success to Date Type 2	39.69 (31.56)	.33 (.20)	-.01 (.01)	.76 (4.03)			-65.12 (85.09)	21	.23
FOX	24	Approve Type 1	23.78* (10.11)	.05 (.13)	-.0007 (.01)	2.94 (3.18)			-21.14 (21.25)	14	.83
	25	Approve Type 2	9.28 (5.97)	-.08 (.10)	.008 (.008)	1.67 (2.18)			3.94 (13.13)	11	.85

*Note: ** p<.01, *p<.0.05. Standard errors in parentheses .Since Breusch-Pagan and White tests detected heteroskedasticity in Q9, 15 and 20, standard errors were corrected to be robust to heteroskedasticity.*

In Q2, the 'unemployment' dummy is dropped due to high multicollinearity. The correlation coefficient between 'cumulative casualty' and 'unemployment' is .509 (p<.05).

Q6 and 8 are excluded from regression due to the ambiguity of categorisation of the choices into positive and negative responses.

In Q1 and 7, the 'period' dummy is coded as 1 if a poll commissioned during the first year of the war, 0 otherwise.

In Q4, the 'period' dummy is coded as 1 if a poll commissioned between January and April 2007, 0 otherwise. This is to capture a surge effect accompanied with the announcement of the then president Bush to dispatch additional troops to Iraq.

Table 1-A-2: Descriptive Statistics of Poll Questions

	Q	Question Type	Mean		Confidence Interval (95%)		Standard Error		Standard Deviation		Minimum		Maximum		N
			Positive Response	Negative Response	Positive Response	Negative Response	Positive Response	Negative Response	Positive Response	Negative Response	Positive Response	Negative Response	Positive Response	Negative Response	
CBS|NYT	1	Right/Wrong	44.99	49.78	43.40 to 46.57	48.14 to 51.42	0.79	0.82	6.53	6.77	35	28	64	61	68
	2	Worth 1	52.27	39.68	47.19 to 57.35	34.50 to 44.86	2.44	2.49	11.46	11.68	30	22	68	64	22
	3	Worth 2	34.86	57.97	32.42 to 37.30	55.34 to 60.59	1.19	1.28	6.42	6.89	20	47	44	72	29
	4	Stay/Withdraw 1	38.69	54.77	35.07 to 42.31	50.94 to 58.59	1.76	1.86	8.97	9.46	27	31	63	68	26
	5	Stay/Withdraw 2	48.24	45.41	45.39 to 51.08	42.23 to 48.60	1.34	1.50	5.54	6.20	38	35	56	59	17
	6	Stay/Withdraw 3	24.18	9.45	20.55 to 27.81	6.97 to 11.94	1.63	1.11	5.40	3.70	12	5	31	16	11
	7	Stay/Withdraw 4	37.67	58.33	35.76 to 39.57	56.19 to 60.47	0.89	1.00	3.44	3.87	32	52	43	64	15
	8	Stay/Withdraw 5	13.29	49.71	9.84 to 16.73	46.39 to 53.04	1.41	1.36	3.73	3.59	10	45	21	55	7
	9	Approve 1	41.77	51.88	38.72 to 44.82	48.51 to 55.25	1.54	1.69	14.56	16.08	21	17	79	75	90
	10	Approve 2	51.73	40.28	49.83 to 53.63	38.22 to 42.35	0.95	1.04	8.21	8.91	39	16	79	54	74
	11	Success to Date 1	16.07	37.80	14.17 to 17.97	33.82 to 41.78	0.89	1.85	3.43	7.18	9	25	21	48	15
	12	Success to Date 2	43.88	53.04	41.47 to 46.29	50.40 to 55.67	1.21	1.32	11.17	12.22	22	24	72	77	85
	13	Expected Success	53.07	44.40	48.91 to 57.22	40.55 to 48.25	1.94	1.80	7.51	6.96	42	35	64	55	15
	14	Reinforce	33.63	57.19	28.33 to 38.92	50.96 to 63.41	2.48	2.92	9.94	11.68	17	40	50	76	16
ABC	15	Worth 1	44.22	53.58	42.12 to 46.33	51.34 to 55.83	1.05	1.12	8.63	9.20	33	27	70	66	67
	16	Worth 2	52.00	45.28	50.21 to 53.79	43.45 to 47.11	0.88	0.90	4.98	5.08	44	34	63	53	32

| WP	17	Stay/Withdraw 1	53.05	44.24	48.35 to 57.74	39.57 to 48.91	2.25	2.24	10.32	10.26	39	26	72	59	21
	18	Stay/Withdraw 2	45.87	51.13	42.34 to 49.39	47.73 to 54.54	1.64	1.59	6.37	6.15	36	38	60	60	15
	19	Casualty	36.17	60.61	31.15 to 41.20	55.04 to 66.18	2.42	2.69	11.63	12.88	21	28	66	77	23
	20	Approve	44.22	54.09	41.12 to 47.32	50.69 to 57.49	1.55	1.70	11.48	12.58	29	21	75	70	55
	21	Approve 2	54.98	42.60	52.28 to 57.68	39.85 to 45.34	1.34	1.36	8.66	8.80	40	19	79	57	42
	22	Success to Date 1	37.50	59.50	35.11 to 39.89	56.76 to 62.24	1.06	1.21	3.34	3.84	33	54	43	65	10
	23	Success to Date 2	44.67	51.90	41.36 to 47.98	48.47 to 55.34	1.59	1.65	7.27	7.54	31	37	60	66	21
FOX	24	Approve 1	54.21	38.93	47.40 to 61.02	31.47 to 46.39	3.15	3.45	11.79	12.92	37	19	75	58	14
	25	Approve 2	65.73	29.45	59.60 to 71.86	23.81 to 35.10	2.75	2.53	9.12	8.41	51	16	81	44	11

Table 1-A-3: Modified Data for Time Series Analysis in Comparison with the Original Data

	Right/Wrong Type		Worth Type		Approve Type I		Approve Type II		Stay/Withdraw Type		Success to Date Type	
	Original Data	Modified Data	Original Data	Modified Data	Original Data	Modified Data	Original Data	Modified Data	Original Data	Modified Data	Original Data	Modified Data
Number of observation	68	59	150	72	159	62	116	57	94	60	106	77
Number of months with more than 2 polls		14		40		43		37		28		33
Number of months without polls		10		11		3		6		17		13
Sample period	Dec 2003-Aug 2010	Dec 2003-Oct 2008	Mar 2003-Aug 2010	Mar 2003-Feb 2009	Mar 2003-Aug 2010	Mar 2003-Apr 2008	Apr 2003-Aug 2010	Apr 2003-Dec 2007	Jul 2003-Jun 2008	Jul 2003-Jun 2008	May 2003-Aug 2010	May2003 - Sep 2009

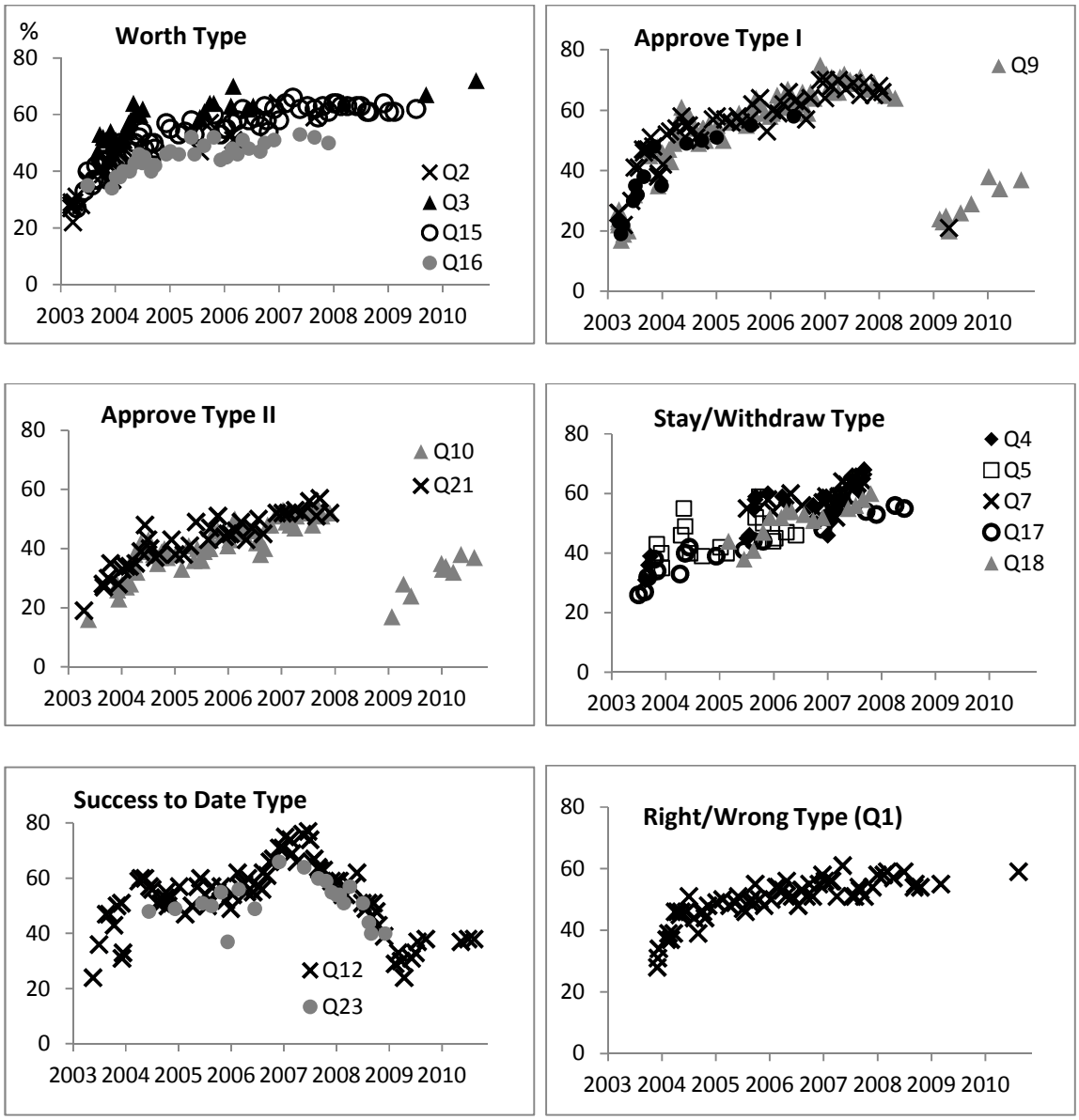
Table 1-A-4: Casualty Effects on Public Opinion towards the 2003 Iraq War in the UK[59] [60]

	Positive Responses			Negative Responses		
Polling Institution	Populus	YouGov	ICM Research	Populus	YouGov	ICM Research
Question Type[61]	Right/Wrong	Right/Wrong	Right/Wrong	Right/Wrong	Right/Wrong	Right/Wrong
Cumulative Casualty (Log)	-106.78** (17.29)	-37.02 (19.30)	83.04 (59.69)	87.87** (22.28)	31.31 (15.68)	-142.53 (81.91)
Marginal Casualty	.58 (.28)	-.44 (.32)	.29 (.95)	-.90* (.33)	.28 (.22)	.69 (1.14)
Time (Days)	.01 (.01)	-.005 (.009)	-.05 (.03)	-.01 (.01)	.003 (.007)	.07 (.04)
Unemployment	2.91 (2.58)	-.69 (1.95)	5.38 (3.28)	1.42 (2.24)	-2.56 (1.78)	-2.08 (4.09)
Constant	219.53** (25.21)	112.56** (29.64)	-84.05 (94.26)	-100.92* (33.60)	-9.69 (23.78)	271.16 (129.86)
N	17	38	12	17	38	12
Adjusted R^2	.91	.84	.63	.84	.79	.35
Sample Period	Apr 2003 -Feb 2006	Mar 2003 -Jun 2007	Jan 2004 -Jul 2006	Apr 2003 -Feb 2006	Mar 2003 -Jun 2007	Jan 2004 -Jul 2006

*Note: ** p<.01, *p<.05*
Standard errors in parentheses are corrected to be robust to heteroskedasticity."

[59] The poll and casualty data are obtained from the UK Polling Report (http://ukpollingreport.co.uk/iraq) and the BBC archive (http://www.bbc.co.uk/news/uk-10637526) respectively.
[60] The dependent and independent variables are constructed with the same manner of the US data analysis presented in Table 1-2. In particular, *cumulative* and *marginal casualty* indicate the natural logarithm of the total number of UK hostile military deaths that have occurred at the time of the poll surveys and marginal casualties for 7 days prior to the polls respectively. *Time* is the number of days between the start of the war and the date of the polls to net out the possible time effect. *Unemployment* is coded as 1 if the most recently released UK unemployment rate prior to the poll decreased compared to that of the previous quarter, 0 otherwise.
[61] The poll questions are as follows; (1) Populus: Thinking about the build-up to the war in Iraq and everything that has happened since, was taking military action the right thing to do, or the wrong thing to do?; (2) YouGov: Do you think the United States and Britain were right or wrong to take military action against Iraq?; (3) ICM Research: From what you have seen or heard, do you think the war against Iraq to remove Saddam Hussein was justified or unjustified?

Figure 1-A-1: Aggregated Negative Responses for Selected Questions Types



Chapter 2

Two Perspectives on Iraqi Civilian Deaths

2.1. Introduction

The exact number of civilian deaths from the violence during the 2003 Iraq War and its aftermath that had lasted for about 8 years will never be known. There have been efforts, however, to estimate human losses by ministries of the Iraqi government in cooperation with the United Nations Development Programme (UNDP)[62] and the World Health Organization (WHO),[63] by researchers in medical and nursing schools in the US and Iraq,[64] [65] and by a UK polling firm.[66] The majority of these estimates depend upon cluster sample surveys to extrapolate the total number of violent civilian deaths. Furthermore, governmental as well as nongovernmental sources have released the collective number of violent civilian deaths at different time intervals during the war.[67] Amongst these attempts, two records have been distinguished due to their consistency and comprehensibility to document Iraqi civilian deaths from violence across all 18 Iraqi governorates during the war period. The first has been extracted from the Iraq War Logs – the archive of the US Department of Defense (DoD), which were leaked by WikiLeaks in October 2010. The second is a dataset created by Iraq Body Count (IBC), an NGO based in the UK, which has compiled violent civilian deaths on the basis of media reports since the beginning of the war.[68] Although neither the Pentagon nor the IBC dataset is the list of the true number of war deaths, examining the two could not only provide the intensity of war and its evolution over time, but also a clue about the probable behavioural differences between the US military authority and media coverage in counting violent civilian deaths. .

[62] Central Organization for Statistics and Information Technology (2005a).
[63] Iraq Family Health Survey Study Group (2008).
[64] Robert et al. (2004).
[65] Burnham et al. (2006).
[66] Opinion Research Business (2007).
[67] Congressional Research Service (2008, 2010).
[68] IBC also depends on the figures released by morgues, hospitals, governmental and nongovernmental organisations but its main source is international and local news media. Iraq Body Count Methods.

An analysis of violent civilian deaths facilitates understanding of conflicts, since human loss is one of the most immediate costs of conflicts (Fischhoff, Atran and Fischhoff 2007, Stiglitz and Bilmes 2008). In addition, it could ensure that further attention should be paid towards enhancing civilian protection from violence (Sloboda et al. 2011). The number of violent civilian deaths which have occurred in conflicts has been of direct interest to social scientists in war studies. Civilian deaths during the 2003 Iraq war in particular, arguably one of the major political phenomena in recent decades, have been researched due to the geopolitical significance of the war. For instance, Wallsten and Kosec (2005) calculate the direct economic cost of Iraqi civilian deaths during the initial two years of the war using the IBC dataset to find that the cost incurred from war deaths outstrips the estimated cost accrued from avoided murders by the Saddam Hussein administration by about 25 percent.[69] Iyengar and Monten (2008) also use the civilian death toll recorded in the IBC dataset to find that uncertainty in the US political landscape regarding the war engagement increased the magnitude of insurgency in Iraq. In addition, Condra et al. (2010) are interested in the effect of civilian casualties as a possible factor underlying escalation of insurgent violence. By examining violent civilian deaths that occurred during the Iraq and Afghanistan war, they discover the level of violence amongst counterinsurgent forces results in resentment in the locals, leading to an increase in future violence. Finally, Alvarez-Ramirez et al. (2010) use civilian and military casualties as a means to understand the relations between regime types and war evolution. They find that violent war deaths showed discrete behavioural patterns in each stage of the five regimes established in Iraq between 2003 and 2010.

Researchers involved in the IBC project have also generated in-depth analysis with the dataset. Hicks et al. (2011a) categorise agents responsible for violent civilian deaths during the Iraq war into three groups; coalition forces, anti-coalition forces and unknown perpetrators. The descriptive statistics provided by the authors show that deaths attributed to coalition forces are not trivial, implying that the military authority should have been

[69] The lower bound of the cost accrued from Iraqi fatalities between March 2003 and August 2005 is 52 billion dollars in 2005 values whilst that from avoided murders by the Saddam Hussein administration during the same period is estimated to be 65 billion dollars.

more cautious in performing its operations. The authors discover that 12% of Iraqi civilian deaths from violence during the initial five years of the war were killed by coalition forces whilst 74% by unknown perpetrators. The coalition forces, however, are more likely to be accountable for the deaths of women and children compared to anti-coalition forces. The proportion of women and children amongst all civilian deaths caused by coalition forces was 51% whilst those by anti-coalition forces 10%. Hicks et al. (2011b) subsequently performed a more comprehensive analysis on the effects of suicide bombings.

Even though the principal characteristics of war evolution and violent civilian deaths have been intensively researched using the IBC dataset, war deaths using the Pentagon dataset have yet to be scrupulously examined in the scholarly literature. The Pentagon dataset includes almost 400,000 classified documents used by officers in the US Department of Defense and in the US Forces' military operations in Iraq.[70] The unprecedented, huge-scale material in relation to the war evoked a sensation in the international society and a strong condemnation by the US government when it was released by WikiLeaks in 2010. Especially, the dataset irrefutably contradicts the US official stand that they do not count Iraqi deaths.[71] The details of violent deaths contained in the dataset substantiates that the US military authority had been consistently and comprehensively recording not only civilian deaths but insurgents and Iraqi security forces killed by armed violence during the war with the exact location and the time of the violent events. To this effect, despite of the lack of given information on the methods in counting violent deaths and in distinguishing civilians from combatants, the Pentagon dataset gives a rare opportunity to infer US military authority's attitude towards violent deaths during the war period. Furthermore, the availability of the official record enables a comparative analysis with the existing dataset on Iraqi civilian deaths compiled based on media reports. This comparative study has rarely been conducted for the Iraq War or any other armed conflict. This chapter therefore aims to gauge any differences between the US military

[70] New York Times (http://www.nytimes.com/2010/10/23/world/middleeast/23box.html).
[71] "We don't do body counts" by General Tommy Franks in a news conference in 2002, who was in charge of the 2003 Iraq War. BBC News (http://news.bbc.co.uk/1/hi/world/middle_east/3672298.stm). "We don't do body counts on other people" by the then US Secretary of Defense Donald Rumsfeld in an interview with Fox News in 2003 (http://www.foxnews.com/story/0,2933,101956,00.html).

authority and the media in acknowledging human losses from violence during the war using the two dataset from the public and private sources. In the absence of guidelines on how the US military authority drafted the dataset, this chapter further attempts to reason out the methods and principles of the authority towards counting violent deaths by conducting the comparative study with the IBC dataset across the spatial, temporal, and spatiotemporal dimensions. Given the conventional wisdom that war deaths provided by governmental sources are allegedly counted in a conservative way to mitigate negative effects on domestic war support, the comparative study could render a clue about systematic discrepancies and counting methods between the US military authority and the media on the same political incidents. If any discrepancies are found to demonstrate US military authorities' methodical undercounting of violent civilian deaths during the war, this chapter also considers its effects upon the ensuing development of the war.

The remainder of the chapter is organised as follows. Section 2 describes an overview of the Pentagon and the IBC dataset. Section 3 presents the comparative analysis of both datasets and section 4 concludes.

2.2. Data Summary

War deaths recorded in both the Pentagon and the IBC dataset are obtained from the IBC website.[72] [73] Despite both datasets reporting incident-based war-related deaths during the 2003 Iraq war, there are significant differences between the two which hinders direct comparison. The IBC dataset itself is the record only for violent *civilian* deaths, defined as non-combatants. As a UK-based NGO, IBC has compiled civilian deaths since the beginning of the Iraq war, aiming to provide a complete number of violent civilian deaths as possible. The main source of the IBC dataset is international and Iraq local news media

[72] The Pentagon dataset originally contains GPS coordinates for the locations where violent incidents occurred. IBC transformed these coordinates into specific places (i.e. governorate and districts) to accommodate research convenience.

[73] The IBC dataset used for this study was downloaded from the IBC searching engine at midnight on 1st July 2011. The number of civilian deaths can vary depending on when the dataset is downloaded since IBC continues to update its figures.

although it also depends on the figures released by morgues, hospitals, governmental and nongovernmental organisations.[74] As the IBC dataset is based on multiple sources, it provides both the minimum and maximum number of civilian deaths for each violent incident. The sum of the minimum deaths therefore represent the most conservative number of civilian loss provided by IBC whereas that of the maximum deaths indicate the upper bound of the civilian death toll during the war. Furthermore, as IBC defines civilians as non-combatants, police in non-paramilitary roles (i.e. local and traffic police) are included in the dataset. IBC also counts members of Iraqi security forces such as National Guard or Iraqi Army as civilians if they were executed after capture.

The Pentagon dataset is the US military archive containing 391,832 classified reports from Iraq. It was released by a whistle-blowing NGO WikiLeaks titled as the "Iraq War Logs" in October 2010. The dataset discloses that the US military authority keeps details on more than 100,000 war deaths that occurred between 2004 and 2009 with two missing months.[75] These war deaths are categorised into 4 groups in the dataset; Civilian, Host Nation, Enemy and Friendly. Civilian is the most relevant category with the IBC dataset as it mainly involves Iraqi civilians.[76] Host Nation is also used for the comparative analysis as it contains Iraqi security forces that the IBC dataset partially includes. Enemy is the category for insurgents or anti-coalition forces whereas Friendly for coalition forces including US military members. As both Enemy and Friendly count combatants, war deaths recorded in these two categories are not overlapped with those in the IBC dataset in principle. However, whilst Friendly unambiguously involves military members, Enemy requires to be examined for the comparative study given the unavailability of methodology on how the US military authority distinguished Iraqi civilians from insurgents or anti-coalition forces. Although it is reasonably assumed that the details on violent deaths recorded in the Pentagon dataset were mainly reported by the US troops in the field or intelligence agents working in Iraq, it is not known how the military authority categorised

[74] Iraq Body Count Methods.
[75] War deaths that occurred in May 2004 and March 2009 are not available in the Pentagon dataset.
[76] The Civilian category also includes foreign security contractors, who are not included in the IBC dataset. However, matching the Civilian category with the IBC dataset is fairly straightforward as the absolute majority recorded in Civilian is Iraqis (Iraq Body Count 2010a).

each death as the dataset was released in an informal way.[77] Nonetheless, methods and principles of the US military authority in categorising the war deaths can be partially captured by the comparative analysis with the IBC dataset as presented in section 2.3.

Beyond the number of war deaths, which this chapter focuses upon, both datasets also provide detailed information on war-related violent incidents including dates and locations. The Pentagon dataset contains the number of injuries from violent incidents, types of the incidents,[78] and GPS coordinates for the locations as to where the incidents occurred.[79] It also provides the number of detainees (i.e. insurgents or anti-coalition forces), totalling more than 180,000 during the period of interest. The IBC dataset supplies the number of injuries caused by war-related incidents that generated at least one civilian death, victims' identities (i.e. name, age and gender) if available, perpetrators, types of weapons, locations (i.e. governorates), and the sources (i.e. local and international media).

IBC has counted violent civilian deaths since the beginning of the war in March 2003 whereas war deaths recorded in the Pentagon dataset are limited to six years between 2004 and 2009 with two missing months (May 2004 and March 2009). The comparative study is therefore restricted to this overlapping time period of seventy months. Table 2-1 presents the descriptive statistics of the minimum and maximum number of civilian deaths recorded in the IBC dataset as well as different war death categories of the Pentagon dataset during this overlapping period. Amongst 4 categories of war deaths of the Pentagon dataset, Friendly is not included in Table 2-1 since this chapter mainly examines violent *civilian* deaths, not military fatalities. The most relevant category with the IBC dataset is Civilian that contains 66,081 violent deaths. The civilian death toll recorded in the Pentagon dataset

[77] The Pentagon dataset is allegedly known to be handed to WikiLeaks by Bradley Manning, an intelligence analyst in the US Army. He was charged with regard to the data theft in July 2010, and his court martial began September 2012. Furthermore, Julian Assange, the founder of WikiLeaks, was granted asylum by Ecuador in August 2012 to avoid possible extradition to the US.

[78] The incidents recorded in the Pentagon dataset are categorised into 9 types; criminal event, enemy action, explosive hazard, friendly action (i.e. coalition forces' military operations), friendly fire, non-combat event, suspicious incident, threat report and others.

[79] IBC transformed this geographic information into districts and governorates in accordance with the boundaries applied since 2005 when the Coalition Provisional Authority in Iraq changed the peripheries of Baghdad. This 'post-2005' list contains 104 districts under 18 governorates. Some districts such as Abu Ghraib, Mahmoudiya, Adhamiya, Mad'in, Khadamiya and Tarmia were transferred to Baghdad from the neighbouring governorates in 2005.

therefore reaches 78% of the lower bound of IBC (i.e. Minimum, 66,081/85,132), and 72% of the upper bound (i.e. Maximum, 66,081/92,027).[80] However, when Civilian is added by Host Nation, a category for Iraqi security forces that the IBC dataset partially includes, the number of war deaths (81,277) reaches 95% of the lower bound of the IBC dataset. Whilst the absolute number of war deaths recorded in the Pentagon dataset is smaller than that in the IBC dataset, the former contains the greater number of violent incidents involving at least one death, suggesting that the Pentagon dataset is likely to include more small-scale violent events. For instance, 73% of the incidents recorded in Pentagon's Civilian (24,721 in 34,009) involve only 1 death whereas 53% in IBC's Minimum (11,577 in 21,865) relate 1 death.[81] This may be because firstly, US troops in the field report small-scale violent events that war journalists occasionally do not. Secondly, US troops may have an advantage over journalist in collecting information on violent events especially when violence escalates.

In spite of the substantial difference in the absolute number of civilian deaths recorded in the Pentagon and the IBC dataset, the monthly averages of the two may not be significantly different considering the overlapping confidence intervals presented in Table 2-1.[82] Furthermore, both the Pentagon and IBC dataset record that the majority of civilian deaths occurred in Baghdad, the capital governorate where a quarter of population reside.[83] However, 73% of insurgent deaths occurred outside of Baghdad, as suggested by the Enemy category of the Pentagon dataset. Together, this implies that civilian deaths are centred around the capital whereas military operations against insurgents or anti-coalition

[80] The number of deaths from prolonged incidents recorded in the IBC dataset is distributed following IBC's distribution algorithm. Three incidents involving more than 800 deaths in the IBC dataset that occurred between 2004 and 2009 span the preceding year (i.e. 2003). As IBC assumes that the deaths from prolonged incidents occurred evenly over the periods of the incidents, I uniformly distributed these deaths throughout the period. If an incident, for instance, generated two deaths between 31 December 2003 and 1 January 2004, one is allocated to December 2003, which is outside the period of interest of this chapter, whilst the other is attributed to January 2004, which is within the period of interest. With this distributive algorithm, the number of deaths for IBC's Minimum and Maximum is established as shown in Table 2-1. This distribution process is not required for the Pentagon dataset as every incident recorded in the dataset falls on a specific day.
[81] Fifty-one percent of the incidents recorded in IBC's Maximum (11,375 in 22,108) involve 1 civilian death.
[82] The monthly distribution of the two datasets is further discussed in section 3.
[83] Population calculated based on the 2007 estimate. The estimated number of population in Baghdad is 7,145,470 (UN Inter-Agency Information and Analysis Unit). The estimated number of population in Iraq is 29,682,000 in 2007 (Central Organization for Statistics and Information Technology).

forces may have spread over to the neighbouring regions of Baghdad, speculation corroborated in the subsequent section.

2.3. Comparative Analysis

In order to examine the probable behavioural differences between the US military authority and media reports in counting violent civilian deaths during the 2003 Iraq war, this chapter analyses war deaths recorded in the Pentagon and the IBC dataset along temporal, spatial and spatiotemporal dimensions. The first two subsections present the monthly and governorate level analysis, and the third considers the time and space together in accordance with the panel structure of data. Thereafter, the forth subsection presents the results of the non-parametric equality test of distribution with the Pentagon and the IBC dataset. The final subsection explores whether there is a systematic difference between the US military authority and the media in counting human loss that occurred in violent incidents involving more than 100 civilian deaths.

2.3.1. Monthly Deaths

Monthly deaths recorded in the Pentagon and the IBC dataset are potentially important indicators for the evolution of the Iraq war as both datasets consistently and comprehensively recorded violent deaths across all 18 governorates in Iraq during the war period. Furthermore, the monthly level approach may also highlight different attitudes of the US military authority and the media in collecting information on Iraqi civilian deaths from violence.

As a starting point, monthly deaths recorded in the two datasets are plotted in Figure 2-1. The thick and thin solid lines in Figure 2-1 respectively represent monthly deaths recorded in Pentagon's Civilian and IBC's Minimum between 2004 and 2009, the period when both datasets are commonly available. The thick and thin dotted line respectively indicate the sum of Civilian and Host Nation of the Pentagon dataset, and IBC's Maximum, both of which are slightly greater than the corresponding solid lines throughout the period

of interest.[84] Both Pentagon's Civilian and IBC's Minimum (solid lines) reach their peaks between mid-2006 and mid-2007, as a result of sectarian violence and severe insurgency during this period, thereafter rapidly decreasing after the 'surge' that brought in an additional dispatch of more than 20,000 US troops in the first half of 2007. There is, however, a considerable discrepancy between Civilian and Minimum before this surge. Dividing the war period into three phases may facilitate a better understanding of this discrepancy. During the first phase, period from January 2004 to August 2006, IBC's Minimum is above Pentagon's Civilian. However, in the following phase of the deadly period when the death toll soared up, Civilian substantially exceeds Minimum. The two, however, show an almost identical level during the final phase from June 2007 to the end of the period of interest.

The difference in the monthly civilian death toll recorded in the Pentagon and the IBC dataset are more clearly illustrated in Figure 2-2. During the first phase between January 2004 and August 2006, as explained with an arrow in the figure, the difference between the Pentagon's Civilian and IBC's Minimum is consistently negative. The average monthly deaths of Civilian are 663 during this first phase, which is a half of those for Minimum (1,263). This conspicuous difference between the two may suggest either that media reports may have inflated the number of violent civilian deaths during the initial period of the war or the US military authority might have conservatively counted them. On the contrary, the Pentagon record exceeds the media's one during the second phase between September 2006 and May 2007 as represented by another arrow in Figure 2-2. It may imply that the US military authority might have collected information on violent civilian deaths as actively as the media in this phase when sectarian violence and insurgency prevailed. The average monthly deaths of Pentagon's Civilian were almost 3,000 in this phase whilst those of IBC's Minimum were approximately 2,500. Finally, during the last phase of the war period, from June 2008 to December 2009, Civilian closely approach Minimum except in

[84] Monthly deaths recorded in Enemy, a war death category for insurgents or anti-coalition forces of the Pentagon dataset is illustrated in Figure 2-A-1 in appendix.

March 2008.[85] This suggests that monthly deaths collected by the US military authority are almost identical to those with media reports during the final phase when the insurgency and sectarian violence abated after the surge in early 2007.

Baghdad Effect

To find the causes of significantly different attitude between the US military authority and media reports in counting civilian deaths in the initial and the insurgency period of the war, I firstly examine deaths recorded for Baghdad. As both the US military authority and media reports record Baghdad as the governorate where the majority of violent civilian deaths occurred during the war period, it may be useful to plot monthly deaths occurring in Baghdad and in the rest of the governorates separately to net out a probable Baghdad effect.

The first plot of Figure 2-3 displays monthly civilian deaths occurring in Baghdad governorate only whilst the second plot the rest of the governorates in Iraq.[86] The solid and dotted line in each plot represents Pentagon's Civilian and IBC's Minimum respectively. Looking at Baghdad first, monthly civilian deaths show similar patterns to those illustrated in Figure 2-1. Specifically, Civilian is lower than Minimum until mid-2006, and then exceeds Minimum during the severe insurgency period between mid-2006 and mid-2007. Civilian and Minimum, however, look almost identical since then until the end of the period of interest.

In the second plot excluding Baghdad, Civilian and Minimum show similar trajectories with an exception of 2004. Whilst Civilian is rather flat in 2004, Minimum displays two conspicuous peaks claiming almost 1000 death each month. These two peaks are mainly due to the two battles in Falluja, one of the major cities of Anbar governorate where the US forces launched all-out assaults to take back control of the city from insurgents in April and November. IBC's Minimum records approximately 600 deaths including women and children in Falluja in both months. On the contrary, Pentagon's

[85] IBC's Minimum and Pentagon's Civilian show a substantial difference in Diyala governorate in March. Minimum documented an incident involving findings of 100 bodies in Al-Khalis district in Diyala governorate this month, which Civilian did not report.
[86] The 18 governorates in Iraq are listed in Table 2-2.

Civilian counts only one or two deaths in the same months. Instead, the Enemy category of the Pentagon dataset records about 400 deaths in both months. This implies that the US military authority might have acknowledged almost all human loss occurring during the two fierce battles in Falluja as lump-sum insurgent deaths without attempting to single out civilians from insurgents. This is further elucidated in section 2.3.3.

Initial Discrepancy: Did the US undercount Civilian Deaths?

A monthly level approach to war deaths recorded in the Pentagon and the IBC dataset provides a clue to the notable differences between the US military authority and the media count of Iraqi civilian deaths during the initial stage of the war. The number of deaths recorded in Pentagon's Civilian is only 29% of that in IBC's Minimum in 2004 (2,781/9,478), and 41% in 2005 (5,746/13,913). The discrepancy between the two datasets during the initial period of the war derives mainly from the distribution of deaths which occurred in Baghdad and the neighbouring Anbar governorate where the largest scale military operations were carried out in 2004.

On one hand, one can assume that even the most conservative number of war deaths reported by the media (i.e. IBC's Minimum) may be substantially inflated as media coverage on violent events tends to be intensified in the beginning of any contemporary war due to the 'rally 'round the flag' effect.[87] On the other hand, the US military authority may have not established an effective system to report violent civilian deaths during the initial stage of the war. Moreover, it could be that the US forces' priority had been on ensuring victory over their armed opponents or on decisive exit strategies rather than on the counting non-coalition deaths at the beginning of the war whereas war journalists' priority lies with reporting violent events involving civilian loss. Given the unavailability of the Pentagon's methods of collecting war-related death information, there is no concrete evidence to support the speculation that the US military authority did not effectively function or rather neglected the accurate counting of civilian deaths in the initial stage of the war. Nevertheless, the evolution of the intensity of violence in the subsequent phases of the war

[87] The Rally 'round the flag effect is a political terminology devised by Mueller (1973) to explain a phenomenon that a war tends to enjoy comparatively high domestic support in the beginning.

may partially support the speculation that the initial discrepancy between the US military authority and media reports may be attributed to US forces' undercount of violent civilian deaths due to the absence of an effective counting system rather than media's exaggeration on violence.

As illustrated with Figure 2-1, Iraq experienced acute sectarian violence and insurgency between mid-2006 and mid-2007 that brought about large-scale civilian deaths. The symptom of the sectarian civil war was already present during the previous year when the lowest bound of monthly civilian deaths reported by the media exceeded 1,000 for 9 months in 2005, a signal for the onset of a sectarian war.[88] However, the US military authority systematically understated the civilian deaths toll compared the media during the same year. This undercount may have hindered the US military authority from predicting the subsequent escalation of violence between mid-2006 and mid-2007 when the average civilian death toll reached almost 3,000 a month as recorded by both the Pentagon and the IBC dataset. The sectarian war and severe insurgency consequently led to the surge that brought in the additional dispatch of more than 20,000 US troops in the first half of 2007, and prevented the early withdrawal of US forces. This war was prolonged by more than 7 years from the time of George Bush's declaration of victory in May 2003.

Discrepancy during the Insurgency Period

In contrast to the initial stage of the war, monthly civilian deaths recorded in the Pentagon dataset far exceeded those in IBC's between mid-2006 and mid-2007 when sectarian violence and insurgency prevailed. A probable reason for this may be due to the suspension of information-release regarding civilian deaths from the Baghdad city morgue. IBC recorded the number of civilian deaths released from the morgue since May 2003 until it stopped providing the list of deaths in October 2006.[89] The sum of the morgue deaths

[88] For example, BBC News reports that symptoms of the sectarian war had been observed since early 2005, and a bombing attack on Al Askari Mosque, a holy shrine for Shia Muslims located in Samarra, in February 2006 is largely regarded as an event that actualised the civil war between Sunni and Shia Muslims (http://www.bbc.co.uk/news/world-middle-east-11107739).

[89] The Iraqi government clamped down on releasing the figures on violent civilian deaths from the Baghdad city morgue after the United Nations Assistance Mission for Iraq (UNAMI) publicised far higher numbers than those admitted by the Iraqi government. Guardian (http://www.guardian.co.uk/world/2008/mar/19/iraq).

during this period is not trivial, accounting for 57% of total deaths that occurred in Baghdad (17,191 in 30,128 deaths recorded in IBC's Minimum). The suspension of the morgue release may have contributed to the cessation of the rapid increase of war deaths recorded by IBC as shown in Figure 2-1. Another possible reason that monthly civilian deaths recorded in the Pentagon dataset exceeded those in the IBC's during the insurgency period may have stemmed from the limitation of media coverage amidst severe violence especially in Baghdad and neighbouring governorates. IBC mainly collects its data from media reports, and it may have been too dangerous for war journalists to comprehensively cover violent incidents during the deadly period between mid-2006 and mid-2007.

2.3.2. Deaths across Governorates

A governorate level analysis on violent civilian deaths recorded in the Pentagon and the IBC dataset renders a clear view of how differently or similarly the US military authority and the media had archived civilian losses during the war period across each governorate. Table 2-2 provides the number of civilian deaths recorded in Pentagon's Civilian and IBC's Minimum in each governorate arranged in order, from high to low. It also presents Host Nation and Enemy, war death categories of the Pentagon dataset for Iraqi security forces and insurgents respectively, to help identify any distinguished features from the distribution of civilian deaths along the governorate dimension. Looking at the governorates at the top in each category, Baghdad accounts for the majority of civilian deaths in both the Pentagon and the IBC dataset. Baghdad also claims the greatest number of civilian deaths per 1000 in the population,[90] implying that the capital was the most volatile region in terms of civilian losses. Neighbouring Anbar governorate, however, is involved in the largest number of insurgent deaths as seen in the Enemy column, suggesting that military operations against insurgents or anti-coalition forces had actively been conducted in this region.

When looking at the proportion of deaths of the governorates in each war death category, it is noticeable that 85% of the deaths recorded in Pentagon's Civilian and IBC's Minimum occurred in the top five governorates listed in the Table 2-2, with both datasets

[90] Deaths per 1000 in population based on 2003 estimations (World Bank).

sharing four governorates.[91] In addition, 83 and 86% of deaths recorded in Host Nation and Enemy also centre upon the top five governorates, which are exactly the same as those for Minimum.[92] Moreover, the neighbouring governorates of Baghdad such as Diyala, Anbar, Salah al-Din and Babylon account for a relatively large number of violent deaths, implying that armed violence centred on the capital and its adjacent regions during the war period. On the other hand, the three Kurdish governorates, Erbil, Sulaymaniyah and Dahuk, where the Kurdistan Regional Government (KRG) autonomously rules in North Iraq, have experienced a comparatively smaller number of violent deaths.[93] It may suggest that the security situation in this region had been comparatively stable during the war period under the control of Peshmerga.[94]

Figure 2-4 visually presents the number of civilian deaths recorded in Pentagon's Civilian and IBC's Minimum, as represented by the solid and dotted lines respectively, across all 18 Iraqi governorates. The proportion of Civilian to Minimum for each governorate is also illustrated with the histograms in the figure. Looking at the governorates with more than 1,000 deaths in both Civilian and Minimum,[95] the number of deaths recorded in Civilian reaches 70 to 100% of that in Minimum in every governorate except Anbar.[96] The number of deaths recorded in Civilian for Anbar governorate is only 37% of that in Minimum, suggesting that the US military authority might have a significantly different standard towards counting civilian deaths in this region, supporting the earlier findings about the violent deaths predominantly occurring in Falluja, one of the main cities of Anbar.

2.3.3. A Monthly-Governorate Approach

The monthly and the governorate level analysis in the previous subsections provide an overview of the difference between the US military authority and the media in counting

[91] These 4 governorates are Baghdad, Diyala, Ninewa and Salah al-Din.
[92] Baghdad, Ninewa, Diyala, Salah al-Din and Anbar for Host Nation, Anbar, Baghdad, Diyala, Ninewa and Salah al-Din for Enemy.
[93] Refer to Map 2.A.1 in appendix for the location of each governorate.
[94] Kurdistan military forces.
[95] Kirkuk and the governorates are placed on the right side of Kirkuk in Figure 2-4.
[96] Pentagon's Civilian records 66,081 civilian deaths, which is 78% of IBC's Minimum (85,132).

violent civilian deaths during the 2003 Iraq war. This subsection further facilitates comparisons by putting temporal and geographical information together. To compare how violent civilian deaths differ along the monthly-governorate dimension, I plot monthly deaths occurring in each governorate in Iraq except Baghdad in Figure 2-5.[97] The spatiotemporal approach provides a clear view of the differences and similarities that exist between Civilian and Minimum represented by a solid and a dotted line respectively in each governorate. By looking at each plot, we find many of the governorates do not show conspicuously different trends between Civilian and Minimum over the period of interest except the following governorates: Anbar, Najaf, Salah al-Din, Kerbala and Basrah.

2.3.3.1. Anbar

As disscussed in the previous subsections (section 2.3.1 and 2.3.2), the difference between Pentagon's Civilian and IBC's Minimum in Anbar governorate mainly arises in 2004 when the two most intense battles between the US forces and anti-coalition forces or insurgents occurred in Falluja in April and November of that year, as represented by the two outstanding peaks of Minimum in the first row in Figure 2-5. Figure 2-6 plots monthly civilian deaths for Anbar governorate again as well as those for Falluja district[98] in order to more precisely examine the differences between Civilian and Minimum. Furthermore, monthly deaths recorded in Enemy, a war death category of the Pentagon dataset for insurgents or anti-coalition forces is also included in Figure 2-6. As signified by the two arrows in the second plot, the two peaks of Minimum in 2004 of Anbar governorate are mainly due to violent deaths occurring in the first and the second battle of Falluja in April and November of that year. In Falluja district, Minimum records 577 and 668 deaths in April and November respectively whilst only 1 and 2 deaths are recorded in Civilian for each month. At the same time, Host Nation, a war death category for Iraqi security forces of the Pentagon dataset, records 0 and 7 deaths for the same months although it is not illustrated in Figure 2-6. Instead, Enemy records 386 and 479 deaths in both months, meaning that the US military authority categorised almost all violent deaths that occurred during the two battles in Falluja as insurgent deaths.

[97] See Figure 2-3 for Baghdad governorate.
[98] The city of Falluja is the main cities in Falluja district, one of the seven districts of Anbar governorate.

The US military authority claimed that civilian victimisation was minimised as most of the 300,000 pre-war population of Falluja fled in the fear of the largest scale assaults that involved in up to 15,000 US military forces and 3,000 insurgents.[99] However, the record of the Pentagon dataset that only 3 civilians or 10 Iraqis, if counting Iraqi security forces as well (i.e. Host Nation), were killed as a result of armed violence during the two major battles in Falluja is hardly reliable considering that even the Iraqi government official figures reported 271 civilian deaths including more than 50 deaths of women and children during the initial period of the first battle in April.[100] This suggests that the US military authority might not have attempted to single out unarmed civilians during the major military operations in the city of Falluja.

Table 2-3 present further details on war deaths in each district of Anbar governorate including Falluja district. As shown in the Enemy column, 27% of insurgent deaths occurred in Anbar governorate during the period of interest. Anbar is the largest governorate in Iraq, accounting for 32 percent of the territory (138,228 km^2 from a total of 435,052 km^2) but sparsely populated due to a large desert in the west.[101] The major cities in Anbar governorate, however, are included in the 'Sunni triangle' where the insurgency against the coalition forces was frequent during the war period.[102] As seen in the Civilian and Minimum columns in Table 2-3, the majority of civilian deaths occurring in Anbar governorate are centred on Falluja and Ramadi, the districts that are situated in the Sunni triangle. Furthermore, it is noticeable that the number of deaths occurring in these two districts conspicuously varies across Civilian and Minimum, implying that a substantial disagreement between the US military authority and the media in the counting of violent civilian deaths. Civilian records 782 deaths in Falluja during the period of interest, which is only a quarter of Minimum (3,264). Civilian also records 681 deaths in Ramadi, which is less than a half of Minimum for the district (1,445). On the other hand, Enemy records a

[99] New York Times (http://news.bbc.co.uk/1/hi/world/middle_east/3998049.stm), BBC News (http://news.bbc.co.uk/1/hi/world/middle_east/4012005.stm, http://www.fair.org/index.php?page=1999)
[100] Iraqi Health Ministry announced that 271 civilians including 52 women and children were killed due to armed violence in Falluja between 4 and 22 April 2004. ABC News (http://www.abc.net.au/news/2004-04-23/Falluja-siege-civilian-death-toll-271-iraqi/174876).
[101] Central Organization for Statistics and Information Technology.
[102] Sunni Triangle is the triangular-shaped region that roughly connects Ramadi, Ba'quba and Tikrit. It also includes the city of Falluja and a part of Baghdad.

considerable number of deaths in both districts, suggesting that a careful investigation on whether the Enemy category absorbed some of the civilian deaths in this region is required.

2.3.3.2. Najaf

A significant disagreement between the US military authority and the media in classifying civilian and insurgent deaths is also observed in Najaf governorate. To visualise this discrepancy, I plot monthly deaths occurring in Najaf governorate again as well as those for Najaf district, which claims the majority of civilian deaths in the governorate in Figure 2-7.[103] A spike of IBC's Minimum in 2004 in Najaf governorate is mainly due to the battles between the US forces and Al-Mahdi Army[104] in the city of Najaf in August as explained with an arrow in the second plot in Figure 2-7. Whilst Minimum counts 77 deaths in Najaf district, where the city of Najaf is situated, Civilian counts no death during the same month. Instead, Enemy records 577 insurgent deaths in the same month, implying that, as in the two major battles in Falluja, the US military authority might have collectively classified all the violent deaths occurring in the city of Najaf during the battles as insurgent deaths.

Furthermore, the US military authority seems to omit the counting of a considerable number of civilian deaths that occurred in the city of Najaf in 19 December 2004 due to suicide bombings outside the Imam Ali Shrine as indicated by in the second plot of Figure 2-7.[105] Whilst IBC's Minimum records 53 civilian deaths caused by this single incident, Civilian and Enemy of the Pentagon dataset do not count any death during the whole month.

2.3.3.3. Salah al-Din

Salah al-Din governorate was one of the most insecure regions during the war period as partially explained by the relatively large size of civilian and insurgent deaths that occurred in this governorate.[106] Furthermore, similar to the battles in Falluja and Najaf, war deaths generated during the intense battle in Samarra, one of the major cities of Salah al-Din

[103] Najaf governorate consists of three districts: Najaf, Kufa and Al-Manathera.
[104] The city of Najaf where Imam Ali Shrine, a holy mosque for Shia Muslims, is located in what had been one of the strongholds of Al-Mahdi Army, an anti-coalition force led by Shia cleric Muqtada Al-Sadr.
[105] New York Times (http://www.nytimes.com/2004/12/20/international/middleeast/21CND_IRAQ.html).
[106] See Table 2-2 for the detailed figures on civilian and insurgent deaths for Salah al-Din governorate.

governorate, were collectively categorised as insurgents by the US military authority. During the major offensive in the city of Samarra to take control back from insurgents on 1 October 2004, Pentagon's Civilian records no death whilst IBC's Minimum counts 48. Instead, Pentagon's Enemy records 134 insurgent deaths on the same day as illustrated in Figure 2-8. Moreover, the US military authority seems to have documented far smaller number of violent civilian deaths than the media for Salah al-Din governorate in the initial period of the war. As seen in Figure 2-8, Civilian is placed below Minimum in most of the months until mid-2006 although the two show similar trends since then with the exception of February 2008. The peak of Minimum in February 2008 involves a finding of 55 executed bodies near Samarra whilst Civilian appears to omit this incident.

2.3.3.4. Kerbala

Pentagon's Civilian and IBC's Minimum display similar trends in Kerbala governorate over the period of interest except two months as seen in Figure 2-9. Both Civilian and Minimum display peaks in March 2004 although the peaks conspicuously vary. These peaks are mainly as a result of the Ashura bombings[107] that claimed more than 100 civilian deaths from suicide bombs in Kerbala governorate. Civilian and Minimum record 113 and 121 deaths respectively for this violent incidents. However, Minimum also records more than 200 additional deaths for March on the basis of the list of violent deaths released by the Kerbala provincial morgue, revealing a conspicuous difference between Civilian and Minimum in that month.[108] Another set of spikes in 2007 as illustrated in Figure 2-9 seems to be a coding error in Civilian. On the 14th April 2007 there was a bomb attack near Imam Hussayn Shrine, one of the holy sites for Shia Muslims. Minimum records 46 deaths and 224 injuries for this incident whilst Civilian counts 36 deaths and 158 wounded. However, Civilian records another 158 deaths and 34 wounded on the same day, implying that the

[107] The Ashura bombings indicate a series of violent attacks on the Day of Ashura, a religious festival especially for Shia Muslims.
[108] In documenting violent civilian deaths released by Iraqi official sources including morgues and Ministry of Health, IBC "only uses such data when it is possible to assign some date and location specificity" to avoid double counting. IBC Methods.

second record may be a double count for the same incident by switching the numbers of the deaths and wounded albeit with a slight decrease in the latter.[109]

2.3.3.5. Basrah and Baghdad

Basrah governorate was an important military posting during the war period as well as Baghdad since UK forces were stationed in Basrah governorate from the initiation of the 2003 Iraq war until they handed over control of Basrah International Airport to Iraqis in January 2009. Coincidently, the evolution of monthly civilian deaths recorded in the Pentagon and the IBC dataset for Basrah governorate shares similarities with that of Baghdad as shown in Figure 2-10.

By looking at monthly deaths that occurred in Basrah governorate in Figure 2-10, we find that Civilian is lower than Minimum in the initial period of the war. Civilian, however, exceeds Minimum between mid-2006 and mid-2007, and the two show almost identical patterns in the last phase of the war period. This evolvement of Civilian and Minimum in Basrah governorate is similar with that in Baghdad although the total civilian death toll in Baghdad is 14-17 times greater than that in Basrah in both the Pentagon and the IBC dataset. The similarity of this trend in both governorates is noteworthy considering that the former had been a major post for the US forces and the latter for the British forces during the entire war period. It may suggest that the tendency of the US military authority to conservatively count civilian casualties than media reports in the initial period of the war was stronger in the major military postings such as Baghdad and Basrah.

In summary, the monthly-governorate level approach to war deaths recorded in the Pentagon and the IBC dataset shows similar patterns between the two datasets in many of the eighteen governorates in Iraq except the following; Anbar, Najaf, Salah al-Din, Kerbala, Basrah and Baghdad. In Baghdad and Basrah governorate, both of which have been major military postings during the war period, the US military authority seems to be less active than the media in collecting civilian deaths during the initial period of the war before the

[109] Although there is no evidence to prove the fact of double counting for the incident, IBC indicates the presence of many coding errors in the Pentagon dataset, which require further examination of each violent incident (Iraq Body Count 2010b).

violent death toll soared in early 2006. The US military authority also show a substantial discrepancy with the media in distinguishing civilians' from insurgents' death during the fierce battles in Falluja, Najaf and Samarra. Finally, the US military might have miscounted civilian deaths due to omitting or miscoding of violent incidents in Najaf, Kerbala and Salah al-Din governorate, leading to a necessity of further examination of the incidents recorded in the Pentagon dataset.

2.3.4. Distribution of War-related Deaths

The previous subsections show considerable differences between the US military authority and the media in counting violent civilian deaths during the initial stage of the 2003 Iraq war. This subsection examines how far apart is the distribution for war deaths recorded in the Pentagon and the IBC dataset. If both datasets render consistent results despite of the initial differences, this could provide some degree of assurance that the number of deaths recorded in both datasets is not totally arbitrary although neither one could be a true number of violent deaths during the Iraq war. I firstly discuss distribution of *monthly* deaths and then present the results of equality tests of distribution across the temporal, spatial, and spatiotemporal dimensions.

2.3.4.1. Distribution of Monthly Deaths

To see the overall shape and form of distribution of monthly deaths recorded in Pentagon's Civilian and IBC's Minimum, kernel density graphs are illustrated in Figure 2-11. Furthermore, kernel density graphs of Civilian added by Host Nation, as represented by a dotted line in each plot in Figure 2-11, are also included since Host Nation contains Iraqi security forces that the IBC dataset partially includes. The first plot shows distributions of monthly deaths which occurred in Iraq during the period of interest whilst the second and third plots are for Baghdad only, and for the rest of the governorates respectively.

By looking at the first plot, we find that most areas of Civilian and Minimum, represented by a thick and thin solid line respectively, are close to the means, and the distributions are right skewed, indicating a low frequency for the months with a comparatively large number of violent deaths (i.e. more than 1,000 deaths a month). When

added by Host Nation, the distribution of monthly deaths recorded in the Pentagon dataset is more similar to that in the IBC dataset. In Baghdad governorate, as shown in the second plot in Figure 2-11, the distribution of the sum of Civilian and Host Nation is almost identical to that of IBC's Minimum. Excluding Baghdad, however, produces to some degree a different form and shape as illustrated in the third graph. Together, this suggests that the discrepancy between Civilian and Minimum at the monthly level is observed in both Baghdad and the rest of the governorates. The discrepancy, however, decreases with regards to Baghdad governorate, who claims the majority of civilian deaths in both the Pentagon and the IBC dataset, when Iraqi security forces are taken into account.

2.3.4.2. Consistency between the Pentagon and the Media

Having discussed the monthly level distributions, I now go a step further by testing the equality of distribution employing the Wilcoxon signed rank-sum method. This non-parametric procedure fits the purpose of this comparative study to test the equality of distribution of *paired* data.[110] The equality tests consider distributions not only by months and governorates but by districts, which has not been examined in the comparative analysis in the previous subsections due to missing observations which are listed under 'unknown' districts.

Whilst most deaths documented in the Pentagon's Civilian fall into a specific district (i.e. known deaths),[111] approximately a third recorded in IBC's Minimum are categorised as occurring in unknown districts (i.e. unknown deaths)[112] although governorates where these deaths occurred are known. These unknown deaths are allocated in proportion to the known categories of districts. For instance, if a district claims10 percent

[110] Z statistics of the Wilcoxon signed rank-sum test is computed as follows. Firstly, one obtains the differences of paired observations and takes the absolute values of these differences. Then one excludes the observations if the absolute value is zero. Secondly, the absolute values are ranked from low to high, and these ranked values are then divided into two groups. One group includes the positive differences from the paired observations of ranked values, and the other negative. Thirdly, all ranks in the positive group (W^+), and negative group (W^-) are summed up. Finally, z statistics of the Wilcoxon signed rank-sum test is calculated with the equation $\frac{W^+ - E(W^+)}{\sqrt{Var(W^+)}} \sim N(0,1)$, where E ($W^+$) and Var ($W^+$) represent the expected value and the variance of the sum of the ranks respectively (Hogg, McKean and Craig 2005).

[111] Only 490 deaths in 66,081 deaths recorded in Civilian occurred in unknown districts.

[112] 26,986 in 85,132 deaths recorded in Minimum (32%), and 26,986 in 92,027 in IBC's Maximum (29%).

of *known* deaths recorded for a governorate it belongs to, then I allocate a 10 percent of *unknown* deaths of the governorate into this known district. This simple imputation makes it possible to conduct an equality test of distribution at the district level.

After imputing the unknown deaths recorded in the IBC dataset, the next challenge is to infer how far apart the distribution is for war deaths as recorded in the Pentagon and the IBC dataset. Table 2-4 presents the results of the equality test of distribution of war deaths recorded in both datasets employing the Wilcoxon signed rank-sum method.[113] As shown in the first column of Table 2-4, I firstly paired Pentagon's Civilian with IBC's Minimum or Maximum, then coupled the sum of Civilian and Host Nation with IBC's Minimum or Maximum. By firstly looking at the results for the monthly dimension, we do find that war deaths recorded in Pentagon's Civilian have a significantly different distribution with that of Minimum or Maximum, regardless of adding Host Nation deaths. The distribution of the sum of Civilian and Host Nation, however, is not significantly different with that of the lower bound of the IBC dataset (i.e. Minimum) when excluding the year 2004. It ensures that the US military authority and media reports were consistent to some degree in counting violent deaths over the war period except the initial stage of the war. Furthermore, the z statistics obtained from the Wilcoxon signed rank-sum tests presented in Table 2-4 consistently suggest that the difference in distribution of Pentagon's Civilian and IBC's Minimum is not statistically significant along the spatial (i.e. governorate and district) and spatiotemporal dimensions (monthly-governorate) when Civilian is added with Host Nation, substantiating that the monthly death toll for each governorate and district provided by the US military authority and media reports are consistent with the count of Iraqi security forces. Furthermore, since the two datasets record the same political incidents, and render consistent distribution to some degree over time and space, it may be possible to estimate total civilian deaths by combining the two as attempted for the Kosovo War.[114]

[113] The null hypothesis of the Wilcoxon signed rank-sum test is that the distributions of war deaths recorded in WikiLeaks and the IBC dataset are not significantly different.

[114] Given the two independently documented lists of war deaths, the 'capture-recapture' method can be used to estimate the total number of deaths. It firstly links the two lists, and indentifies overlaps and non-overlaps using the information of the deaths (i.e. name, age and gender). Given the number of deaths commonly

In sum, the equality tests corroborate that civilian deaths counted by the US military authority and the media are not entirely incompatible across the governorates and districts when Iraqi security forces are taken into account. Furthermore, the Pentagon and the media appear to have consistent attitudes in recording civilian deaths over the war period except the initial stage of the war if Iraqi security forces are included in the analysis. It particularly enhances the findings discussed in the previous subsections that the US military authority and the media had a significantly different attitude towards counting violent civilian deaths during the initial period of the war.

2.3.5. Discrepancy on Most Lethal Events during the Iraq War

Although this comparative analysis does not examine every incident by incident listed in the Pentagon and the IBC dataset, Table 2-5 presents the incidents involving in at least 100 civilian deaths documented in IBC's Minimum and their counterparts in Pentagon's Civilian to grasp how similarly or differently the US military authority and the media recorded the most lethal events during the war.[115]

As seen in Table 2-5, Civilian tends to record a smaller number of deaths than that of Minimum for the same incidents with the exception of the suicide attacks that occurred in Salah al-Din in July 2007 and in Babylon in February 2005. For instance, Minimum counted 965 deaths for a stampede which occurred in Baghdad in 31 August 2005 as seen in the first incident in Table 2-5 whilst the number of victims for this incident recorded in Civilian is only a half (436). Furthermore, the number of wounded in Civilian is also smaller than Minimum in most of the incidents. One can assume, on one hand, even the smallest numbers of civilian casualties reported by the media may be considerably exaggerated. It is speculated, on the other hand, the US military authority might have

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recorded in both lists (represented by A), and in one of the lists only (B and C), the capture-recapture method estimates the total number of deaths, N, by assuming that the proportion of deaths recorded in both datasets to those in the second list (A/C) is the same to the proportion of deaths in the first list to the total number of population (B/N). This relationship is shown by the equation A/C=B/N. Ball and Asher (2002) estimate 10,356 war deaths based on 4,400 recorded in four different lists of war deaths. The capture-recapture method may not be applicable for the Iraqi datasets used for this chapter since not all deaths were documented with detailed information. It may be, however, applicable to sub-groups or samples containing identifiable individuals only.

[115] Deaths from prolonged incidents (e.g. morgue public statements) were excluded. The table includes all the incidents that generated more than 100 deaths in Pentagon's Civilian.

conservatively recorded the number of civilian casualties occurring from the most lethal incidents during the war.

In relation to the last two incidents in Table 2-5, the first is recorded only in the IBC dataset, and the second in the Pentagon dataset, engendering suspicion of how both violent events involving more than a hundred civilian deaths could be detected only by either the US military authority or the media, not both. Although the locations where the bodies were discovered are different (i.e. Al Khalis in Diyala governorate vs. Al Resafa in Baghdad governorate), the distance between the two district is only 58km,[116] and the two governorate share the same border. Furthermore, although the number of deaths engaged in these two incidents conspicuously vary (i.e. 100 vs. 250), the count of the deaths may be not precise since the bodies found were decomposed. Moreover, a brief note tagged in the Pentagon dataset for the incident furthers the suspicion that the two incidents may in fact be identical.

"Military Intel indicated the presence of an estimated 250x human remains in Til Al-Thaheeb Sector, which it falls under the responsibility of the 4/14/3 IA. Xactual grid is unknown."

Although I could not find where 'Til Al-Thaheeb Sector' in the note is located, it appears that the US military authority may not have information on the exact location for the discovery when the last sentence of the note is considered.

2.4. Conclusion

Both the Pentagon and the IBC dataset are incomplete records to grasp the true number of violent civilian deaths which occurred during the 2003 Iraq war. Nonetheless, since the former is the official military record, and the latter is based on media reports, a comparative analysis with the two dataset can provide clues on the significant behavioural differences between the US military authority and media reports in counting civilian deaths from violence. Furthermore, given the unavailability of Pentagon's methods in drafting war

[116] The distance between Al Khalis and Al Resafa district is computed using the Google distance calculator.

deaths, the comparative analysis enables to infer the attitude of the US military authority towards counting violent civilian deaths over the war period.

Non-parametric equality tests of distribution substantiate that the Pentagon and the IBC dataset provide consistent figures of violent civilian deaths along the spatial and spatiotemporal dimensions when Iraqi security forces taken into account. Furthermore, the distribution tests along the temporal dimensions also support that the US military authority and media reports appears to have consistent attitudes in counting violent civilian deaths except the initial stage of the war. This could provide some degree of assurance that the number of deaths recorded in both datasets is not totally arbitrary although neither one could be a true number of violent deaths during the war.

The substantial differences between the US military authority and the media in the initial stage of the war are mainly observed: i) during the intense battles between the US forces and insurgents or anti-coalition forces in Falluja, Najaf and Samarra in 2004; and ii) in the capital from 2004 to mid-2006. First, whilst the mainstream media reported considerable number of civilian deaths including women and children during the major military operations in Falluja, Najaf and Samarra in 2004, the US military authority collectively categorised almost all violent deaths as insurgent deaths. In particular, given the official figures provided by the Iraqi government on unarmed civilian deaths that occurred during the all-out assaults in Falluja, the Pentagon may have been less mindful in distinguishing civilian losses out of combatant deaths. Second, the difference in the number of violent civilian deaths counted by the US military authority and media reports is conspicuous before violence rapidly escalated in mid-2006. The civilian death toll recorded in the Pentagon dataset is only 29% of the lower bound of the IBC dataset in 2004, and 41% in 2005. The U.S military authority's conservative attitude towards counting civilian deaths compared to the media was especially prominent in the Baghdad and Basrah governorate, which were major military postings for the US and the UK troops during the war period.

The discrepancy between the two may suggest either that media reports may have inflated the number of violent civilian deaths during the initial stage of the war or the US military authority may have undercounted them. Assuming that media coverage on violent

events involving human loss was intensified especially in the beginning of the war, it is then likely that the most conservative number of civilian deaths reported by the media may have been inflated. However, one could also speculate that the US military authority may have not fully established an effective system to report violent events in the initial stage of the war. Furthermore, the US forces could have prioritised the winning of battles or exit strategies rather than trying to minimise collateral damage by counting non-coalition deaths. Given the unavailability of Pentagon's methods in documenting war deaths, there is no clear evidence to support the speculations that the US military authority did not effectively function or neglected in counting civilian deaths in the initial stage of the war. Nonetheless, this speculation may be partially supported by the evolution of the intensity of violence during the subsequent period of the war.

Iraq experienced the acute sectarian violence and insurgency between mid-2006 and mid-2007 that brought about large-scale civilian victimisation. The onset of civil war was already sensed during the previous year when the lowest number of monthly civilian deaths reported by the media exceeded 1,000 during the majority of the months in 2005. However, the civilian death toll recorded by the US military authority was systematically far lower than that of media reports during the whole year. This undercount may have restricted the US military authority's ability in predicting and preparing for the subsequent escalation of violence between mid-2006 and mid-2007 when the average civilian death toll reaches almost 3,000 a month as recorded by both the Pentagon and the IBC dataset. During this insurgency period and thereafter, monthly civilian deaths recorded by the US military authority exceeded or were almost identical with those reported by the media, which may indicate that the capacity of the US military authority to report violent deaths was equivalent, if not superior, to the media once it established an effective counting system of war deaths.

The political implication for these findings is clear. The accurate counting of civilian deaths from violence is a requisite to ensure civilian protection during any armed conflict, and to understand the evolution of war intensity. Furthermore, an effective system to collect civilian casualty information is also one of the key requirements to tackle

insurgent violence as the link between civilian casualties and insurgency is known to be strong as observed during the ongoing Afghanistan War (Contra et al. 2010). The suspicion that the US military authority understated the civilian death count during the initial period of the war is more credible in light of the evolution of the intensity of violence in the subsequent phases of the war. By reporting just 30-40% of the number of civilian deaths compared to the media during the initial, and arguably the most critical phase of the war, the US military authority failed to grasp the perspective of violence escalation. The subsequent sectarian violence and severe insurgency resulted in large-scale human loss and a troop surge of an additional 20,000 US troops in the first half of 2007. The escalation of violence also prevented the early withdrawal of US forces since the war extended more than 7 years. Since the Vietnam War, the US authorities have been scrupled to count civilian death tolls as they learned increasing human costs inevitably leads to the aggravation of public opinion towards war. However, the accurate counting of both military and civilian casualties from violence could better understanding of war evolution, promote accountability of the government, and contribute on minimising the civilian impact of conflict as attempted in the Afghanistan and Kosovo Wars.[117] In addition, the norms of distinguishing civilians from combatants should be firmly established within the US military authorities as the classification of some violent deaths are not straightforward, as shown in the significant discrepancies between the Pentagon archives and the media-based record during the early phase of the Iraq War.[118] Greater transparency and consistency in counting violent civilian deaths will help military authorities to understand the wider landscape and spread of violent conflict. The analysis presented in this chapter has demonstrated an effective counting system of war deaths is particularly critical during the initial stages of any war in order to prevent an unnecessary escalation.

[117] The United Nations Assistance Mission in Afghanistan (UNAMA) has provided the number of civilian deaths from violence in Afghanistan based on on-site investigations since 2007. The recently issued UNAMA annual report showed that civilian casualties have declined for the first time in six years (UN Assistance Mission in Afghanistan 2013). Similarly, 'The Kosovo Memory Book: Volume 1' has been published in 2011 to offer a comprehensive list of war deaths during the 1998 Kosovo War.

[118] International Humanitarian Law (the Fourth Geneva Convention) defines civilians those who are not combatants. Civilians lose their status if they directly participate in hostilities. IBC records civilian deaths based on this international norm, but when the civilian status is unclear, the deaths are added to the higher IBC number but not to the lower one (Iraq Body Count Methods). In the ongoing Afghanistan War, the UN excludes the number of victims when their civilian status is uncertain (UN Assistance Mission in Afghanistan 2013).

Table 2-1: Descriptive Statistics of War-related Deaths during the Iraq War (2004-2009)

Data sources	Pentagon Dataset				IBC Dataset	
Categories	Civilian	Host Nation	Enemy	Civilian + Host Nation	Minimum	Maximum
Number of Deaths	66,081	15,196	23,984	81,277	85,132	92,027
Number of Deaths in Baghdad (% in total)	36,998 (56%)	5,090 (33%)	6,526 (27%)	42,088 (52%)	46,019 (54%)	49,683 (54%)
Number of Incidents*	34,009	8064	9,417	42,073	21,865[119]	22,108[120]
Deaths per Incident	1.94	1.88	2.55	1.93	3.89	4.16
Monthly Average Deaths	944.01	217.09	342.63	1161.10	1216.17	1314.67
95% Confidence Interval of Monthly Average Deaths	711.33 to 1176.70	180.85 to 253.32	268.72 to 416.54	894.90 to 1427.30	1031.36 to 1400.99	1117.05 to 1512.30
Standard Deviation	975.84	151.95	309.97	1116.43	775.10	828.82
Median	483.5	167.5	283	674	987.5	1064.5
Minimum (month)	95 (Nov 2009)	26 (Jan 2004)	6 (Aug 2004)	127 (Nov 2009)	176 (Nov 2009)	207 (Nov 2009)
Maximum (month)	3784 (Dec 2006)	666 (Oct 2006)	1619 (Dec 2009)	4334 (Dec 2006)	2972 (Jul 2006)	3184 (Jul 2006)
Period of Interest	Year 2004 to 2009 (except May 2004 and March 2009, 70 months)					

** The incidents indicate violent events involving at least 1 death.*

[119] The number of incidents includes 3 events that span the period before 2004.
[120] The number of incidents includes 3 events that span the period before 2004.

Table 2-2: War-related Deaths across Governorates during the Iraq War

Order	Pentagon Civilian				IBC Minimum				Pentagon Host Nation			Pentagon Enemy		
	Governorate	Deaths	%	Per 1000**	Governorate	Deaths	%	Per 1000**	Governorate	Deaths	%	Governorate	Deaths	%
1	Baghdad	36998	55.99	1.410	Baghdad	46019	54.06	1.754	Baghdad	5090	33.50	Anbar	6602	27.53
2	Diyala	7142	10.81	0.272	Diyala	8941	10.50	0.341	Ninewa	2520	16.58	Baghdad	6526	27.21
3	Ninewa	6009	9.09	0.229	Ninewa	7085	8.32	0.270	Diyala	2315	15.23	Diyala	3211	13.39
4	Salah al-Din	3197	4.84	0.122	Anbar	5864	6.89	0.224	Salah al-Din	1547	10.18	Ninewa	2615	10.90
5	Basrah	2635	3.99	0.100	Salah al-Din	4368	5.13	0.166	Anbar	1153	7.59	Salah al-Din	1760	7.34
6	Babylon	2251	3.41	0.086	Babylon	2860	3.36	0.109	Kirkuk	768	5.05	Najaf	1064	4.44
7	Anbar	2191	3.32	0.084	Basrah	2635	3.10	0.100	Babylon	472	3.11	Basrah	467	1.95
8	Kirkuk	1780	2.69	0.068	Kirkuk	2502	2.94	0.095	Basrah	366	2.41	Babylon	417	1.74
9	Wassit	887	1.34	0.034	Wassit	1737	2.04	0.066	Wassit	245	1.61	Kirkuk	394	1.64
10	Kerbala	819	1.24	0.031	Kerbala	1212	1.42	0.046	Qadissiya	242	1.59	Wassit	265	1.10
11	Qadissiya	468	0.71	0.018	Najaf	527	0.62	0.020	Thi-qar	105	0.69	Qadissiya	160	0.67
12	Najaf	335	0.51	0.013	Qadissiya	441	0.52	0.017	Erbil	66	0.43	Thi-qar	142	0.59
13	Thi-qar	280	0.42	0.011	Erbil	296	0.35	0.011	Kerbala	62	0.41	Kerbala	120	0.50
14	Erbil	235	0.36	0.009	Missan	245	0.29	0.009	Najaf	50	0.33	Missan	51	0.21
15	Missan	135	0.20	0.005	Thi-qar	201	0.24	0.008	Missan	41	0.27	Erbil	28	0.12
16	Sulaymaniyah	125	0.19	0.005	Muthanna	75	0.09	0.003	Sulaymaniyah	36	0.24	Muthanna	14	0.06
17	Muthanna	64	0.10	0.002	Sulaymaniyah	71	0.08	0.003	Muthanna	24	0.16	Sulaymaniyah	8	0.03
18	Dahuk	40	0.06	0.002	Dahuk	25	0.03	0.001	Dahuk	4	0.03	Dahuk	5	0.02
	Others*	490	0.74		Others*	28	0.03		Others*	90	0.59	Others*	135	0.56
Sum		66081	100			85132	100			15196	100		23984	100

**Note: Deaths recorded in IBC's Maximum are presented in Table 2-A-1 in appendix.*
Some deaths in the Pentagon dataset are categorised as 'others' when locations of incidents causing the deaths are not known.
Some deaths in the IBC dataset are also categorised as 'others' when the locations are not known, Furthermore deaths from incidents involving nation-widely attacks (i.e. air strike) or released by morgues in more than two governorates are also included in the 'others' category of the IBC dataset.
***Deaths scaled by 1000 in the population based on 2003 World Bank estimates (World Development Indicators).*

Table 2-3: War-related Deaths in Anbar Governorates during the Iraq War

District	Pentagon Civilian		IBC Minimum		Pentagon Host Nation		Pentagon Enemy	
	Deaths	%	Deaths	%	Deaths	%	Deaths	%
Falluja	782	35.7	3264	55.7	376	32.6	1907	28.9
Ramadi	681	31.1	1445	24.6	452	39.2	2944	44.6
Heet	285	13.0	211	3.6	134	11.6	265	4.0
Al-Rutba	141	6.4	87	1.5	38	3.3	76	1.2
Haditha	127	5.8	245	4.2	52	4.5	264	4.0
Al-Ka'im	122	5.6	392	6.7	65	5.6	1074	16.3
Ana	53	2.4	39	0.7	36	3.1	72	1.1
Unknown Places			181	3.1				
Anbar Governorate Total	2191	3.32% in Civilian total	5864	6.89% in Minimum total	1153	7.59% in Host Nation total	6602	27.53% in Enemy total

Table 2-4: Equality Test with the Pentagon and the IBC Dataset

Null Hypotheses	Monthly	Monthly without 2004	Governorate	District	Monthly- Governorate	Monthly- Governorate without 2004
Pentagon Civilian = IBC Minimum	-5.08** (.00)	-4.14** (.00)	-2.88** (.00)	-2.20* (.03)	-12.17** (.00)	-10.06** (.00)
Pentagon Civilian = IBC Maximum	-6.01** (.00)	-5.16** (.00)	-3.20** (.00)	-2.82** (.00)	-14.40** (.00)	-12.34** (.00)
Pentagon Civilian + Host Nation = IBC Minimum	-1.97* (.05)	-.55 (.58)	.20 (.84)	1.15 (.25)	.11 (.91)	1.90 (.06)
Pentagon Civilian + Host Nation = IBC Maximum	-3.47** (.00)	-2.23* (.03)	-1.33 (.18)	-.003 (.997)	-3.38** (.00)	-1.60 (.11)
Number of Observations	70	59	18	104	1260 (70 months*18 governorates)	1062 (70 months*104 districts)

Note: The figures are z statistics of Wilcoxon signed rank-sum test. P values in parentheses.
** Statistically significant at the 5% level*
*** Statistically significant at the 1% level*

Table 2-5: Most Lethal Incidents Involving More than 100 Deaths during the Iraq War

Date	Incident	Governorate	District	Minimum		Civilian			
				Killed	Injured	Killed	%*	Injured	%**
31-Aug-05	Stampede	Baghdad	Khadamiya	965	465	436	45%	114	25%
14-Aug-07	Suicide bombs	Ninewa	Sinjar	516	1500	299	58%	402	27%
23-Nov-06	Car bombs	Baghdad	Al Sadr	215	257	181	84%	247	96%
07-Jul-07	Suicide bombs	Salah al-Din	Tooz	159	270	170	107%	250	93%
27-Mar-07	Car bombs	Ninewa	Telafar	152	347	83	55%	140	40%
25-Oct-09	Suicide car bombs	Baghdad	Karkh	150	695	93	62%	641	92%
18-Apr-07	Car bombs and other methods	Baghdad	Al Resafa	140	150	115	82%	137	91%
03-Feb-07	Suicide car bombs	Baghdad	Al Resafa	136	320	105	77%	251	78%
28-Feb-05	Suicide car bombs	Babylon	Al-Musayab	135	124	166	123%	146	118%
19-Aug-09	Car bombs and other methods[121]	Baghdad	Unknown	130	1200	75	58%	749	62%
08-Dec-09	Car bombs[122]	Baghdad	Unknown	122	513	41	34%	90	18%
02-Mar-04	Suicide bombs	Kerbala	Kerbala	121	200	113	93%	233	117%
06-Mar-07	Suicide bombs	Babylon	Al-Musayab	118	200	93	79%	164	82%
14-Sep-05	Suicide car bombs	Baghdad	Khadamiya	111	156	75	68%	138	88%
01-Feb-04	Suicide bombs	Erbil	Erbil	107	247	65	61%	247	100%
08-Mar-08	Decomposed bodies found	Diyala	Al-Khalis	100	0				
18-Jul-08	Human remains found	Baghdad	Al Resafa			250		0	0

** Proportion to the deaths recorded in Minimum*
*** Proportion to the wounded recorded in Minimum*
Deaths from prolonged incidents (e.g. morgue public statements) were excluded. The table includes all the incidents that generated more than 100 deaths in Pentagon's Civilian.

[121] Two incidents recorded in Civilian; 14 and 61 deaths each
[122] Two incidents recorded in Civilian; 21 and 20 deaths each

Figure 2-1: Monthly War-related Deaths during the Iraq War (2004-2009)

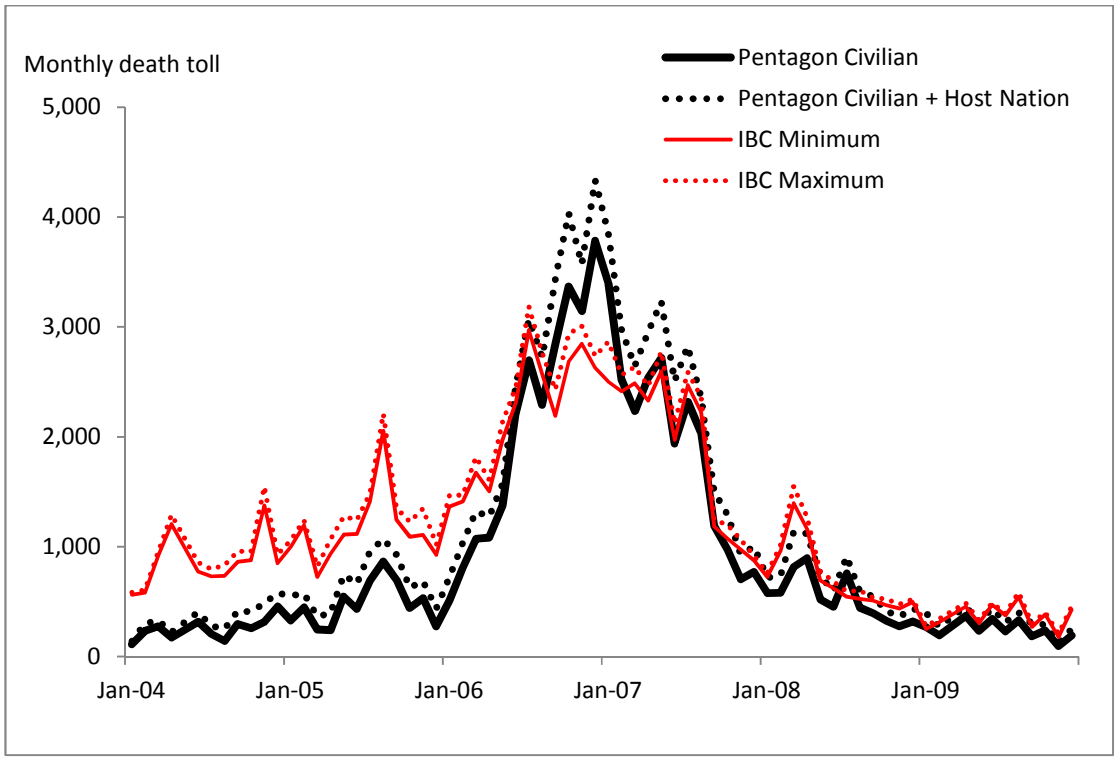


Figure 2-2: Differences in Monthly Deaths between the Pentagon and the IBC Dataset

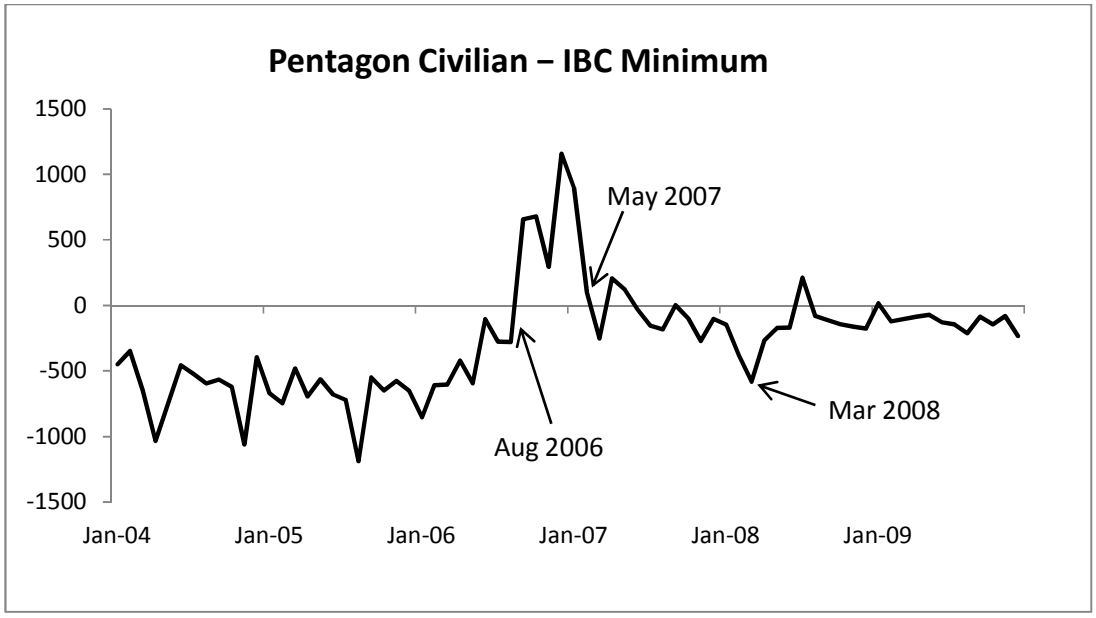


Figure 2-3: Monthly Deaths in Baghdad and the Rest of the Governorates during the Iraq War

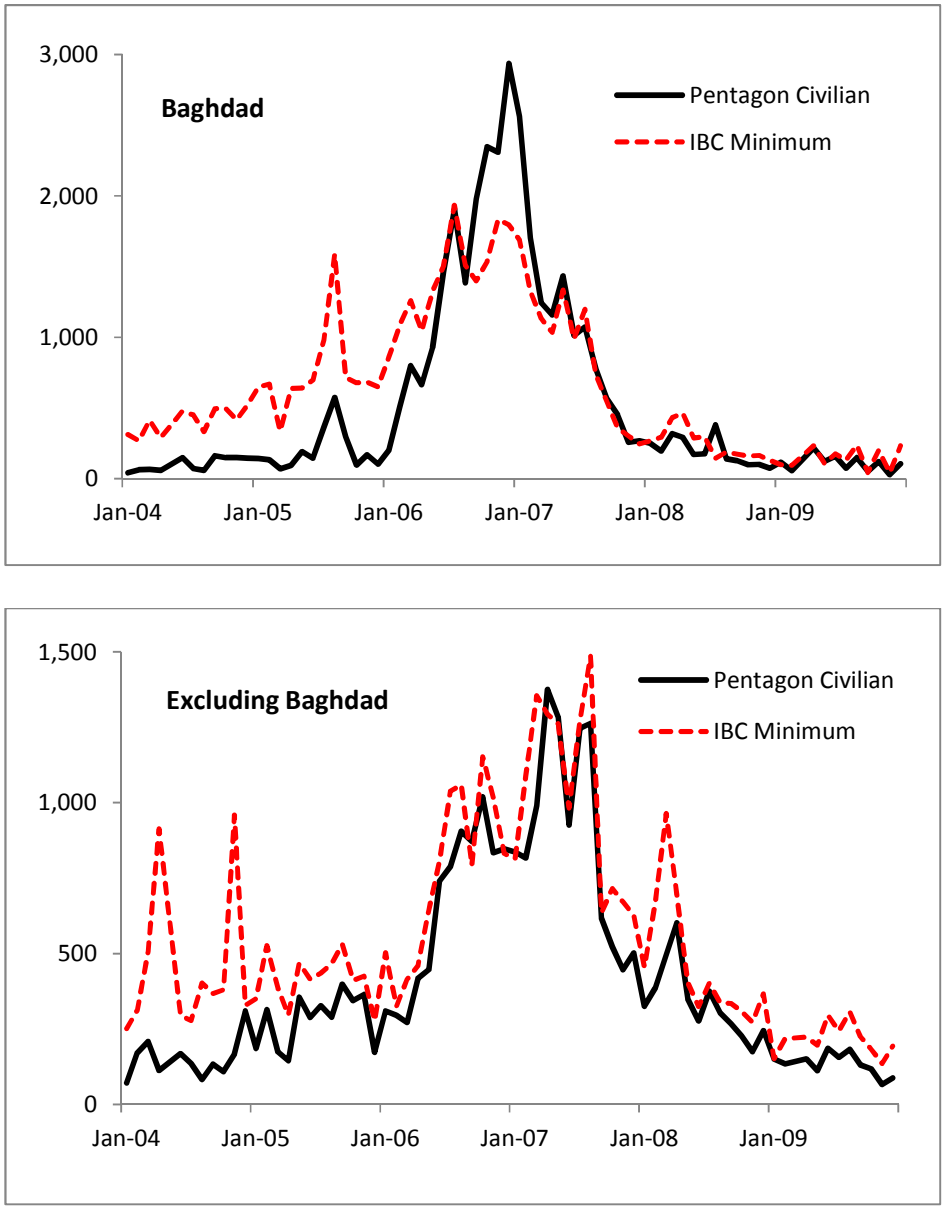


Figure 2-4: Civilian Deaths across 18 Iraqi Governorates during the Iraq War

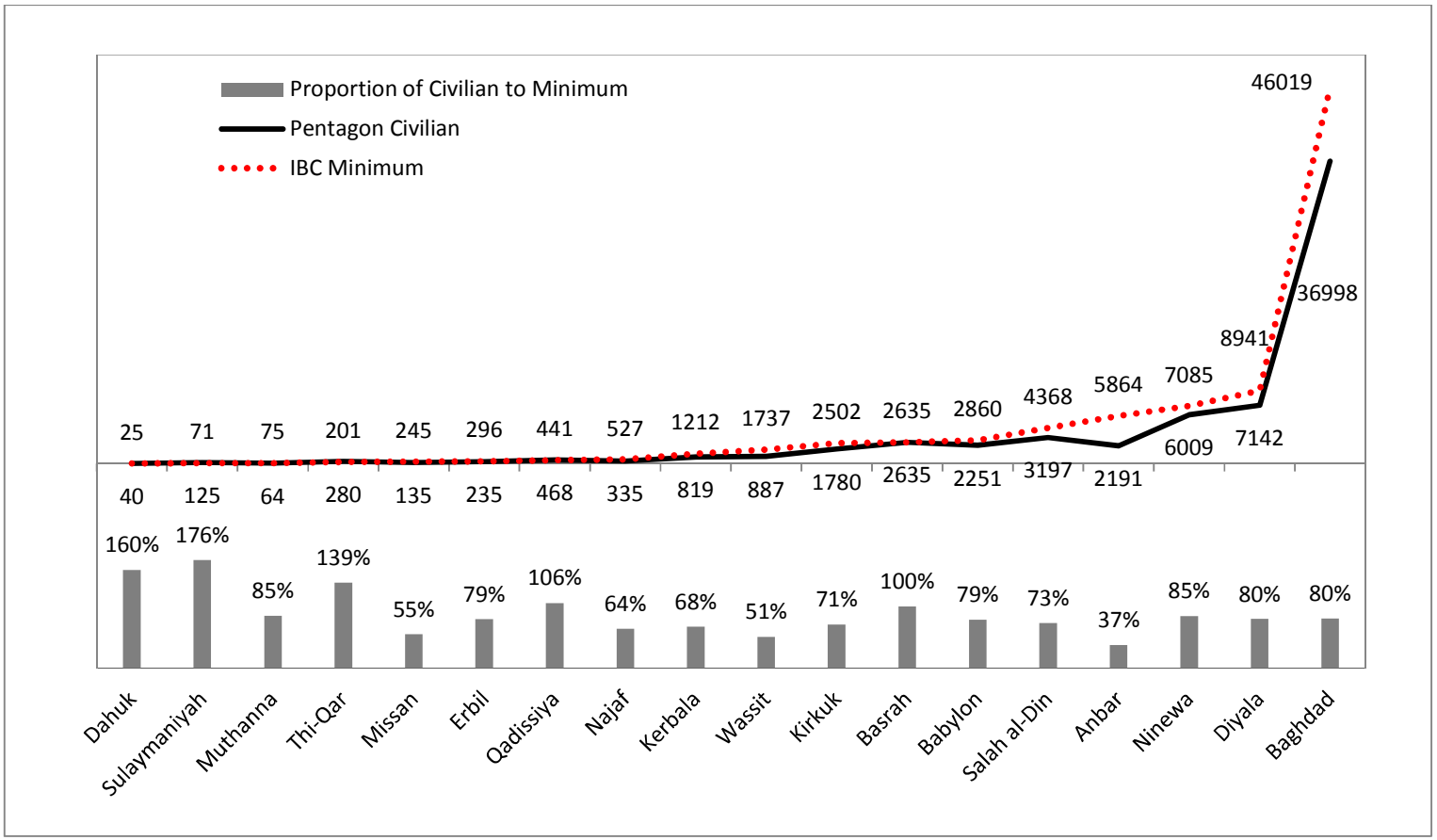


Figure 2-5: Monthly Deaths across Iraqi Governorates during the Iraq War

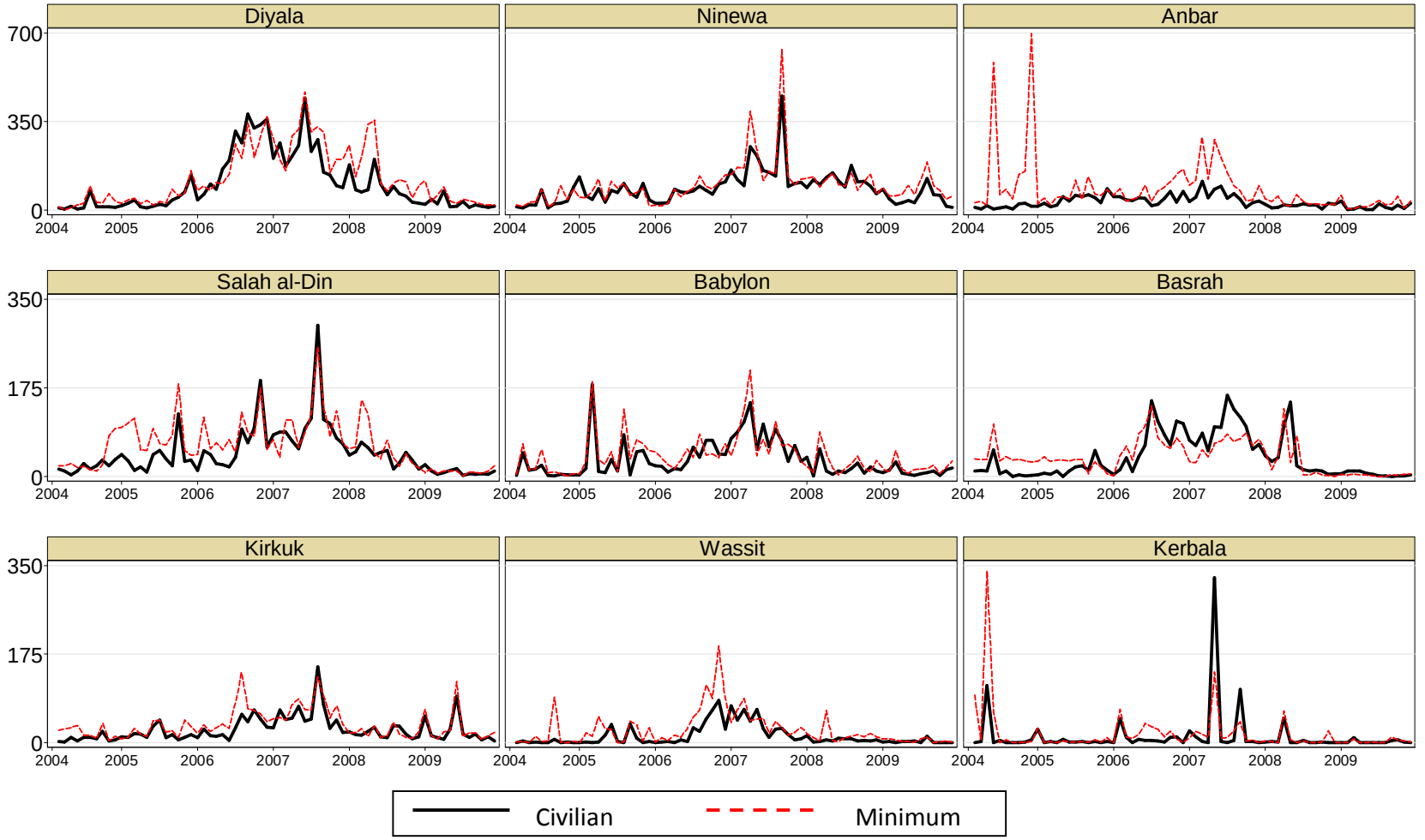


Figure 2-5 continued

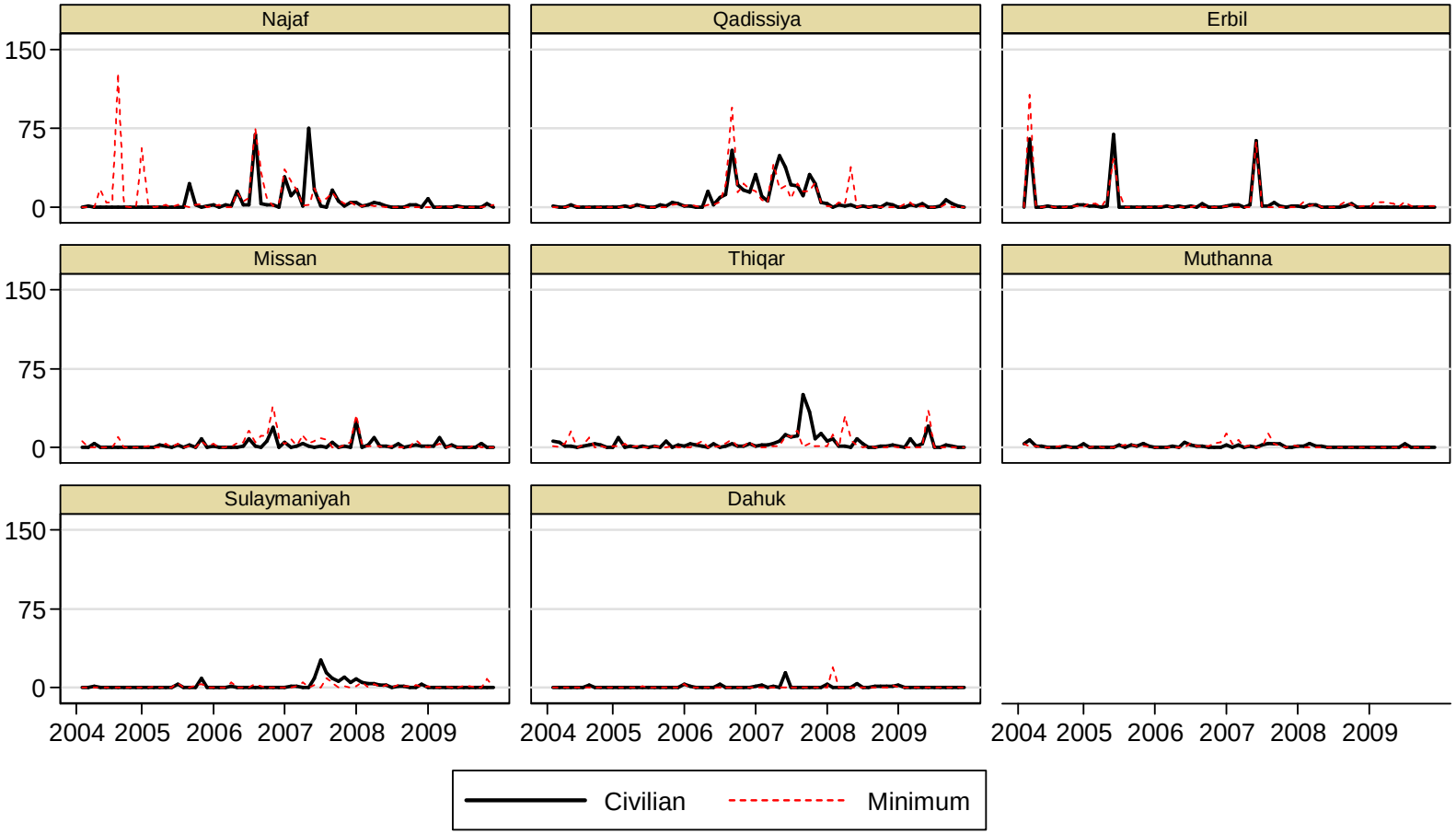


Figure 2-6: Monthly Deaths in Anbar Governorate and Falluja District during the Iraq War

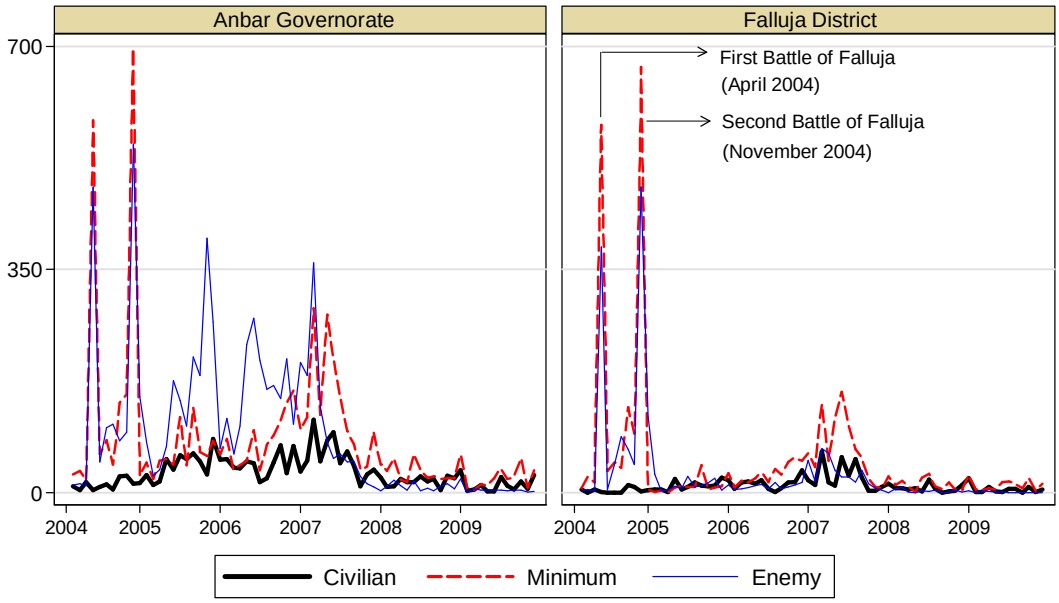


Figure 2-7: Monthly Deaths of Najaf Governorate and Najaf District during the Iraq War

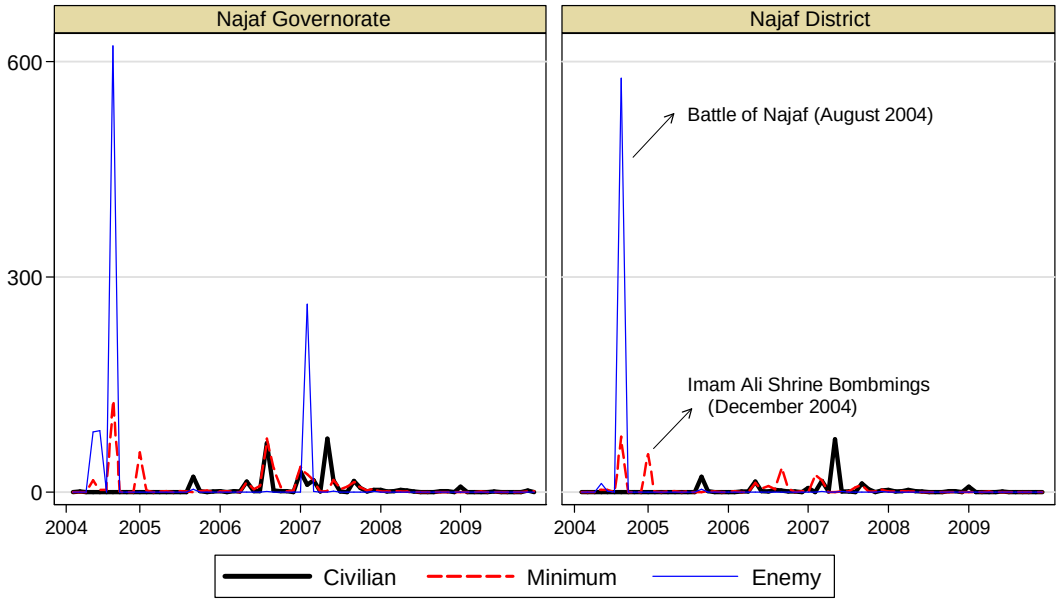


Figure 2-8: Monthly Deaths in Salah al-Din Governorate during the Iraq War

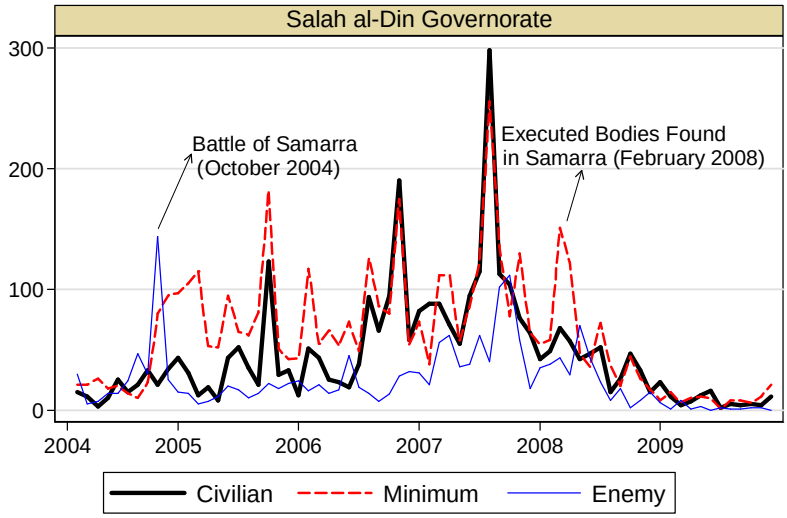


Figure 2-9: Monthly Deaths in Kerbala Governorate during the Iraq War

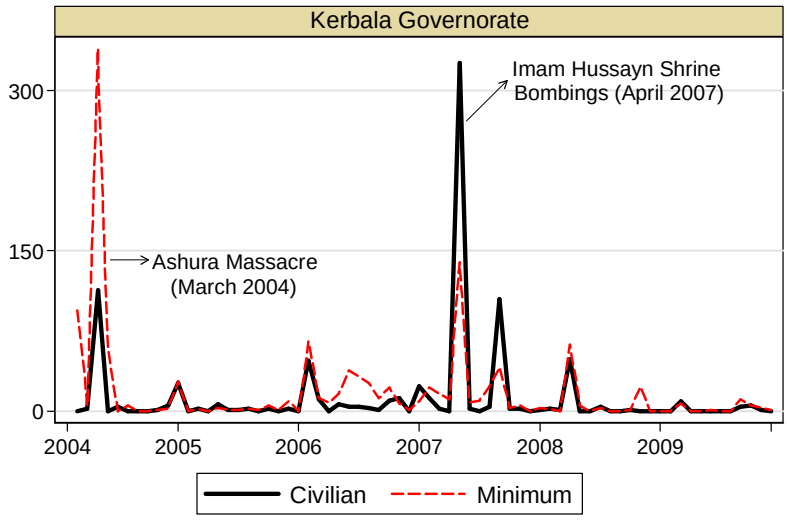


Figure 2-10: Monthly Deaths in Baghdad and Basrah Governorate during the Iraq War

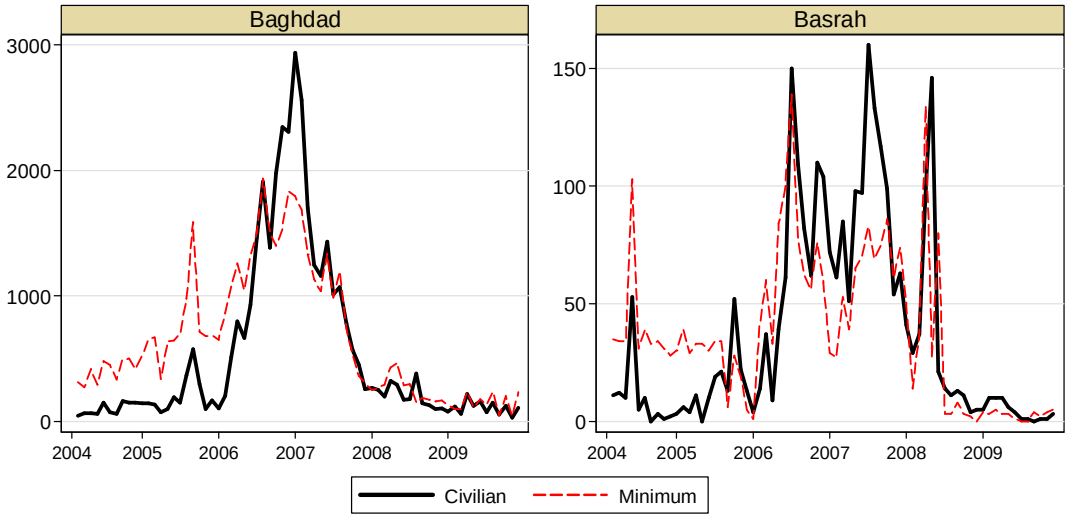
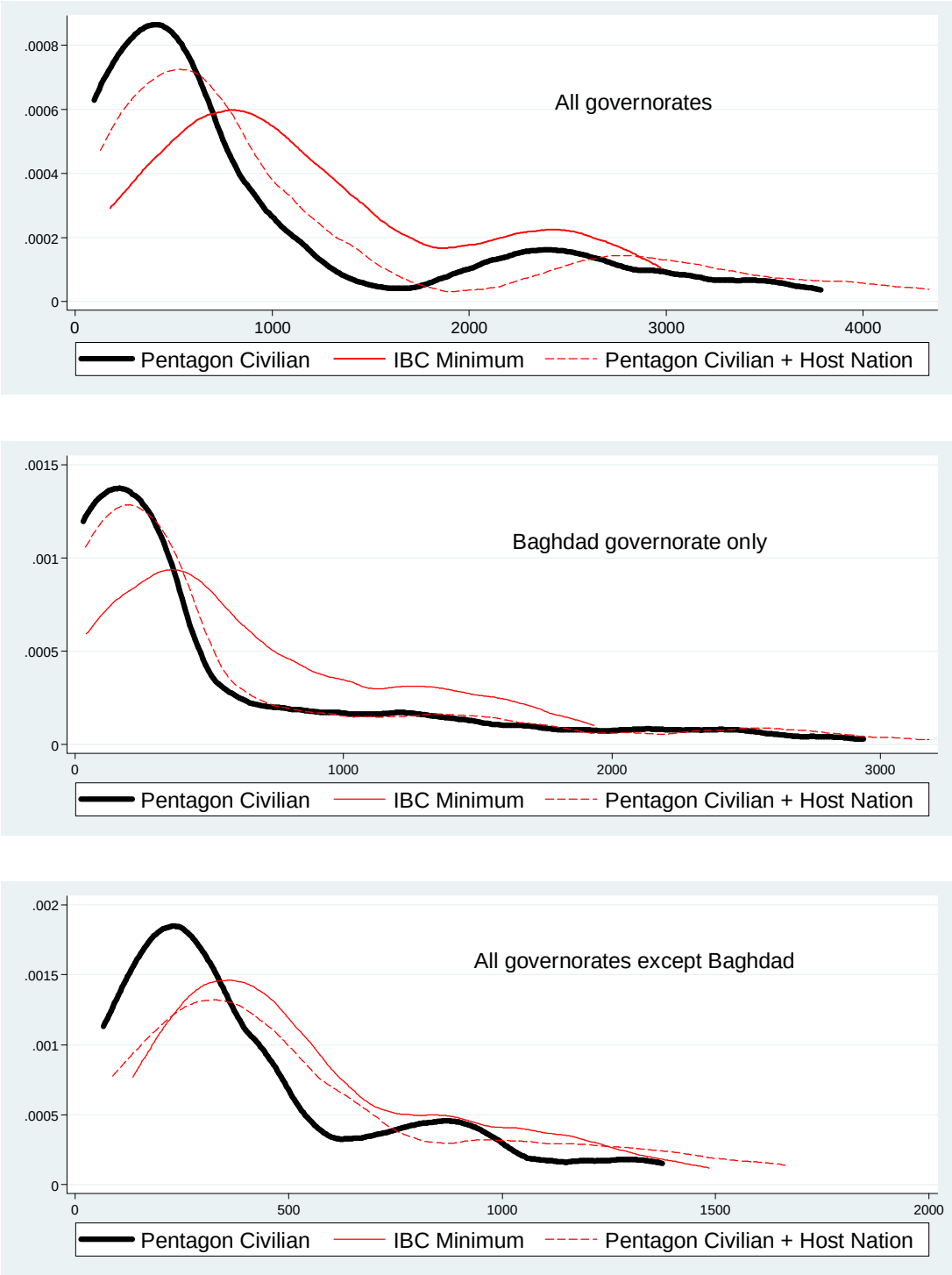


Figure 2-11: Distribution of Monthly Deaths during the Iraq War

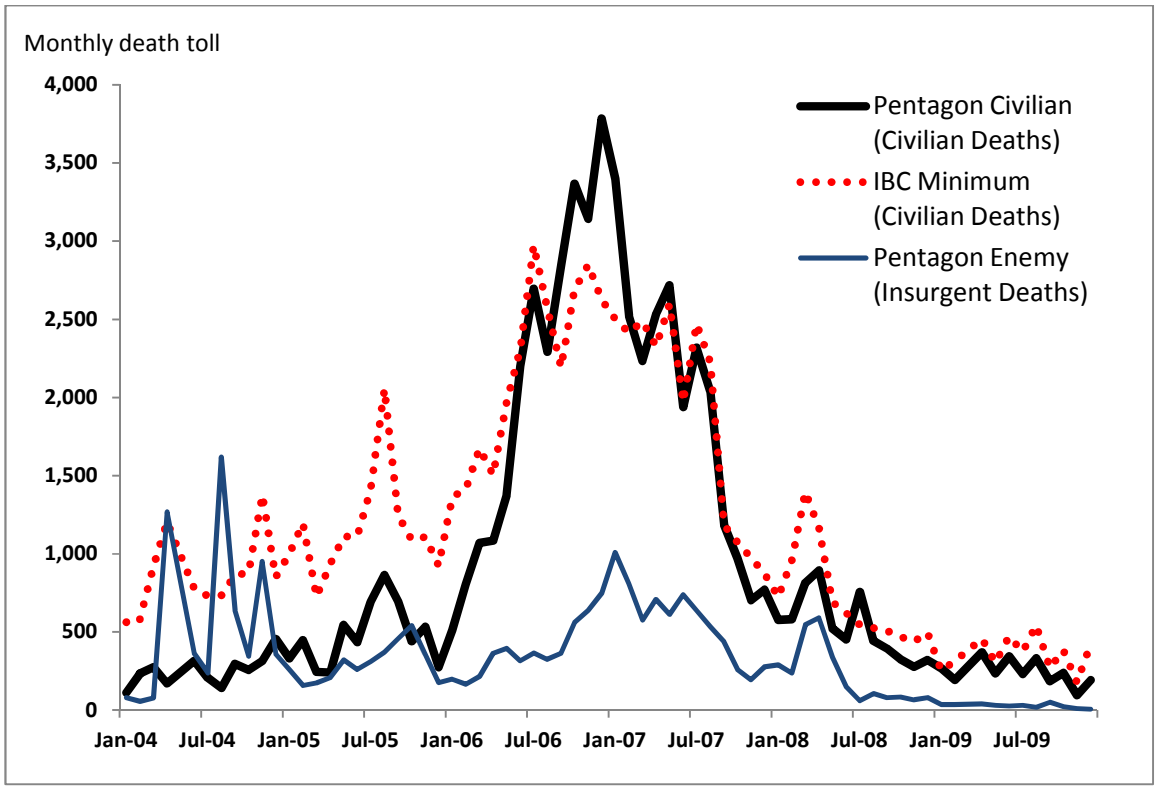


Appendix 2

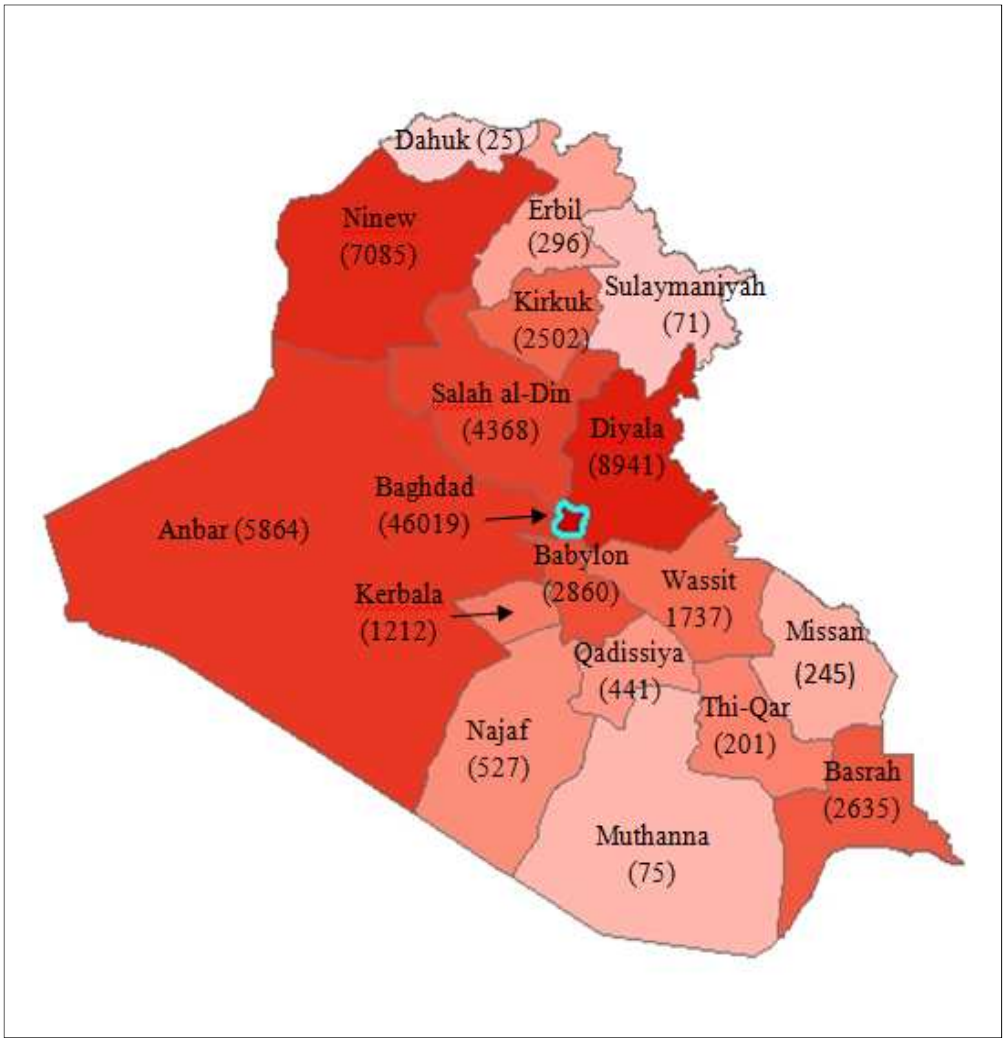
Table 2-A-1: War-related Civilian Deaths across 18 Iraqi Governorates during the Iraq War (2004-2009)

Order	IBC Minimum			IBC Maximum		
	Governorate	Deaths	%	Governorate	Deaths	%
1	Baghdad	46019	54.06	Baghdad	49683	53.99
2	Diyala	8941	10.50	Diyala	9616	10.45
3	Ninewa	7085	8.32	Ninewa	7442	8.09
4	Anbar	5864	6.89	Anbar	6519	7.08
5	Salah al-Din	4368	5.13	Salah al-Din	4684	5.09
6	Babylon	2860	3.36	Babylon	3031	3.29
7	Basrah	2635	3.10	Basrah	2936	3.19
8	Kirkuk	2502	2.94	Kirkuk	2654	2.88
9	Wassit	1737	2.04	Wassit	1800	1.96
10	Kerbala	1212	1.42	Kerbala	1314	1.43
11	Najaf	527	0.62	Najaf	863	0.94
12	Qadissiya	441	0.52	Qadissiya	460	0.50
13	Erbil	296	0.35	Erbil	326	0.35
14	Missan	245	0.29	Missan	263	0.29
15	Thi-qar	201	0.24	Thi-qar	212	0.23
16	Muthanna	75	0.09	Muthanna	84	0.09
17	Sulaymaniyah	71	0.08	Sulaymaniyah	82	0.09
18	Dahuk	25	0.03	Dahuk	25	0.03
	Others	28	0.03	Others	33	0.04
Sum		85132	100%		92027	100%

Figure 2-A-1: Monthly Civilian and Insurgent Deaths during the Iraq War



Map 2-A-1: Distribution of Violent Civilian Deaths across 18 Iraqi Governorates



Note: The number of civilian deaths recorded in the IBC lower bound (Minimum) in parentheses.
The Iraq map is based on the 'pre-2005' boundaries before the border of Baghdad changed.

Part II

Civilian Targeting in Armed Conflict

Chapter 3

Global Comparison of Warring Groups in 2002-2007: Fatalities from Targeting Civilians vs. Fighting Battles[123]

3.1. Introduction

Warring groups that compete to dominate the territory of a civilian population face contending behavioural options: target the population or battle the enemy. Studies of the intentional targeting of civilians in armed conflict have been limited primarily to datasets on conflicts that involve sovereign states (Downes 2008, Valentino, Huth, Croco 2006), and to studies of genocide or of mass killing defined as over 50,000 deaths over five years (Wayman 2010, Valentino, Huth, Balch-Lindsay 2004, Hultman 2007, Human Security Report Project 2010). More recently developed conflict datasets such as those of the Uppsala Conflict Data Program (UCDP) used in this chapter, have allowed more complete analyses of the behaviour of armed groups in war by encompassing combatant groups involved in low-to-high intensity armed conflicts and by including conflicts between non-state clans, rebel groups and rebel factions (Hultman 2007, Human Security Report Project 2010, Wood 2010).

Opportunities to increase the understanding of factors affecting civilian targeting can potentially be multiplied by coupling studies of civilian targeting by human actors with informative parallels across disciplines and in nature. For example, national security defences against terrorism have been informed by examining: competitive adaptation between predator and prey; relationships with symbiotic or pathogenic bacteria; and immune system defences against pathogens (Sagarin et al. 2010). Interdisciplinary studies have found the size, organisation, and timing of insurgency violence to show patterns similar to those in ecology and financial markets (Bohorquez et al. 2009, Johnson et al.

[123] This chapter was written in collaboration with three other researchers, and resulted in the academic publication: Hicks, M., Lee, U. Sundberg, R. and Spagat, M. (2011). "Global Comparison of Warring Groups in 2002–2007: Fatalities from Targeting Civilians vs. Fighting Battles" *PLoSONE*, 6 (9).

2006). In the case of civilian targeting, we consider the dynamics of warring groups and the civilian population to be potentially comparable to the dynamics of competing parasitic bacteria and the parasitised host organism or population as described in a number of recent studies (Gardner, West and Buckling 2004, West and Gardner 2010, Inglis and Gardner 2010, Hawlena et al. 2010, Vigneux et al. 2008, Massey, Buckling and Ffrench-Constant 2004). A civilian population in war can be considered analogous to a parasitised host in that it possesses a finite resource (i.e. the disputed territory) that warring groups are competing to dominate and use. Warring groups can be considered analogous to competing parasitic bacteria in that both can focus their limited resources either on attacking the competitor or on attacking the host or civilian population. In this chapter, we will discuss our study and its findings in the context of research from the fields of biological sciences, social sciences, and conflict studies, drawing on parallels between the dynamics of cooperation, organisation, and violent competition found in nature and dynamics of human armed conflict.

Intentional targeting of civilians is a typologically important strategy for warring actors to secure contested territory or resources. In particular, certain characteristics of war and its participants are more likely to result in the intentional targeting of civilians. In an asymmetric conflict such as guerrilla war, incumbent governments target a civilian population to scale down guerrilla forces' capacity as they often count on the local population for logistic support. On the other hand, guerrilla armies also have strong incentives to target civilians to prevent them from cooperating with the incumbent or to threaten them to draw further support (Valentino, Huth and Balch-Lindsay 2004). Furthermore, internal characteristics of insurgent groups such as a loose control over their members better explain civilian victimisation (Humphreys and Weinstein 2006). In addition, armed conflict rooted in ethnic discrimination occasionally coincides with a systematic sexual abuse as observed in Darfur in Sudan and in Bosnia during the recent decades (Wood 2006, Olsson and Siba 2009).[124]

[124] The paragraph is added after the chapter has been published. More detailed discussion as to purposes of civilian targeting along the economic and geopolitical dimensions can be found in Chapter 4 of this dissertation.

Typically, studies of armed conflict report findings in terms of absolute numbers of casualties (e.g. counts of civilian fatalities from targeting). However, systematic analysis of the proportional effects of weapons and perpetrators on civilians is being increasingly used to expand the scope and interpretation of conflict casualty findings, with direct implications for human rights, public health, and civilian-protective policies in armed conflict (Coupland and Meddings 1999, Coupland 2001, Taback and Coupland 2005, Hicks and Spagat 2008, Hicks et al 2009, Hicks et al. 2011, Cameron, Spagat and Hicks 2009). For example, studies of a single conflict (i.e. Iraq War) have measured the proportions of women and children among civilian fatalities to identify relatively indiscriminate effects from perpetrators' use of various weapons (Hicks et al 2009, Hicks et al. 2011a), and to identify varying effects of civilian targeting by perpetrators using different forms of armed violence (Hicks et al. 2011a). For studies of combatant groups across armed conflicts on an international scale, a common problem is that combatant groups are typically aggregated together at the country level, or into 'government' versus 'challenger', despite the fact that many conflicts involve multiple warring parties (Shellman, Hatfield and Mills 2010). The disaggregation of findings to particular combatant groups, as in this chapter, allows examination of tactics employed at the group-specific level that could otherwise be obscured by dynamics at the conflict level (Shellman, Hatfield and Mills 2010, Hultman 2007).

Our aim in this chapter was to describe degrees to which combatant groups in contemporary human warfare concentrated lethal behaviour into the direct, intentional targeting of civilians as opposed to battling armed opponents. To do this, we analysed the universe of all 226 formally organised combatant groups that used lethal armed force during the calendar years 2002 to 2007. For brevity, we hereafter use the term 'actor' to describe a formally organised group that was actively involved in an armed conflict that resulted in at least 25 fatalities from armed violence in a year (a threshold that includes low-to-high intensity armed conflicts).

Our study contributes new information to the field of armed conflict studies in the following ways: First, we integrated three datasets so that all state (i.e. government) actors

and all non-state (i.e. rebel or clan) actors in armed conflicts globally could be analysed for fatalities they caused by targeting civilians and for fatalities from battles in which they were involved. Ours is one of few studies (Wood 2010, Hultman 2007) that statistically examines relationships between fatalities from civilian targeting and fatalities from battles. Second, we measure fatalities from civilian targeting as a proportion of total direct fatalities from armed conflict. To do this, we use the *Civilian Targeting Index* (CTI), a proportional measure that we introduce in this chapter for efficient measurement and communication of degrees to which actors in armed conflict concentrate lethal behaviour into the direct, intentional targeting of civilians as opposed to battling armed opponents. Civilian targeting has been prohibited by formalised social norms on a global scale since the 1949 Fourth Geneva Convention, and by subsequent Associated Protocols I and II (Hicks and Spagat 2008, International Committee of the Red Cross 2010), making CTI outcomes relevant to international humanitarian law and to studies of social aggression and transgression. Third, our data-based attribution of civilian targeting to named, combatant groups uses a consistent methodology to identify the degree to which specific actors exercised restraint vs. committed civilian targeting. Fourth, we analyse the universe of actors participating in a recent period of armed conflict to reveal larger patterns of lethal behaviour in armed competition, specifically in regard to civilian targeting, in real-world environments of contemporary warfare. This addresses an identified need for more studies to use empirical data from real societies and natural settings to complement studies of competition, cooperation and conflict based on theoretical and laboratory modelling (West, Griffin and Gardner 2007a, Rockenback and Milinski 2009).

3.2. Data Summary and Regression Results

3.2.1. Civilian Targeting by Specific Actors

Using the Uppsala Conflict Data Program (UCDP), we identified all 226 formally organised armed actors participating in international or civil armed conflicts in 2002-2007: 43 state actors and 183 non-state actors. Our findings for specific actors are shown in Figure 3-1 and Table 3-A-1 in appendix. The x axis of Figure 3-1 shows ‘total fatalities

associated with an actor' (on logarithmic scale), calculated as the number of civilians the actor killed by direct, intentional targeting plus the number of civilians and combatants killed in battles in which the actor was involved. The y axis of Figure 3-1 shows the degree to which an actor concentrated lethal behaviour into targeting civilians rather than battling opponents in terms of its Civilian Targeting Index. The Civilian Targeting Index (CTI) is the proportion of total fatalities that consists of civilians killed by the actor's intentional targeting (the proportion of total fatalities from battles in which the actor was involved is its reciprocal). In terms of global social norms formalised in laws of war, which are international humanitarian laws and customary standards that delineate the proper treatment of civilians in armed conflict (Hicks and Spagat 2008, International Committee of the Red Cross 2010),[125] the best possible CTI value is 0 and the worst possible CTI value is 100.

Actors whose CTI values were 100, meaning that 100% of associated fatalities were from their direct targeting of civilians, are found in the upper left quadrant of Figure 3-1. Our data indicate that actors with CTIs of 100 were all associated with cumulative total fatalities numbering fewer than 500 during the 2002-2007 time period. Nine percent (4/43) of state actors and 11% (21/183) of non-state actors used civilian targeting as their sole form of lethal behaviour in conflict (CTI = 100). Actors whose high rates of civilian targeting contributed to some of the bloodiest conflicts in 2002-2007 are found in the upper right quadrant of Figure 3-1. For example, the CTI of 96 generated by the non-state Front des Nationalistes et Intégrationnistes (FNI) in the Democratic Republic of the Congo indicates that 96% of fatalities associated with the FNI were unarmed civilians killed by intentional FNI targeting and 4% were combatants or civilians killed in battles between the FNI and an armed opponent. Another non-state group, the Janjaweed, had a CTI of 93: 93% of its associated fatalities were unarmed civilians killed by Janjaweed targeting and 7% were combatants or civilians killed in battles between the Janjaweed and an armed opponent. The state actor Sudan had a CTI of 37 indicating that over one-third of the 14,145 direct fatalities associated with Sudan's government during 2002-2007 were unarmed civilians killed by the government's direct, intentional targeting.

[125] The Geneva Conventions is one of the examples.

The overall mean CTI for all 226 actors was 18 (95% CI: 13 to 22). Mean CTIs for all state actors (N=43) and all non-state actors (N=183) did not differ significantly (Mean state CTI=19, 95% CI 10 to 29. Mean non-state CTI=17, 95% CI 12 to 22). Mean CTIs by region did not differ significantly, as suggested by the heavily overlapping 95% CIs shown in Table 3-1. The regions that had the greatest numbers of actors in armed conflict were Sub-Saharan Africa (N=105: 17 state and 88 non-state) and Asia (N=62: 11 state and 51 non-state).

3.2.2. Crossing the Line: Whether Actors Used Restraint or Targeted Civilians

Overall, 61% of actors (138/226, 95% CI 55% to 67%) refrained from killing civilians through intentional direct targeting (CTI=0) and 39% (88/226, 95% CI 33% to 45%) carried out some degree of civilian targeting (CTI>0) during 2002-2007. We used bivariate analysis followed by multivariate analysis of the following variables available in the UCDP datasets of this chapter to examine for factors associated with actors that used civilian targeting as opposed to restraint: type of actor (state or non-state); scale of armed conflict (in terms of total number of direct associated fatalities); duration of conflict in years; and region of actor.

We first explored relationships between civilian targeting and explanatory variables using bivariate analysis. In absolute numbers, more non-state actors than state actors carried out civilian targeting (64 vs. 24, respectively, with CTI>0). However, a higher proportion of state actors carried out civilian targeting than non-state actors: 56% (24/43) of state actors targeted civilians compared to 35% (64/183) of non-state actors. We considered it possible that the association of state actors with a higher likelihood of targeting civilians was confounded by state involvement in conflicts of greater scale, if scale itself was a factor in whether or not actors targeted civilians, because state actors were associated with a greater mean number of total associated fatalities than non-state actors (State mean=2,809; 95% CI 1,495 to 4,123. Non-state mean=708; 95% CI 452 to 963). Table 3-2 shows the distribution of state and non-state actors across varying ranges of total associated fatalities: The largest proportion of state actors (42%, 18/43) was associated with 1,000-4,999 total direct fatalities and the largest proportion of non-state actors (42%, 76/183) was associated

with less than 100 total direct fatalities. We also considered it possible that the association of state actors with a higher likelihood of targeting civilians was confounded by state involvement in conflicts of greater duration, if duration was a factor in whether or not actors targeted civilians. For example, proportionally more state actors than non-state actors were engaged in armed conflict for a total of six years: 11/43 (26%) of state actors vs. 17/183 (9%) of non-state actors. Table 3-3 shows the distribution of actors across different durations of armed conflict. Among the total of 226 actors, 47% participated in armed conflict for one year or less, and 13% participated in armed conflict for the full six years of the study. Regional distributions of actors with no civilian targeting (CTI=0) and civilian targeting (CTI>0) are shown in Table 3-1. The region that had the greatest number of actors that targeted civilians was Sub-Saharan Africa (N=36). However, the proportion of actors that targeted civilians in Sub-Saharan Africa (36/105, 34%) did not differ significantly from proportions of actors of other regions that targeted civilians at the 5% level of significance.

We then carried out multivariate analysis to analyse for independent contributions to the binary actor outcome of restraint from targeting civilians (CTI=0) vs. targeting civilians (CTI>0) using combinations of the following explanatory variables: total number of fatalities associated with the actor in 2002-2007 (indicating scale of armed conflict in which the actor was involved); dummy variables for duration of conflict in years (e.g. the variable '2 years' is coded 1 if the actor was involved in conflict for 2 years, 0 otherwise); dummy variables for region of actor; and the dummy variable 'state' (equals 1 if state, 0 if non-state). Table 3-4 shows our logistic regression results. Values in the columns indicate the odds ratio of each explanatory variable. If the odds ratio is greater than 1, the effect on the dependent variable is positive. If the odds ratio is between 0 and 1, the effect on the dependent variable is negative. When duration of conflict dummies were absent (column 1 and 4), the variable for total fatalities was statistically significant, indicating that additional fatalities were associated with increased odds of an actor having targeted civilians. However, with the addition of duration of conflict dummies (column 2, 3, 5 and 6), the effect of total fatalities became insignificant, with significance dropping from the 99.9% confidence level to the 90% confidence level, while coefficients for the duration of conflict had a positive, significant effect on the odds that an actor targeted civilians at some point

during armed conflict. For example, in column 2, the odds that an actor targeted civilians was 3.16 times higher ((3.16-1)x100=216%) for an actor involved in 3 years of conflict than for an actor involved in one year of conflict (the comparator duration). The odds that an actor targeted civilians at some point was 7.92 times higher ((7.92-1)x100=692%) for an actor involved in 4 years of conflict than for an actor involved in one year of conflict. The significant effect of conflict duration in these models may be because most actors in the one-year duration group (79%, 84/107) had a CTI of 0. The state vs. non-state dummy and the regional dummies never approached statistical significance in these models, suggesting that these actor characteristics had no effect on whether or not actors targeted civilians when other factors were taken into account.

In summary, the majority of warring groups (61%, 95% CI 55% to 67%) refrained from intentional, direct civilian targeting during the period of our study. When possible contributors to civilian targeting were examined together in multivariate analysis, a group's involvement in armed conflict for three years or more was associated with an increase in its likelihood of having targeted civilians at some point. These findings do not, however, provide information on factors that may have affected *how much* civilian targeting was carried out by armed groups once they targeted civilians.

3.2.3. Once the Line is Crossed: Intensity of Civilian Targeting

We examined degrees of civilian targeting by the 88 actors that targeted civilians during 2002-2007, and factors that may have affected how much these actors concentrated lethal force onto targeting civilians as opposed to battling opponents. The mean CTI for all 88 actors that targeted civilians (CTI>0) was 45 (95% CI 37 to 54). There was no statistically significant difference between the mean CTIs of state actors that targeted civilians (N=24) and non-state actors that targeted civilians (N=64) (State mean CTI = 35, 95% CI 20 to 49. Non-state mean CTI = 49, 95% CI 39 to 60, p=0.12). Regional analysis of mean CTIs for actors that targeted civilians showed no statistically significant difference by region, as suggested by the overlapping 95% CIs shown in Table 3-5.

We fit ordinary least squares linear regressions to actors that targeted civilians to examine whether proportionate levels of civilian targeting (i.e. concentration on civilian targeting) changed with total numbers of associated war fatalities. The total fatalities associated with an actor consisted of civilian fatalities from the actor's direct, deliberate targeting plus civilian and combatant fatalities from battles in which the actor was involved.

A linear regression for all 88 actors that targeted civilians showed a statistically significant correlation for actors associated with greater total numbers of fatalities (i.e. involved in a greater scale of armed conflict) to have caused lower proportions of these fatalities by civilian targeting, with a slope coefficient of -39.1 (95% CI -46.1 to -32.2, t=-11.2, $p < 0.001$). We fit separate linear regressions, shown in Figure 3-1, to state actors and non-state actors that carried out civilian targeting to determine whether they differed in relationships between their degree of civilian targeting and their total associated fatalities. The 24 state actors that targeted civilians had a statistically significant slope coefficient of -35.8 (95% CI -47.0 to -24.5, t=-6.6, $p<0.001$). The 64 non-state actors that targeted civilians had a statistically significant slope coefficient of -40.2 (95% CI -49.3 to -31.2, t=-8.9, $p < 0.001$). The difference between the slope coefficients of state actors and non-state actors was not statistically significant, indicating that among actors that targeted civilians, state and non-state actors shared the same quantified dynamic for causing decreasing proportions of civilian-targeted fatalities as they were involved in increasing scales of total armed conflict fatalities. To put it another way, actors that were associated with lower numbers of battle fatalities tended to focus a greater proportion of their lethal behaviour onto targeting civilians, with no difference between rebel and government actors.

We then tested whether the finding of decreased concentration on civilian targeting by actors involved in greater scales of conflict held when other explanatory variables were added. Simple linear regressions for the explanatory variable of the log of total fatalities are shown in column 1 (for all actors with CTI>0), column 5 (for state actors with CTI>0), and column 8 (for non-state actors with CTI>0) of Table 3-6. Table 3-6 also shows the effect of adding combinations of the following independent variables in ordinary least squares multiple regressions: dummy variables for duration of conflict in years; dummy variables

for region of actor; and the dummy variable 'state' (equals 1 if state, 0 if non-state). Inclusion of the dummy variables did not improve the goodness of fit of the regression model, as seen by the adjusted r-square values. In all specifications for actors that carried out some degree of civilian targeting, the intensity of civilian targeting was unaffected by actors' region or by actors being state vs. non-state. In specifications for all actors that carried out civilian targeting, duration of conflict in years was a significant factor: actors involved in conflict for three or more years had lower CTI values than actors involved in conflict for one year (the comparator). This was because actors participating in one year of conflict tended to be involved with smaller total numbers of fatalities and to have higher CTI values than actors participating in longer periods of conflict. Finally, and importantly, although the magnitude of the coefficient of logged total fatalities was somewhat decreased when duration of conflict was accounted for, the effect of total fatalities on actors' CTI values remained robust, with a negative direction and high statistical significance.

3.2.4. Civilian Targeting by Actors in Prolonged Armed Conflict

We analysed civilian targeting by actors that were involved in prolonged armed conflict for the maximum duration covered by our dataset: six years. Figure 3-2 shows annual CTI values for the 29 actors in prolonged armed conflict. We included the U.S. because it was involved in armed conflict for six years in total: as a joint actor with the U.K. and Australia against Iraq in 2003, and as an individual actor during the five years of 2002 and 2004-2007 in Afghanistan, Iraq, Pakistan (involving U.S. drone attacks), and Saudi Arabia (in attacks on, and by, representatives of the U.S.). As shown in Figure 3-2, eight actors refrained from any intentional, direct targeting of civilians throughout prolonged conflict, maintaining a CTI of 0. Twenty-one actors targeted civilians in at least one of the six years.

We analysed for factors that influenced whether or not actors crossed the line into civilian targeting over the course of prolonged conflict. Because our data included actors' CTIs over a series of six years, we transformed the data into a panel structure for panel data analysis, which confers regression analysis with the capacity to examine cross-sectional data (e.g. on actors' behaviour) over time. Table 3-7 shows our random effect logit regressions for independent contributions to the binary dependent variable of an actor

targeting civilians (CTI>0), as opposed to exercising restraint from targeting civilians (CTI=0). We analysed using combinations of the following explanatory variables: 'year' to identify the time trend; total fatalities associated with the actor within the year (indicating scale of armed conflict within the year); dummy variables for region; and the dummy variable 'state' (equals 1 if state, 0 if non-state). We confirmed our random effect logit regression results using random effect probit regressions for robustness checks and confirmed that the direction and the significance of coefficients for each variable remained the same (available upon request).

Specification 1 to 3 of Table 3-7 show results for all 29 actors involved in prolonged armed conflict. Specification 1 is a simple regression model that contains the time variable (year) as a single explanatory variable. The odds ratio (.7595) implies that each additional year was associated with a decrease in the odds of targeting civilians of 24.05% ((1-.7595)*100=24.05%). For specification 2 and 3, we extended specification 1 by including total fatalities within the year, the 4 region dummies, and the state dummy. The following variables had no significant effect on whether an actor targeted civilians vs. exercised restraint: total fatalities within a year, the actor's region, or being a state vs. non-state actor. The time variable, however, remained significant. Holding all other factors fixed, each additional year was associated with a decrease in the odds of targeting civilians of about 24%. Specification 4 to 6 of Table 3-7 focus on the 21 actors in prolonged conflict that targeted civilians in at least one year: for these actors, the time effect continued to be robust, with similarly decreased odds of targeting civilians with each additional year. However, regional effects of actors from Sub-Saharan Africa and the Americas became significantly associated with increased odds of targeting civilians in this subgroup of actors.

We next analysed for factors that affected the degree to which actors in prolonged conflict targeted civilians. Figure 3-2 gives the impression that there was no prevailing pattern for increased or decreased civilian targeting over time. We used the random effects model of panel regression because Hausman test results (unreported) indicated that this was a consistent, more efficient model for our data. Table 3-8 shows panel regressions for relationships between the continuous, dependent variable of an actor's CTI and explanatory

variables of: the common log of total fatalities within a given year; time dummy variables D2003 to D2007 to identify a specific year effect (e.g. D2003 equals 1 if the observation is from 2003, 0 if otherwise); dummy variables for region; and the dummy variable 'state'. The only statistically significant variable was the SSA dummy, indicating that the CTI values of actors fighting prolonged conflicts in Sub-Saharan African countries were higher than those fighting prolonged conflicts in Europe (the comparator region). We found no statistically significant tendency for actors in prolonged conflict to increase or decrease their degree of civilian targeting over time, with total fatalities within a given year, or with state vs. non-state classification of the actor, even when actors that never targeted civilians were excluded from the analysis.

In summary, our findings on the 29 actors involved in prolonged conflict indicate that these actors were more likely to completely refrain from civilian targeting (i.e. to have CTI=0) in later years of conflict than in earlier years. However, their degree of concentration of lethal behaviour into targeting civilians as opposed to battling opponents (i.e. their actual CTI value) showed no overall pattern of decrease or increase over time, due to high variability in the behaviour of specific actors over the course of prolonged conflict.

3.3. Discussion

Our study shows the degree to which specific, formally organised actors in armed conflict concentrated their lethal behaviour into intentionally targeting civilians as opposed to engaging in battles during 2002-2007. We found four significant behavioural patterns in contemporary warfare. First, the majority (61%) of all formally organised actors in armed conflict during 2002-2007 refrained from killing civilians in deliberate, direct targeting. Compared to our finding, a study of actors in interstate wars during 1900-2003 found that just under half refrained from killing civilians in targeting (Valentino, Huth and Croco 2006). This study's methodology differed from ours by excluding actors in intrastate conflicts (e.g. civil wars), by including indirect (nonviolent) deaths and by requiring at least 1,000 fatalities per year for inclusion (we require at least 25 fatalities per year for inclusion).

We expect that if the study included low-intensity conflicts and intrastate conflicts involving non-state actors, the percentage of actors refraining from civilian targeting would be closer to ours, as we show (in Table 3-3) that state actors tend to be involved in conflicts of longer duration, which is itself associated with a greater likelihood of carrying out some degree of civilian targeting. This takes us to our next point.

Second, controlling for other variables, actors were more likely to have carried out some degree of civilian targeting, as opposed to none, if they participated in armed conflict for three or more years rather than for one year. In regard to this finding, we speculate that the longer the duration, the more likely that at least some combatants in an actor's armed forces will at some point carry out civilian targeting, which would move the actor from the 'restraint' (CTI=0) to the 'targeting' (CTI>0) category. Three possible reasons for an actor's movement from 'restraint' to 'targeting' categories include: i) The actor does not control troops adequately for complete enforcement of a culture of restraint from targeting civilians – complete enforcement requires an increasing expenditure of resources to prevent civilian targeting as the actor has more troops to control for a longer time; ii) The actor has a combat culture of disregard for civilians and expends no resources on preventing civilian targeting; and iii) The actor channels resources into a strategy of targeting civilians. Because of the multiple, in some cases nonspecific, factors that can contribute to an actor carrying out some degree of civilian targeting as opposed to none, use in quantitative conflict studies of a binary outcome of civilian targeting vs. no civilian targeting might not be highly productive in examining contributors to civilian targeting. However, because maintaining a CTI of 0 indicates ongoing resource expenditure, and a more specific, nonrandom element of choice, concentrating quantitative and qualitative research on actors that refrain from civilian targeting in war may identify promising avenues for increasing or supporting civilian-protective behaviour in war.

Our third main finding focuses on the actors that targeted civilians rather than maintaining restraint from civilian targeting. Once actors targeted civilians, what were the factors that affected the degree to which they concentrated lethal behaviour into intentionally targeting civilians? In both simple and multiple regressions, we found that

among actors that targeted civilians, those that engaged in greater scales of armed conflict concentrated less of their lethal behaviour into civilian targeting and more into involvement with battle fatalities. Conversely, those that engaged in lesser scales of armed conflict concentrated more of their lethal behaviour into civilian targeting and less into involvement with battle fatalities. Also, among actors that targeted civilians, those that were involved in conflict for total durations of three or more years concentrated less of their lethal behaviour into civilian targeting than those involved in conflict for one year or less. This was because the actors that targeted civilians during one year or less of conflict tended to be involved with smaller total numbers of fatalities and to have higher CTI values than actors participating in longer periods of conflict. These findings suggest that warring groups that targeted civilians during small-scale conflicts of brief duration tended to concentrate more of their lethal behaviour into targeting civilians than warring groups that targeted civilians during larger-scale conflicts of moderate or long duration.

Fourth, when factors of scale of conflict and duration of conflict were accounted for, an actor's likelihood and degree of targeting civilians was unaffected by whether it was a state or a non-state group. The absolute number of non-state (rebel) actors that targeted civilians (N=64) was higher than the number of state actors that targeted civilians (N=24) only because more non-state actors than state actors participated in armed conflict (183 vs. 43, respectively).

We also examined civilian targeting over the course of consecutive years in the subset of 29 actors that were involved in prolonged conflict of six years duration in 2002-2007. Controlling for other variables in panel data analysis to examine cross-sectional data on actors' CTIs over time, we found that actors in prolonged conflict were more likely to refrain from civilian targeting (with a CTI=0) in later years of conflict than in early years. Nevertheless, for actors in protracted conflict, their degree of concentration on targeting civilians as opposed to battling opponents (i.e. their actual CTI value) showed no overall pattern of decrease or increase over time, due to high variability in the behaviour of specific actors over the course of prolonged conflict. The only clear association was that CTI values for sub-Saharan African actors tended to be higher than for other regions. In earlier

analyses of all 226 actors, we analysed for the variable of 'total fatalities summed for all years of conflict'. This variable was not examined for association with actors' CTI values tracked over consecutive years of prolonged conflict, since it lacks the time-specific element. Our analyses for 'all actors' and for 'actors in prolonged conflict' examine different 'total fatality-time' dynamics. For actors in prolonged conflict we used the fatality measure of 'total fatalities within the given year'. There was no evidence for this subset of 29 actors in prolonged conflict that there was any association between high total fatalities within a given year of conflict and their CTI value for that year, although our failure to find this could be a consequence of small sample size and numerous explanatory variables. Analysis for longer, or different, periods of time than our study could show different results.

As our findings show, combatants' adherence to global social norms against targeting civilians can be quantified to identify the worst offenders in contemporary warfare, to show variance between actors, and to identify broad patterns of human behaviour in armed conflict. Civilian Targeting Index (CTI) outcomes that measure the proportional degree to which actors concentrate lethal behaviour into targeting civilians may be more informative than binary outcomes that indicate targeting vs. restraint for indicating probable cases of systematic, strategic civilian targeting. Actors whose total fatalities from armed conflict were caused in large part by their intentional targeting of civilians, as indicated by high CTI values in this chapter, can be considered more likely to have used civilian targeting as a deliberate, systematic strategy in armed conflict, especially if associated with high absolute numbers of fatalities (Hicks and Spagat 2008, Hicks et al. 2009).

Although we refer to a variety of studies across disciplines to discuss our findings, a particular, though rough, analogy can be made between a form of microbial warfare and our findings on human warfare. Many types of bacteria use chemical weapons when fighting in competition against other bacteria to parasitise a host, some releasing their bacteriocins (bacteriocidal toxins) by suicidal self-explosion to kill competitors (Gardner, West and Buckling 2004, West and Gardner 2010, Inglis et al. 2009, Hawlena et al. 2010, Vigneux et al. 2008, Massey, Buckling and Ffrench-Constant 2004). This is an example of 'spiteful behaviour' in nature, which is harmful to both the actor (e.g. the bacterial suicide attacker)

and the recipient (e.g. the targeted bacterial opponent) (Gardner, West and Buckling 2004, West and Gardner 2010, Inglis et al. 2009, Hawlena et al. 2010). A parasitic bacteria's harm to the host is 'selfish behaviour', being beneficial to the actor (e.g. the parasite) and harmful to the recipient (e.g. the weakened or killed host) (West and Gardner 2010). A civilian population in war is comparable to a parasitised host in that it possesses a finite resource - the disputed territory - that opposing actors are competing to dominate and use. Warring actors can attempt to shift the dynamics of this competition in their favour by focusing their energies onto controlling or eliminating the civilian population, or on controlling or eliminating their opponent, by lethal force. In addition to competing for territory, armed groups compete, sometimes using lethal coercion, to gain other resources of the civilian population: food, information, logistical support and political support. We believe that our study's finding that warring actors concentrate less on killing civilians if they are involved in more lethal battles against armed opponents is analogous to the decreasing virulence to host organisms found as competing parasitic bacteria kill each other more in direct battles using bacteriocins (Gardner, West and Buckling 2004, West and Gardner 2010, Inglis et al. 2009, Vigneux et al. 2008, Massey, Buckling and Ffrench-Constant 2004).

Cooperative behaviour exists at many levels in nature (West, Griffin and Gardner 2007a) and has been shown to be increased by enforcement through punishment, policing and sanctions in humans, meerkats, fish, social insects, bacteria and plants (West, Griffin and Gardner 2007a, Rockenback and Milinski 2009, Fehr and Gachter 2002, Fehr and Fischbacher 2004, West, Griffin and Gardner 2007b, Herrmann, Thoni and Gachter 2008). One of the best-known examples of cooperation in humans is warfare, in which soldiers place themselves at risk of injury or death in an activity that benefits others[126] (analogous to the 'spiteful' behaviour of bacteriocin-producing bacteria).[127] Once actors are at war, the exercise of restraint to comply with global social norms (e.g. laws of war) requires an additional level of cooperation. For example, in an asymmetric, irregularly-fought war in which Side A soldiers disguise themselves as civilians, a Side B soldier could likely

[126] Fehr and Gachter 2002, Herrmann, Thoni and Gachter 2008.
[127] Gardner, West and Buckling 2004, West and Gardner 2010, Inglis et al. 2009, Hawlena et al. 2010.

decrease his or her individual risk by killing all those encountered who look like civilians. Not only do Side B soldiers place themselves at risk by directly battling Side A soldiers, they accept additional risk when they do not target the civilian population that could include or support hidden Side A soldiers. In our study, it is probable that higher levels of cooperation, resources and maintenance of discipline (i.e. enforcement) were required to ensure that all soldiers of a combatant group refrained from targeting civilians to result in actors with CTIs of 0.

On a social level, it may be that actors that refrain from civilian targeting are responding to historically recent global social norms that prohibit the targeting of civilians, formalised in treaties and customary standards that constitute contemporary laws of war (Hicks and Spagat 2008, Slim 2007, Walzer 1977), whereas the regression lines in Figure 3-1 represent trends in lethal behaviour of actors that operate according to cost-benefit considerations in which cooperation with, or punishments against breaching, global norms against civilian targeting have, or are considered to have, little effect on the actor's success. It would be of interest to examine whether the percentage of actors that refrain from civilian targeting, and the regression slope for actors that carry out civilian targeting (Figure 3-1), are different for conflicts fought before and after the creation of international norms against civilian targeting such as the Geneva Conventions of 1949. Replication studies using comparable inclusion criteria and extending beyond our study's timeframe will be valuable to test our findings, as we only show actors' civilian targeting during 2002-2007, based on the UCDP data available at the time of our study.

The proportion of fatalities caused by civilian targeting may be affected by different factors and dynamics than those affecting the absolute number of civilians killed in targeting. For example, although studies of state actors have suggested that longer duration of conflict is associated with actors killing greater absolute numbers of civilians (Downes 2008, Valentino, Huth and Croco 2006), this is compatible with findings from our study, which differs by focusing on the *proportion* of total fatalities caused by civilian targeting in order to quantify an actor's concentration of its efforts into civilian targeting as opposed to engaging in battles. Absolute numbers of civilians killed by targeting can be calculated

from our data by applying the actor's CTI value (a proportion) to the total fatalities associated with the actor. However, we believe that a distinctive value of our study is its exposure of behavioural patterns of targeting civilians in war through a focus on proportional analyses.

Other studies in the fields of social sciences, natural sciences, and conflict studies suggest that the following additional variables will be important to examine in future research on the dynamics of groups' concentration on civilian targeting vs. battling opponents: regime type (Downes 2008, Hultman 2007, Wood 2010); spatial distribution (Gardner, West and Buckling 2004, Inglis et al. 2009, Massey, Buckling and Ffrench-Constant 2004); actors' reasons, costs and resources for war (Downes 2008, Valentino, Huth and Croco 2006, Wood 2010, Hultman 2007, Hultman 2009, Vargas 2009, Kalyvas 2006); degree of relatedness between opposing actors and between actors and civilians (Villarreal 2008, Gardner, West and Buckling 2004, West and Gardner 2010, Vigneux et al. 2008, Hultman 2009); and behaviour of the civilian population (Sagarin et al. 2010, Villarreal 2008, Kalyvas 2006). Civilian populations may tolerate or mount resistance against use of their resources or territory by warring actors and may do so in complex ways that vary with actors and their circumstances (Kalyvas 2006), similar to a parasitised host immune system interacting with, or reacting against, pathogens (Sagarin et al. 2010, Villarreal 2008).

Eck and Hultman (2007), who also use the UCDP one-sided violence dataset, find that the regime type of the country in which actors target civilians is associated with numbers of civilians killed by targeting, with higher numbers of targeted civilian fatalities in autocratic and democratic countries and lower numbers in semi-democracies. This pattern is driven by autocratic state actors killing greater numbers of civilians by targeting within their countries and by non-state actors killing greater numbers of civilians by targeting in democratic countries (Eck and Hultman 2007, Wood 2010). Findings from studies that are limited to mass killings and genocide (e.g. Wayman and Tago 2010, Valentino, Huth and Balch-Lindsay 2004); that exclude actors involved in non-state conflicts (e.g. Downes 2008, Huth and Balch-Lindsay 2004); that combine direct and

indirect deaths (e.g. Downes 2008, Huth and Balch-Lindsay 2004); or that combine civilian fatalities from both targeted and indiscriminate violence (e.g. Downes 2008) may be suggestive but are not directly applicable to this and other studies that examine direct, targeted fatalities from violence of low-to-high intensity involving all conflict actors (Eck and Hultman 2007, Human Security Report Project 2010, Wood 2010).

Actors' reasons, costs or resources for war can affect civilian targeting (Downes 2008, Valentino, Huth and Balch-Lindsay 2004, Wood 2010, Hultman 2007, Hultman 2009, Vargas 2009, Kalyvas 2006). Actors' resources in war can include numbers and effective capacity of soldiers; numbers and effective capacity of weapons; financial resources; political power; control of territory; and civilian support. The dynamics of civilian targeting can be affected by both absolute and relative resources of actors in a conflict. For example, Vargas (2009) finds empirical support from data on the Colombian civil war for his model predicting that an actor that comes into power kills more civilians in territories where its enemy is powerful, possibly to coerce a shift in civilian support. Vargas's study is one of many that address the proposal by Kalyvas (2006) that actors in civil wars target civilians as a group (which he calls 'indiscriminate' violence) more in territories that are controlled solidly by their opponent and that actors use personalised targeting of individual civilians (called 'selective' violence) more in territories where they have partial but not complete control, in order to shift civilian support from opponents.

Rather than focusing on where actors target civilians based on relative control over territory (Kalyvas 2006), Hultman (2007) focuses on when actors target civilians, and how many they kill, based on their strength relative to armed opponents on the battlefield. Her study of civilian targeting by 60 rebel (non-state) actors over 2002-2004, showed that rebels killed greater numbers of civilians in targeting after losing more rebel fighters in battles, and after killing fewer government (state) fighters in battles. In a similar study of 212 non-state groups in conflict with state actors in 1989-2004, Wood (2010) measured relative strength of opposing actors as the ratio of numbers of rebel troops to government troops and found that weaker rebel actors, relative to their government opponents, killed higher numbers of civilians by targeting, with an additional effect that weaker rebels further

increased civilian targeting if the state actor also targeted civilians. Although civilian targeting by state actors was not measured as an outcome in these studies (Wood 2010, Hultman 2007), their primary finding, which Hultman summarises as "rebel violence against civilians is, like terrorism, the weapon of the weak" (Hultman 2007, pp. 218), relates closely to our finding that the less that actors were associated with battlefield fatalities, and the shorter they fought, the more that they concentrated lethal force onto targeting civilians; a finding that could be consistent with the explanation of battlefield weakness of actors. Although our findings show that state and non-state actors had the same statistical relationship between concentration on civilian targeting and total conflict fatalities, further research is needed to determine whether battlefield weakness can explain high concentrations of civilian targeting by state actors.

Hultman (2007, 2009) speculates that weak rebels target civilians as an alternative strategy to fighting battles because it is a relatively cheap and easy way to impose extra political and military costs on its state opponent, and in order to signal the rebel's power and the state's impotence in settings off the battlefield. The signalling function of civilian targeting by weak rebel actors has been described in anthropological research on civilian targeting by rebels in Sierra Leone and Liberia (Hoffman 2004). As a Sierra Leonean commander summarised:

> *That (targeting civilians) is one of the major tools in guerrilla warfare. Because when the guerrilla is fighting, he is less equipped, he has less manpower. He's going to use tactics to put fear into the civilian populace and send the signal to the government that it can't protect its people…It is one of the tools the guerrilla uses. Fear and intimidation. (Hoffman 2004, pp. 222)*

Human actors are particularly able to fine-tune cooperative behaviours (e.g. warfare) quickly in response to proximate factors affecting the direct benefit of cooperation during competition at local and global levels (West, Griffin and Gardner 2007b). Local cultural constructions regarding the nature of political power have been described as predominant factors in non-state actors' civilian targeting, even while simultaneously these actors vie for political and symbolic power in the global context of armed conflicts by using the global media (Hoffman 2004). International research shows wide variation in local social norms for cooperation, punishment and response to punishment across societies with different

cultures, social histories and strength of rule of law (Herrmann, Thoni, Gachter 2008). Although much of the research we describe, including our own, points to broad patterns of behaviour regarding targeting civilians, local contexts of meaning (e.g. what is 'power' or 'success' in a conflict) may interact with global social norms to affect the behaviour of specific human actors (Herrmann, Thoni, Gachter 2008, Hoffman 2004); affecting social norms, costs and benefits within the context where tactics are used, and affecting whether actors depart from general trends to become outliers with unusually low or unusually high levels of concentrating lethal behaviour into the deliberate targeting of civilians during armed conflict.

3.4. Materials and Methods

To create the dataset used for our study, in which all formally organised state and non-state actors participating in international and civil armed conflicts are represented, we combined three datasets compiled by the Uppsala Conflict Data Program (UCDP) for their overlapping periods of 2002-2007: the UCDP One-Sided Violence Dataset v. 1.3 1989-2007[128] for civilian targeting by state and non-state actors, the UCDP Battle-Related Deaths Dataset v. 5 2002-2007[129] for fatalities from battles involving at least one state actor, and the UCDP Non-State Conflict Dataset v. 2.1 2002-2007[130] for battle-related deaths from battles between two non-state actors. Our data describe actors that were associated with at least 25 fatalities, as UCDP requires a minimum of 25 fatalities in a year for an actor to be included in a UCDP dataset; a low threshold that allow inclusion of the low-intensity conflicts in our data. In regard to civilian targeting specifically, the inclusion of low-intensity conflict is in contrast to datasets that predated the UCDP one-sided violence dataset and included only mass killings or genocide (Eck and Hultman 2007).

UCDP produces 'Best', 'Low' and 'High' estimates of deaths based on assessment by human coders of data from a wide range of open-source, independent sources: the media,

[128] UCDP 2008, UCDP 2009a.
[129] UCDP 2009b, UCDP 2009c.
[130] UCDP 2009d, UCDP 2009e.

NGOs (non-governmental organisations), governments, international agencies, truth commissions, and academic reports. Best estimates are based on UCDP coders' evaluation of the sources' credibility and tend to be conservative (Eck and Hultman 2007, Sundberg 2009). We used UCDP Best estimates to provide a systematically derived baseline estimate of fatalities. This baseline is expected to undercount deaths to some degree because some deaths will always go unreported (Eck and Hultman 2007, Sundberg 2009). To date, systematic studies have not been done to determine if civilians killed by targeting are any more, or less, likely to have their fatalities included in the UCDP data than fatalities of civilians and combatants killed in battles, which would be the kind of bias that could affect our proportional CTI analysis. We chose to use UCDP Best estimates because they are considered to provide a confident lower bound for the analysis of trends (Eck and Hultman 2007, Sundberg 2009), for which conservative and consistent coding practices are critical, and because they are used in key, relevant UCDP data analyses in the literature (Eck and Hultman 2007, Human Security Report Project 2010).

What we call 'civilian targeting' in this chapter is termed 'one-sided violence' by UCDP,[131] and is defined as the direct and intentional (also called deliberate) killing of civilians by use of armed force (Eck and Hultman 2007). UCDP's one-sided violence includes acts such as genocide, terrorist attacks on civilians (but not on government or military targets), mass executions and individual extrajudicial executions (except for extrajudicial killings in a government prison or facility). One-sided violence does *not* include indirect deaths from conflict, unintentional (also called 'collateral') civilian deaths, or deaths from disregard for civilians when actors attack each other (e.g. in indiscriminate violence during battles). Our analysis includes only formally organised armed groups because the available version of the UCDP One-Sided Violence Dataset excluded violence by loosely organised groups such as some clans, tribes and ethnic groups.[132]

We calculated 'total fatalities associated with an actor' as all UCDP's 'one-sided violence' fatalities by the actor,[133] plus all UCDP 'battle-deaths' from battles involving a

[131] UCDP 2008, UCDP 2009a.
[132] UCDP 2008.
[133] UCDP 2009a, UCDP 2008.

state actor in which the actor was involved[134] plus all battle deaths from battles involving only non-state actors in which the actor was involved.[135] In simpler terms, we calculated 'total fatalities associated with an actor' as the number of civilians the actor killed by direct, deliberate targeting plus the number of civilians and combatants killed in battles involving the actor. UCDP 'battle-deaths' are associated with each actor involved in the battle and combine civilian and military fatalities in battle because many battle data do not attribute deaths to specific actors or distinguish civilian from combatant deaths. UCDP battle-related deaths are all fatalities – military and civilian – directly related to combat between two military actors (UCDP 2009c, Sundberg 2009). Battle-related deaths include fatalities from traditional battlefield fighting; from guerrilla activities such as hit-and-run attacks or ambushes; and from bombardments of military bases, cities or villages: as long as the intended targets are either military actors or representatives of the actors.

UCDP battle-related deaths include both indiscriminate and unintentional ('collateral') deaths of civilians. The killing of civilians in indiscriminate warfare, in which actors do not distinguish between civilians and opponent combatants, is a form of lethal behaviour which is distinct from the targeting of civilians, but which is also prohibited under international humanitarian laws and customary standards (Hicks and Spagat 2008, International Committee of the Red Cross 2010). Both indiscriminate and unintentional deaths of civilians are important on moral and social grounds, and can have substantial quantitative impact in terms of fatalities. An actor could refrain from intentionally targeting civilians, yet exact an unacceptably high toll on civilians in terms of the absolute number or proportion of civilian deaths among battle deaths. Other studies would be needed to examine the dynamics of actors inflicting indiscriminate or unintentional civilian fatalities, which are difficult to distinguish in practice in compiling conflict data, and which may differ from the dynamics we find for civilian targeting.

We calculated the 'Civilian Targeting Index' as a proportion: the number of civilians killed in direct targeting by the actor, divided by the total fatalities associated with the actor. To the extent that battle-deaths constitute the total associated fatalities of an actor,

[134] UCDP 2009b, UCDP 2009c.
[135] UCDP 2009d, UCDP 2009e.

total associated fatalities of an actor overlap with total associated fatalities of other actors involved in those battles. This does not, however, confound our CTI findings, which are civilians killed by targeting as a *proportion* of the total fatalities associated with an actor.

We show the following data for each of the 226 specific actors in Table 3-A-1: Actor name; Civilian Targeting Index (CTI); rank by CTI from worst (highest CTI=100) to best (lowest CTI = 0), total associated fatalities, and rank by total associated fatalities. Actors are identified in the dataset more than once if they acted alone and jointly. For example, the US is shown as a sole actor and as a joint actor with the UK and Australia in Iraq in 2003. Due to UCDP coding procedures established before the period of this chapter, there are three actors whose involvement in fatalities is recorded under partner actors when acting in cooperation: 'Janjaweed' results are for the Janjaweed acting alone, while the Janjaweed acting with the Sudanese government is coded under 'Sudan'. 'US' results are for the US acting alone, while the US acting with Iraq or Afghanistan governments is coded under 'Iraq' or 'Afghanistan', respectively. 'US/UK/Australia' results are for US/UK/Australia acting alone, while US/UK/Australia acting with Iraq's government is coded under 'Iraq'.

Fatalities are not included in the UCDP conflict dataset if they cannot be associated with any actor (e.g. dead bodies recovered on a street). This stringent requirement of the UCDP coding process means that civilian targeting findings from our dataset can be understood to reflect civilian targeting by combatant groups only, without inclusion of fatalities resulting from criminal activity from noncombatants in the conflict environment. Because the perpetrator of civilian targeting must be identified in order for the fatality to be included in the UCDP one-sided violence dataset (Human Security Report Project 2010), specific counts of numbers of fatalities from civilian targeting derived from our data should be considered with caution, as they lack the robustness of the broad, proportional trends that we present in our findings. Our data describe actors associated with conflict fatalities during 2002-2007 only: Civilian targeting findings for specific actors could differ substantially depending on the time period covered.

The UCDP's data collection methodology of relying on secondary sources (the media, NGOs, governments, international agencies, and academic reports) for information on violent fatalities has the potential to introduce biases arising from how these sources gather and publish their information. Kalyvas (2006) has described how partisan bias and various forms of urban bias can affect fatality reporting by all these types of sources. However, studies that examine conflict coverage bias using substantial datasets have been few, and older studies of media coverage of violence cannot reflect technological advances that have changed data-gathering capacities for recent armed conflicts. One study found that international news articles covering civil wars in 1992-1999 very slightly increased as conflict intensity increased, but at the most extreme intensity of conflict (over 20,000 casualties per month), such as was only present in the Rwandan civil war during the study, the number of news articles covering the conflict started to decrease, possibly due to the poor quality of information filtering out of Rwanda at the height of the genocide (Urlacher 2009). A study that compared UCDP battle-death data for 1989-2002 to fatality data from other sources suggested that the predominance of English-language sources in UCDP searches led to good coverage of fatalities in the Northern Ireland conflict, but undercounted fatalities in Spanish-speaking Colombia's civil war (although UCDP trends over time generally matched well) (Restrepo, Spagat and Vargas 2006). An exceptionally wide gap occurred between UCDP fatality numbers and locally-sourced Colombian fatality numbers in a year that was marked by particularly intense conflict coupled with Colombia's pivotal presidential election. The authors speculated that in an overload of internationally newsworthy stories from Colombia, many smaller conflict events (and their associated fatalities) were not picked up by international news agencies (Restrepo, Spagat M and Vargas 2006).

UCDP spends almost equal time collecting data from news media and from NGO reports, monographs, and other sources. UCDP then triangulates between multiple sources to estimate actors' fatality figures (e.g. witness reports to a truth commission may supplement or be compared to media reported data and NGO reports on a massacre). Reports are traced back to their primary source, when possible, in order to determine reliability, and potential biases of sources are taken into consideration when determining

UCDP Best estimates (Eck and Hultman 2007). UCDP includes local news reports in its searches to some extent (Eck and Hultman 2007), but is limited to reports published or translated into the English language. Journalistic coverage of some areas, such as sub-Saharan Africa, may be lower, making it difficult to establish exact numbers of fatalities (Eck and Hultman 2007, Urlacher 2009). Although UCDP fatality numbers can be viewed as being "too low", i.e. not perfectly representing the actual number of fatalities from a conflict or from one-sided violence, UCDP does not claim to provide a perfect mirror-image of reality, but instead stresses that its Best estimates provide a systematically derived, reliable baseline, useful for cross-country and temporal comparison (Eck and Hultman 2007, Sundberg 2009).

Although we have described here the limitations and possible biases that can affect UCDP estimates of absolute numbers of fatalities, it is important to emphasise that no published critique has questioned or tested civilian targeting to battle-death fatality ratios of the kind we use in this chapter. Plausible critiques that are relevant to our study could include that some actors are better at hiding their hand in massacres than are others (thus lowering their CTI), or that there are large undercounts for total deaths specifically for actors with high CTI scores. To date these possible biases have not been systematically studied. Although these potential biases should be kept in mind by the reader, especially when viewing findings for specific actors, we know of no clear reason to believe that these possible problems are of a magnitude and consistency that would compromise the global trends we find in this chapter.

Table 3-1: Regional Civilian Targeting Index Results: All Actors in Armed Conflict

Region	Europe			Middle East & North Africa			Asia			Sub-Saharan Africa			Americas		
Actor	All	State	Non-state	All	State	Non-state	All	State	Non-state	All	State	Non-state	All	State	Non-state
N	9	3	6	30	6	24	62	11	51	105	17	88	20	6	14
Mean CTI	23.35	1.85	34.10	22.39	18.74	23.30	17.29	17.67	17.21	16.99	22.97	15.84	12.89	21.41	9.24
95% CI	-10.1 to 56.8	-6.1 to 9.8	-19.5 to 87.7	8.6 to 36.2	-23.3 to 60.8	7.7 to 38.9	9.1 to 25.5	-3.2 to 38.5	7.9 to 26.5	10.8 to 23.2	7.6 to 38.4	8.9 to 22.8	-1.4 to 27.1	-19.7 to 62.5	-6.2 to 24.7
SD	43.51	3.21	51.08	36.94	40.04	36.99	32.37	31.06	32.95	32.22	29.96	32.67	30.43	39.13	26.77
Min CTI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max CTI	100	6	100	100	100	100	100	100	100	100	100	100	100	100	100
No. of actors with CTI>0 (%)	4 (44)	1 (33)	3 (50)	16 (53)	3 (50)	13 (54)	26 (42)	7 (64)	19 (37)	36 (34)	10 (59)	26 (30)	6 (30)	3 (50)	3 (21)
No. of actors with CTI=0 (%)	5 (56)	2 (67)	3 (50)	14 (47)	3 (50)	11 (46)	36 (58)	4 (36)	32 (63)	69 (66)	7 (41)	62 (70)	14 (70)	3 (50)	11 (79)

Note: CTI = Civilian Targeting Index. 226 actors: 43 states and 183 non-states.

Table 3-2: Distribution of Actors across Ranges of Total Associated Fatalities in 2002-2007

Range of Total Fatalities Associated with Actor	All Actors (%)	State Actors (%)	Non-state Actors (%)
Over 10,000	5 (2.2)	3 (7.0)	2 (1.1)
5,000 - 9,999	8 (3.5)	4 (9.3)	4 (2.2)
1,000 - 4,999	40 (17.7)	18 (41.9)	22 (12.0)
500 - 999	16 (7.1)	2 (4.7)	14 (7.7)
100 - 499	69 (30.5)	4 (9.3)	65 (35.5)
Less than 100	88 (38.9)	12 (27.9)	76 (41.5)
Total Actors	226 (100)	43 (100)	183 (100)

Table 3-3: Distribution of Actors across Durations of Armed Conflict in 2002-2007

Duration of Conflict	All Actors (%)	State Actors (%)	Non-state Actors (%)
1 year	107 (47.3)	13 (30.2)	94 (51.4)
2 years	37 (16.4)	2 (4.7)	35 (19.1)
3 years	27 (11.9)	5 (11.6)	22 (12.0)
4 years	12 (5.3)	5 (11.6)	7 (3.8)
5 years	14 (6.2)	7 (16.3)	8 (4.4)
6 years	29 (12.8)	11 (25.6)	17 (9.3)
Total	226 (100)	43 (100)	183 (100)

Table 3-4: Logistic Regression for Independent Contributors to Actors Targeting Civilians (CTI>0) as Opposed to Exercising Restraint (CTI=0)

Explanatory variables	Dependent variable: 1 if actor CTI>0, 0 if actor CTI=0					
	(1)	(2)	(3)	(4)	(5)	(6)
Total Fatalities	1.000405****	1.00015	1.000176*	1.000376***	1.000166	1.000188*
2 years		1.70			1.72	
3 years		3.16**			3.12**	
4 years		7.92***			8.59***	
5 years		6.01***			7.25***	
6 years		5.67***			5.17***	
3-4 years			3.41***			3.41***
5-6 years			4.65***			4.63***
MENA				1.41	.72	.81
ASIA				.83	.43	.52
SSA				.74	.56	.65
AMERICAS				.44	.35	.42
State		1.11	1.12	1.48	1.08	1.12
Number of Actors	226	226	226	226	226	226
Pseudo R-square	.09	.15	.14	.10	.16	.15

** p<0.10 ** p<0.05 *** p<0.01 **** p<0.001*
Values are odds ratios.

Table 3-5: Regional Civilian Targeting Index Results for Actors that Targeted Civilians

	Europe			Middle East & North Africa			Asia			Sub-Saharan Africa			Americas		
	All	State	Non-state	All	State	Non-state	All	State	Non-state	All	State	Non-state	All	State	Non-state
N	4	1	3	16	3	13	26	7	19	36	10	26	6	3	3
Mean CTI	52.5	5.6	68.2	42.0	37.5	43.0	41.2	27.8	46.2	49.6	39.1	53.6	43.0	42.8	43.1
95% CI	-34.7 to 139.7	-	-68.6 to 205.0	19.6 to 64.3	-97.5 to 172.5	18.1 to 68.0	25.4 to 57.0	-5.3 to 60.9	26.9 to 65.5	36.8 to 62.3	17.6 to 60.5	37.4 to 69.8	-3.6 to 89.5	-80.2 to 165.8	-80.3 to 166.5
SD	54.8	-	55.1	42.0	54.3	41.3	39.1	35.8	40.0	37.7	30.0	40.1	44.4	49.5	49.7
Min CTI	4.6	5.6	4.6	1.5	1.5	5.1	0.7	.7	2.7	1.2	1.2	1.4	8.4	14.1	8.4
Max CTI	100	5.6	100	100	100	100	100	100	100	100	100	100	100	100	100

CTI > 0 for 88 actors: 24 states and 64 non-states

Table 3-6: Simple and Multiple Regressions for Independent Contributors to the Degree of Civilian Targeting (CTI Value) of Actors that Targeted Civilians

Explanatory variables	All Actors with CTI>0				State Actors with CTI>0			Non-state actors with CTI>0		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log of total fatalities	-39.14**** (3.49)	-25.53**** (6.52)	-39.48**** (3.71)	-26.01**** (6.66)	-35.76**** (5.43)	-26.99** (9.66)	-37.59**** (6.15)	-40.24**** (4.52)	-25.93*** (8.51)	-40.37**** (4.70)
2 years		-13.04 (9.63)		-11.64 (10.00)		-57.86** (19.70)			-4.52 (11.83)	
3 years		-28.84** (11.05)		-28.62** (11.43)		-45.65** (17.85)			-24.10 (14.63)	
4 years		-36.98** (13.55)		-37.18** (13.98)		-50.56** (19.05)			-33.05* (19.23)	
5 years		-30.32** (13.95)		-31.63** (14.56)		-33.30 (20.54)			-33.32* (19.19)	
6 years		-26.70** (12.92)		-26.30* (13.29)		-19.19 (22.71)			-28.42* (16.38)	
MENA			-8.40 (14.42)	-2.21 (14.39)		17.86 (19.70)	14.68 (25.45)		-9.73 (18.32)	-14.75 (17.74)
ASIA			-3.46 (13.87)	3.62 (14.00)		26.21 (18.92)	10.70 (23.49)		-1.52 (17.72)	-7.65 (17.25)
SSA			-7.02 (13.60)	-.93 (13.76)		32.95* (18.30)	9.96 (23.30)		-10.92 (17.34)	-12.32 (16.85)
AMERICAS			-15.35 (16.74)	-9.34 (16.69)		17.14 (21.91)	-6.36 (26.29)		-5.94 (23.12)	-12.41 (22.61)
STATE		.57 (6.26)	-1.02 (6.39)	1.75 (6.48)						
Intercept	153.87**** (10.05)	135.68**** (12.99)	161.57**** (16.32)	136.92**** (18.54)	142.42**** (16.92)	121.01**** (24.84)	139.65**** (31.00)	157.30**** (12.56)	142.09**** (23.39)	168.52**** (19.78)
Number of Actors	88	88	88	88	24	24	24	64	64	64
Adjusted R-square	.59	.60	.57	.59	.65	.79	.60	.55	.53	53

** p<0.10 ** p<0.05 *** p<0.01 **** p<0.001*
Includes actors with CTI>0. Actors with CTI=0 are excluded. Standard errors in parentheses.

Table 3-7: Random Effect Logit Regression for Independent Contributors to Actors in Prolonged Conflict Targeting Civilians (CTI>0) as Opposed to Exercising Restraint (CTI=0) during Six Years

Explanatory variables	All Actors in Prolonged Conflict			Actors in Prolonged Conflict with CTI>0 in at least one year		
	(1)	(2)	(3)	(4)	(5)	(6)
Year	.7595*	.7528*	.7563*	.7603*	.7625*	.7637*
Total Fatalities		.9999	1.0000		1.0000	1.0000
MENA			.6961			2.8033
ASIA			1.5726			4.0489
SSA			9.1012			27.9962**
AMERICAS			4.4404			11.2273*
State			.1699			1.1829
Number of Observations (actors x 6 years)	174	174	174	126	126	126
Number of Actors	29	29	29	21	21	21

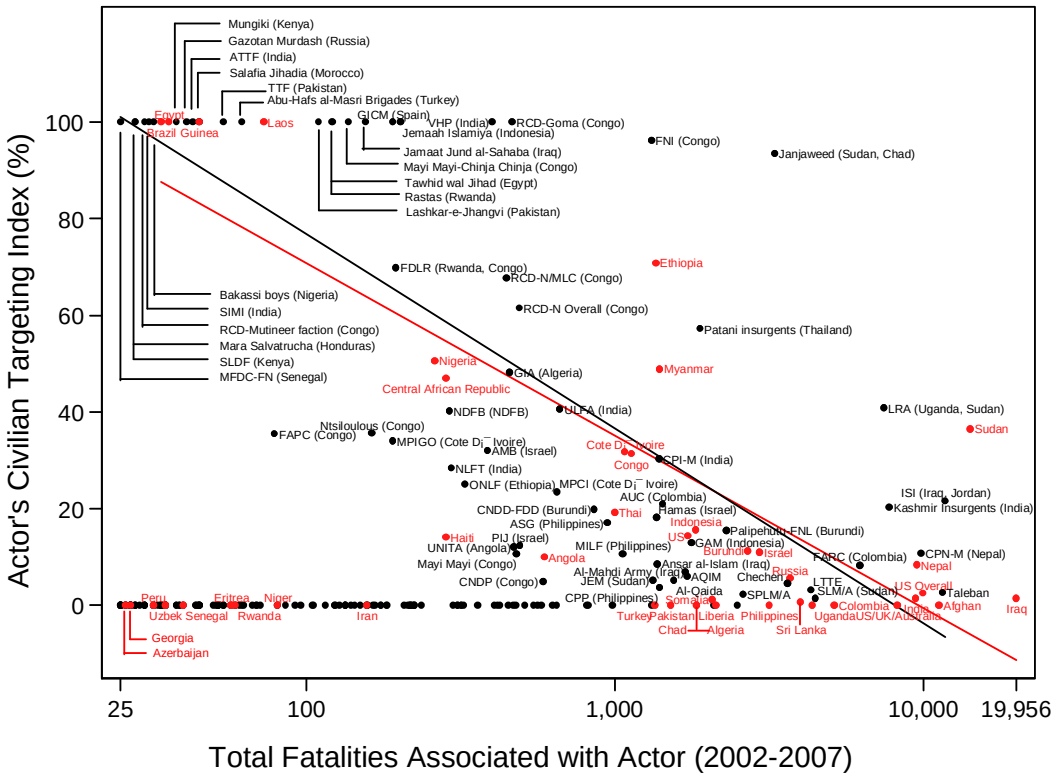
** p<0.05 ** p<0.01*
Dependent variable is 1 if actor CTI>0, 0 if actor CTI=0.
Values are odds ratios.

Table 3-8: Panel Regression for Independent Contributors to the Degree Of Civilian Targeting (CTI Value) by Actors in Prolonged Conflict for Six Years

Explanatory variables	All Actors in Prolonged Conflict	Actors in Prolonged Conflict with CTI>0 in at least one year
Log of total fatalities	1.19 (3.45)	-2.12 (4.66)
Y2003	2.43 (4.27)	3.52 (5.89)
Y2004	4.93 (4.28)	7.24 (5.92)
Y2005	-1.04 (4.29)	-1.98 (5.94)
Y2006	-2.52 (4.30)	-4.10 (5.95)
Y2007	-.57 (4.36)	-1.97 (6.13)
MENA	2.86 (14.43)	5.07 (14.38)
ASIA	4.86 (14.52)	7.24 (14.29)
SSA	30.58* (14.72)	44.11** (14.36)
AMERICAS	6.18 (16.77)	9.40 (17.14)
STATE	8.42 (7.09)	4.19 (8.78)
Intercept	-4.54 (16.89)	6.56 (19.04)
Number of Actors	29	21
Number of Observations(Actors x 6 years)	174	126
Wald chi-square	17.17	23.47
P-value of Wald chi-square	.10	.02

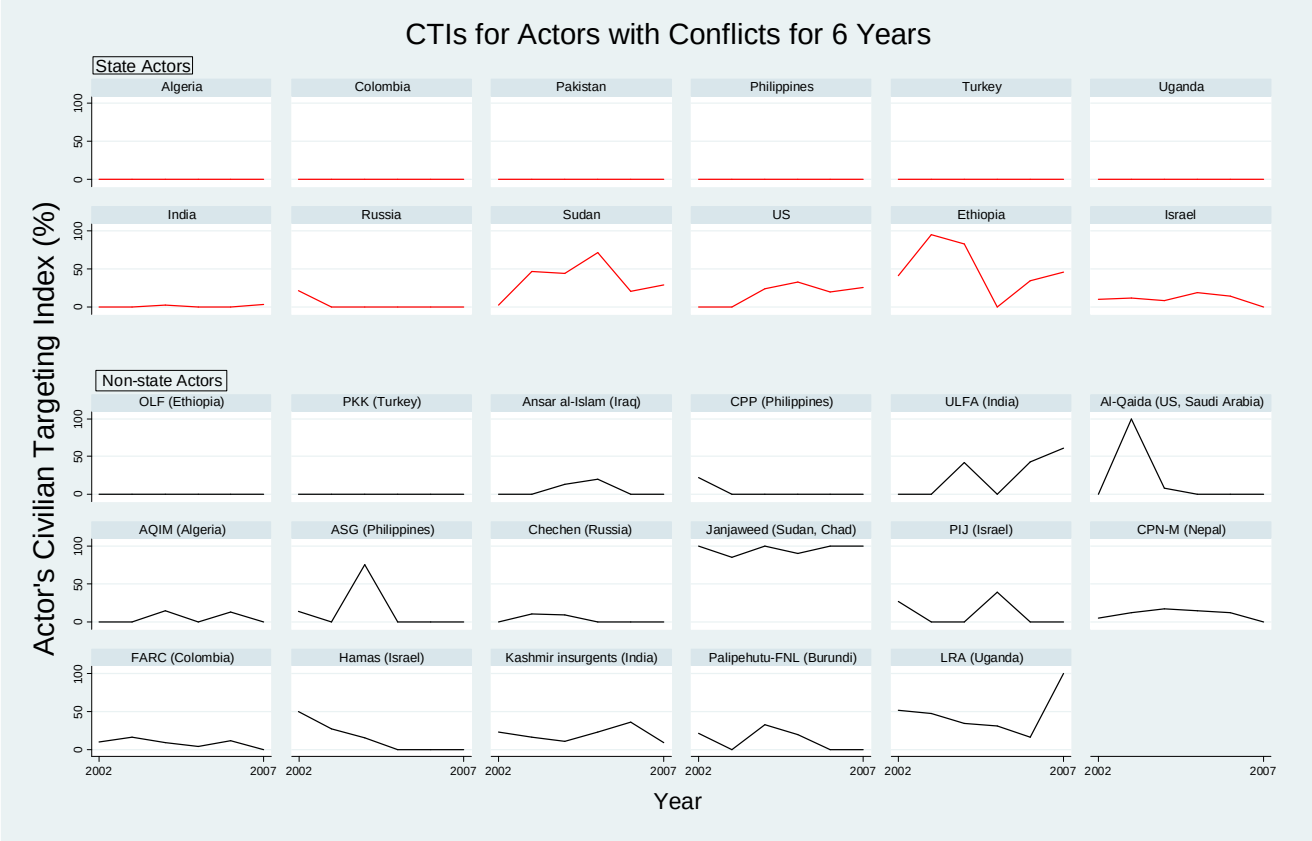
** p<0.05 ** p<0.01*
Standard errors in parentheses.

Figure 3-1: Global Comparison of Fatalities Associated with Actors in Armed Conflict during 2002-2007



Note: Total number of direct fatalities associated with an actor (from battle-deaths and civilian targeting) is plotted against the proportion of total fatalities that was from the actor's civilian targeting, termed the Civilian Targeting Index (CTI). Lines show fitted linear regressions for state actors (in red) and non-state actors (in black) that carried out civilian targeting (actor's CTI > 0).

Figure 3-2: Annual Civilian Targeting Index Values for the 29 Actors inn Prolonged Armed Conflict during 2002-2007



Appendix 3

Table 3-A-1: Actors, Their Civilian Targeting Index (CTI), and Their Total Associated Fatalities during 2002-2007

Range of Fatalities	State Actors					Non-state Actors					
	Actors	CTI (%)	Rank (CTI)	Total Fatalities	Rank (Fatalities)	Actors	Location of Incompatibility	CTI (%)	Rank (CTI)	Total Fatalities	Rank (Fatalities)
Over 10,000 *States: 3. Non-states: 2.*	Sudan	36.5	39	14,145	2	Islamic State of Iraq (ISI or Dawlat al-'Iraq al-Islamiyya)	Iraq, Jordan	21.6	50	11,748	3
	Iraq	1.5	84	19,956	1	Taleban	Afghanistan	2.7	82	11,524	4
	Afghanistan	0	89	11,214	5						
1,000 to 9,999 *States: 22. Non-states: 26.*	Ethiopia	70.8	28	1,357	46	Front for National Integration (FNI or Forces Nationalistes et Integrationistes)	Congo	96.1	26	1,314	49
	Myanmar	48.9	33	1,398	42	Janjaweed (Janjaweed only. Janjaweed with Sudan is coded under Sudan.)	CAR, Chad, Sudan	93.5	27	3,298	20
	Cote D'Ivoire	31.8	44	1,080	52	Patani insurgents	Thailand	57.2	31	1,886	30
	DRC (Democratic Republic of Congo)	31.4	45	1,132	51	Lord's Resistance Army (LRA)	Sudan, Uganda	40.9	36	7,439	11
	Indonesia	15.6	57	1,826	33	Communist Party of India-Maoist (CPI-M)	India	30.3	46	1,391	43
	US (US only. US with Iraq or Afghanistan coded under those actors)*	14.4	59	1,721	35	United Self-Defense Forces of Colombia (AUC or Autodefensas Unidas de Colombia)	Colombia	20.9	51	1,428	40
	Burundi	11.3	64	2,688	23	Kashmir Insurgents	India	20.2		7,745	
	Israel*	11.0	65	2,944	22	Hamas	Israel	18.3	55	1,362	45
	Nepal	8.4	71	9,531	7	Party for the Liberation of the Hutu People-Forces for National Liberation (Palipehutu-FNL or Parti pour la Libération du Peuple Hutu-Forces Nationales de Liberation)	Burundi	15.5	58	2,295	26
	Russia	5.6	75	3,692	18	Free Aceh Movement (GAM or Gerakan Aceh Merdeka)	Indonesia	13.0	61	1,771	34
	India*	1.5	85	9,413	8	Communist Party of Nepal-Maoist (CPN-M)	Nepal	10.7	66	9,815	6

	Somalia	1.2	87	2,061	29	Moro Islamic Liberation Front (MILF)	Philippines	10.7	67	1,060	53
1,000 to 9,999 *States: 22. Non-states: 26*	Sri Lanka	0.7	88	3,995	17	Ansar al-Islam	Iraq	8.6	70	1,374	44
	US/UK/Australia (US/UK/Australia only. With Iraq is coded under Iraq)*	0	89	8,202	9	Revolutionary Armed Forces of Colombia (FARC or Fuerzas Armadas Revolucionarias Colombianas)	Colombia	8.4	72	6,219	12
	Colombia	0	89	5,142	13	Al-Mahdi Army	Iraq	6.9	73	1,685	37
	Uganda*	0	89	4,352	15	Al-Qaida Organisation in the Islamic Maghreb (AQIM)	Algeria	6.0	74	1,712	36
	Philippines	0	89	3,159	21	Justice and Equality Movement (JEM)	Sudan	5.2	76	1,323	48
	Liberia	0	89	2,116	27	Al-Qaida (2002-2007 data do not include September 11, 2001 attack)	US, Saudi Arabia	5.1	77	1,554	38
	Algeria	0	89	1,846	31	Chechen Republic of Ichkeria	Russia	4.6	79	3,624	19
	Chad	0	89	1,837	32	Communist Party of the Philippines (CPP)	Philippines	3.6	80	1,401	41
	Pakistan*	0	89	1,518	39	Liberation Tigers of Tamil Eelam (LTTE or Thamil Eelam Viduthalai Puligal)	Sri Lanka	3.2	81	4,311	16
	Turkey	0	89	1,342	47	Sudanese People's Liberation Movement/Army (SPLM/A)	Sudan	2.2	83	2,600	24
						Sudan Liberation Movement/Army (SLM/A)	Sudan	1.4	86	4,457	14
						Alliance for the Re-liberation of Somalia/Islamic Courts Union (ARS/UIC)	Somalia	0	89	2,502	25
						Liberians United for Reconciliation and Democracy (LURD)	Liberia	0	89	2,089	28
						Kurdistan Workers' Party (PKK or Partiya Karkerên Kurdistan)	Turkey	0	89	1,313	50
100 to 999 *States: 6. Non-states: 79.*	Nigeria	50.6	32	261	96	Congolese Democratic Rally-Goma (RCD-Goma or Rassemblement Congolaises pour la Démocratie-Goma)	Congo	100	1	465	75
	Central African Republic (CAR)	47	35	283	95	World Hindu Council (VHP or Vishwa Hindu Parishad)	India	100	1	401	82
	Thailand	19.2	54	999	54	Jemaah Islamiya	Indonesia	100	1	202	107
	Haiti	14.1	60	284	94	Moroccan Islamic Combatant Group (GICM)	Spain	100	1	191	109
	Angola	10	69	590	64	Jamaat Jund al-Sahaba	Iraq	100	1	156	121
	Iran*	0	89	157	119	Mayi Mayi-Chinja Chinja	Congo	100	1	137	125

						Tawhid wal Jihad	Egypt	100	1	122	133
						Rastas	Rwanda	100	1	121	134
						Lashkar-e-Jhangvi	Pakistan	100	1	110	136
100 to 999 *States: 6. Non-states: 79.*						Democratic Liberation Forces of Rwanda (FDLR or Forces Démocratiques de Libération du Rwanda)	Congo, Rwanda	69.9	29	196	108
						Congolese Rally for Democracy-National/ Movement for the Liberation of Congo (RCD-N or Rassemblement Congolaises pour la Démocratie-National/MLC or Mouvement de Libération Congolais)	Congo	67.7	30	446	78
						Armed Islamic Group (GIA or Groupe Islamique Armé)	Algeria	48.2	34	456	76
						United Liberation Front of Assam (ULFA)	India	40.6	37	665	60
						National Democratic Front for Bodoland (NDFB)	India	40.2	38	291	93
						Ntsiloulous	Congo	35.6	40	163	117
						Ivorian Movement for the Greater West (MPIGO or Mouvement Populaire Ivorian du Grand Ouest)	Cote D'Ivoire	34.0	42	191	109
						al-Aqsa Martyrs' Brigades (AMB or Kataeb al-Shaheed al-Aqsa)	Israel	32.0	43	387	83
						National Liberation Front of Tripura (NLFT)	India	28.4	47	296	92
						Ogaden National Liberation Front (ONLF)	Ethiopia	25.0	48	328	85
						Patriotic Movement of Ivory Coast (MPCI or Mouvement patriotique de la Côte d'Ivoire)	Cote D'Ivoire	23.5	49	650	61
						National Council for the Defence of Democracy-Forces for the Defence of Democracy (CNDD-FDD or Conseil National pour la Défense de la Démocratie-Forces pour la Défense de la Démocratie)	Burundi, Congo	19.9	53	860	57
						Abu Sayyaf Group (ASG)	Philippines	17.0	56	946	56
						Palestinian Islamic Jihad (PIJ or Harakat al-Jihad al-Islami fi Filastin)	Israel	12.4	62	492	70
						National Union for the Total Independence of Angola (UNITA or União Nacional para a	Angola	12.1	63	471	73

						Independência Total de Angola)					
						Mayi Mayi	Congo	10.6	68	479	71
100 to 999 *States: 6. Non-states: 79.*						National Congress for the Defence of the People (CNDP or Congrès National pour la Défense du Peuple)	Congo	5.0	78	585	65
						United Front for Democratic Change (FUCD)	Chad	0	89	979	55
						Hezbollah	Israel	0	89	821	58
						National Redemption Front (NRF)	Sudan	0	89	810	59
						Congolese Democratic Rally (RCD or Rassemblement Congolaises pour la Démocratie)	Congo	0	89	649	62
						Patriotic Union of Kurdistan (PUK)	Iraq	0	89	626	63
						Movement for the Enforcement of Islamic Laws (TNSM or Tehreek-e-Nafaz-e-Shariat-e-Mohammadi)	Pakistan	0	89	578	66
						Alliance for the Restoration of Peace and Counter-Terrorism (ARPCT or Isbaheysiga Ladagaalanka Argagaxisadda)	Somalia	0	89	562	67
						National Liberation Army (ELN or Ejército de Liberatión Nacional)	Colombia	0	89	546	68
						People's Democratic Party (PDP)	Nigeria	0	89	513	69
						All Nigeria People's Party (ANPP)	Nigeria	0	89	478	72
						Shan State Army-South command (SSA-S)	Myanmar	0	89	469	74
						Fatah	Israel	0	89	452	77
						Karen National Union (KNU)	Myanmar	0	89	425	79
						Movement for Democracy and Justice in Chad (MDJT or Mouvement pour la Démocratie et la Justice au Tchad)	Chad	0	89	418	80
						Union Force for Democracy and Development (UFDD or Union des Forces pour la Démocratie et le Développement)	Chad	0	89	408	81
						National Socialist Council of Nagaland-Khaplang faction (NSCN-K)	India	0	89	360	84
						Reformation and Jihad Front (RJF)	Iraq	0	89	324	86
						Islamic Movement of Uzbekistan (IMU)	Pakistan	0	89	319	87

100 to 999 *States: 6. Non-states: 79.*						Lashkha of Wazir tribe	Pakistan	0	89	319	88
						Rahanweyn Resistance Army (RRA)	Somalia	0	89	310	89
						Rahanweyn Resistance Army-Madobe and Habsade faction (RRA-MH)	Somalia	0	89	310	89
						National Democratic Alliance (NDA)	Sudan	0	89	300	91
						Sudan Liberation Movement/Army-Minni Minawi faction (SLM/A-MM)	Sudan	0	89	236	97
						Forces of Rashid Abdul Dostum	Afghanistan	0	89	225	98
						Forces of Ustad Mohammad Atta	Afghanistan	0	89	225	98
						People's War Group (PWG)	India	0	89	224	100
						Congolese Rally for Democracy-Patrick Masunzu faction (RCD-PM or Rassemblement Congolaise pour la Démocratie-Patrick Mazunsu faction)	Congo	0	89	221	101
						Gulf Cartel	Mexico	0	89	218	102
						Sinaloa Cartel	Mexico	0	89	218	102
						New Forces (FN or Forces Nouvelles)	Cote D'Ivoire	0	89	217	104
						Baluch Ittehad	Pakistan	0	89	214	105
						Liberation Tigers of Tamil Eelam-Karuna faction (LTTE-K)	Sri Lanka	0	89	208	106
						National Front for the Liberation of Haiti (FLRN or Front pour la Liberación et la Reconstruction Nationales)	Haiti	0	89	183	111
						United Wa State Army (UWSA)	Myanmar	0	89	182	112
						National Socialist Council of Nagaland-Isaac-Muivah faction (NSCN-IM)	India	0	89	175	113
						United National Liberation Front (UNLF)	India	0	89	175	113
						Alliance of Democratic Forces (ADF)	Uganda	0	89	167	115
						Baluchistan Liberation Army (BLA)	Pakistan	0	89	165	116
						Forces of Amanullah Khan	Afghanistan	0	89	158	118
						Somali Salvation Democratic Front (SSDF)	Somalia, Sudan	0	89	157	119
						Oromo Liberation Front (OLF)	Ethiopia	0	89	150	122
						Congolese Democratic Rally-Liberation Movement (RCD-ML or Rassemblement	Congo	0	89	144	123

						Congolaises pour la Démocratie-Mouvement de Liberation)					
100 to 999 *States: 6. Non-states: 79.*						Niger Delta People's Volunteer Force (NDPVF)	Nigeria	0	89	140	124
						New Forces-Ibrahim Coulibaly faction (FN-IC or Forces Nouvelles-Ibrahim Coulibaly faction)	Cote D'Ivoire	0	89	134	126
						Maoist Communist Centre (MCC)	India	0	89	134	126
						United Somali Congress/Somali Salvation Alliance (USC/SSA)	Somalia	0	89	134	126
						United Somalia Congress/Somali Salvation Alliance-Omar Mohamed Mohamud-Finish faction (USC/SSA-F)	Somalia	0	89	134	126
						Forces of Ismail Khan	Afghanistan	0	89	128	130
						Movement of the Democratic Forces of the Casamance-Northern Front Magne Diémé faction (MFDC Front Nord-MD or Mouvement des Forces Démocratiques de Casamance-Front Nord Magne Diémé)	Senegal	0	89	124	131
						Movement of the Democratic Forces of the Casamance-Salif Sadio faction (MFDC-S or Mouvement des Forces Démocratiques de Casamance-Sadio)	Senegal	0	89	124	131
						Kingdom of Kongo (BDK or Bundu dia Kongo)	Congo	0	89	116	135
						The Free Life Party of Kurdistan (PJAK or Parti Jiyani Azadi Kurdistan)	Iran	0	89	106	137
						Forces of Francois Bozize	Central African Republic	0	89	105	138
Under 100 *States: 12. Non-states: 76.*	Laos	100	1	73	145	Abu-Hafs al-Masri Brigades	Turkey	100	1	62	151
	Guinea	100	1	45	167	Taleban Movement of Pakistan (TTP or Tehrik-i-Taliban Pakistan)	Pakistan	100	1	54	158
	Egypt	100	1	36	184	Salafia Jihadia	Morocco	100	1	45	167
	Brazil	100	1	34	189	All Tripura Tiger Force (ATTF)	India	100	1	43	175
	Niger	0	89	81	142	Gazotan Murdash	Russia	100	1	41	176
	Rwanda	0	89	59	154	Mungiki	Kenya	100	1	38	181

	Eritrea	0	89	57	156	Bakassi boys	Nigeria	100	1	32	195
	Senegal	0	89	40	177	Students' Islamic Movement of India (SIMI)	India	100	1	31	200
Under 100 *States: 12. Non-states: 76.*	Uzbekistan	0	89	35	185	Congolese Rally for Democracy-Mutineer faction (RCD-Mutineer faction or Rassemblement Congolaise pour la Democratie-Mutineer)	Congo	100	1	30	201
	Peru	0	89	32	195	Mara Salvatrucha (Honduras)	Honduras	100	1	28	207
	Georgia	0	89	27	212	Sabaot Land Defence Force (SLDF or Sabaot Land Defence Force)	Kenya	100	1	28	207
	Azerbaijan	0	89	26	217	Movement of the Democratic Forces of the Casamance-Northern Front (MFDC-FN or Mouvement des Forces Démocratiques de Casamance-Front Nord)	Senegal	100	1	25	220
						People's Armed Forces of Congo (FAPC or Forces Armées du Peuple Congolais)	Congo	35.4	41	79	144
						Somali Reconciliation and Restoration Council (SRRC)	Somalia	0	89	96	139
						Front for the Liberation of the Enclave of Cabinda-Armed Forces of Cabinda (FLEC-FAC or Frente da Libertação do Enclave de Cabinda-Forças Armadas de Cabinda)	Angola	0	89	92	140
						Sudan Liberation Movement/Army-Unity (SLM/A-Unity)	Sudan	0	89	86	141
						Niger Movement for Justice (MNJ or Mouvement des Nigériens pour la Justice)	Niger	0	89	81	142
						Arrow Boys	Uganda	0	89	71	146
						Somali National Front-Ali Dheere and Rer Ahmad subclans (SNF-ADRA)	Somalia	0	89	69	147
						Somali National Front-Hawarsame Rer Hasan and Habar Ya'qub subclans (SNF-HRHHY)	Somalia	0	89	69	147
						People's Liberation Army (PLA)	India	0	89	67	149
						Niger Delta Vigilantes (NDV)	Nigeria	0	89	63	150
						Jubba Valley Alliance (JVA)	Somalia	0	89	62	151
						OP Lavalas	Haiti	0	89	61	153
						Movement for Justice and Peace (MJP or	Cote D'Ivoire	0	89	59	154

						Mouvement pour la Justice et la Paix)					
Under 100 *States: 12. Non-states: 76.*						Eritrean Islamic Jihad Movement-Abu Suhail faction (EIJM-AS or Harakat al Jihad al Islami-Abu Suhail faction)	Eritrea	0	89	57	156
						Mara 18	Guatemala	0	89	54	158
						Mara Salvatrucha (Guatemala)	Guatemala	0	89	54	158
						Ahlul Sunnah Jamaa	Nigeria	0	89	52	161
						Forces of Abdullahi Yusuf	Somalia	0	89	52	161
						Forces of Jama Ali Jama	Somalia	0	89	52	161
						Moro National Liberation Front-Nur Misauri faction (MNLF-NM)	Philippines	0	89	52	161
						Jondullah	Iran	0	89	51	165
						Palipehutu-FNL-LP	Burundi	0	89	50	166
						Popular Resistance Committees (PRC)	Israel	0	89	45	167
						Congolese Democratic Rally-Kisangani-Liberation Movement (RCD-K-ML or Rassemblement Congolaises pour la Démocratie-Kisangani-Mouvement de Liberation)	Congo	0	89	45	167
						Congolese Rally for Democracy-National (RCD-N or Rassemblement Congolaises pour la Démocratie-National)	Congo	0	89	45	167
						Union of Democratic Forces for Unity (UFDR or Union des Forces Démocratiques pour le Rassemblement)	Central African Republic	0	89	45	167
						Janjaweed-Bin Kulaib faction	Sudan	0	89	44	173
						Janjaweed-Moro faction	Sudan	0	89	44	173
						Movement of the Democratic Forces of the Casamance (MFDC or Mouvement des Forces Démocratiques de Casamance)	Senegal	0	89	40	177
						May 23 Democratic Alliance for Change-Ibrahim Bahanga faction (ATNMC or Alliance Démocratique du 23 Mai pour le Changement-Ibrahim Bahanga faction)	Mali	0	89	39	179
						Mali	Mali	0	89	39	179

Under 100 *States: 12. Non-states: 76.*						Popular Defence Force (PDF)	Sudan	0	89	38	181
						Palestinian National Authority (PNA)	Israel	0	89	38	181
						Alliance for Democracy (AD)	Nigeria	0	89	35	185
						Jihad Islamic Group (JIG)	Uzbekistan	0	89	35	185
						Karenni National Progressive Party (KNPP)	Myanmar	0	89	35	185
						Ansaar ul-Islam	Pakistan	0	89	34	189
						Lashkar-e-Islam	Pakistan	0	89	34	189
						Puntland state of Somalia	Somalia	0	89	34	189
						Republic of Somaliland	Somalia	0	89	34	189
						Democratic Karen Buddhist Army (DKBA or Democratic Karen Buddhist Army)	Myanmar	0	89	33	194
						Madhesi People's Rights Forum (MJF or Madhesi Jana Adhikar Forum)	Nepal	0	89	32	195
						Rally of Democratic Forces (RAFD or Rassemblement des Forces Démocratiques)	Chad	0	89	32	195
						Sendero Luminoso	Peru	0	89	32	195
						Comando Vermelho	Brazil	0	89	30	201
						Forces of Arbab Basir	Afghanistan	0	89	30	201
						Forces of the Caucasus Emirate	Russia	0	89	30	201
						Tercer Comando	Brazil	0	89	30	201
						Maoist Communist Party (MKP or Maoist Komünist Partisi)	Turkey	0	89	29	206
						Movement for the Liberation of Western Ivory Coast (MILOCI or Mouvement pour la Liberation de l'Ouest de la Côte d'Ivoire)	Cote D'Ivoire	0	89	28	207
						Southern Somalia National Movement (SSNM)	Somalia	0	89	28	207
						United Somali Congress/Somali National Alliance (USC/SNA)	Somalia	0	89	28	207
						14-party Alliance	Bangladesh	0	89	27	212
						Bangladesh National Party Alliance (BNP Party Alliance)	Bangladesh	0	89	27	212
						Movement for Democracy in Liberia (MODEL)	Liberia	0	89	27	212
						Republic of South Ossetia	Georgia	0	89	27	212
						People's Liberation Army (EPL or Ejército	Colombia	0	89	26	217

						Popular de Liberación)					
Under 100 *States: 12. Non-states: 76.*						Republic of Nagorno-Karabakh	Azerbaijan	0	89	26	217
						1920 Revolution Brigades	Iraq	0	89	25	220
						Front for the Liberation of the Enclave of Cabinda-Renewed (FLEC-R or Frente da Libertação do Enclave de Cabinda-Renovada)	Angola	0	89	25	220
						Forces of Abdul Rahman Khan	Afghanistan	0	89	25	220
						Forces of Amanullah	Afghanistan	0	89	25	220
						Jubba Valley Alliance faction (JVA faction)	Somalia	0	89	25	220
						Moro National Liberation Front-Habier Malik faction (MNLF-HM)	Philippines	0	89	25	220
Average *States: 43. Non-states: 183.*		19.3 (95% CI: 10 to 29)		2809 (95% CI: 1495 to 4123)				17.3 (95% CI: 12 to 22)		708 (95% CI: 452 to 963)	

** Locations of armed conflicts involving state actors (whether attacker or attacked) are their own territories except the US (Afghanistan/Iraq/Pakistan/Saudi Arabia), Israel (Israel/Lebanon), India (India/Pakistan/Myanmar), US/UK/Australia (US/UK/Australia/Iraq), Uganda (Uganda/Congo/Sudan), Pakistan (Pakistan/India) and Iran (Iran/Iraq).*

Chapter 4

Hysteresis of Targeting Civilians in Armed Conflicts[136]

4.1. Introduction

International norms strictly prohibit intentional targeting of civilians in any armed conflict,[137] but it is not an infrequent phenomenon nonetheless. As an alternative war strategy to fighting armed combatants, civilian targeting has been often carried out in contemporary armed conflict. According to the data compiled by the Uppsala Conflict Data Program (UCDP), almost 700,000 civilians, defined as non-combatants, were killed due to *intentional* and *direct* attacks by sovereign states or formally organised non-state groups in armed conflicts between 1989 and 2010.[138] Intentional targeting of civilians is regarded as a typologically important strategy for a stronger actor in asymmetric conflict to scale down opponents' military capacity (Arreguín-Toft 2001, Valentino, Huth and Balch-Lindsay 2004).[139] However, this 'barbaric' act[140] against civilians is not restricted to stronger actors, commonly being sovereign states. Weaker actors, occasionally non-state armed groups, often deliberately target civilians to prevent them from cooperating with incumbent governments, or to threaten them to draw further support towards rebels (Zahar 2007, Vargas 2009, Wood 2010, Butler and Gates 2010).

[136] Chapter 3 is an additive study of chapter 3 with updated datasets.
[137] The Fourth Geneva Convention and its Associated Protocols I and II (International Committee of the Red Cross 2010).
[138] The figure comes from the 'one-sided violence' dataset documented by the UCDP (UCDP 2011a). It only includes civilian deaths by *intentional* and *direct* attacks by warring actors. Intentional killings of civilians are defined as actions deliberately taken to kill civilians, and direct killings refer to civilian deaths by actors' direct attacks such as bombings and gun shots. The one-sided violence dataset does not include civilian deaths that occurred during battles in armed conflict since it is ambiguous whether attacks in battles are directed towards civilians. These battle deaths, both combatants and civilians, were recorded in two other UCDP datasets, the 'battle-related' and 'non-state conflict' datasets (Eck & Hultman 2007).
[139] Given the assumptions that a stronger actor in asymmetric conflict is an attacker, and an ideal strategy in conflict is to ensure victory, not a cessation of war, Arreguín-Toft (2001) argues that a stronger actor could either directly attack opponents or take commit the barbaric act including attacks on civilian populations.
[140] Arreguín-Toft 2001.

The existing literature on intentional targeting of civilians in armed conflict has focused on causes of civilian victimisation or its correlation with war outcomes. In relation to the former, substantial variation in the causes of intentional targeting of civilians is found across political, economic, geographical and temporal circumstances under which warring actors operate. For instance, Zahar (2007) approaches intentional targeting of civilians within a civil-militia relation framework to analyse degrees of external intervention for humanitarian assistance on civil populations. Humphreys and Weinstein (2006), however, argues that civil-militia relations are not significant determinants of civilian abuse. Instead, internal characteristics of insurgent groups such as a loose control over their members better explain civilian victimisation. Moreover, Vargas (2009) models a power shift between two armed groups contending for a strategic territory as a factor of intentional targeting of civilians utilising the Colombian Civil War data during the 1988-2005 time period. On the other hand, Wood (2010) views resource mobilisation as a determinant of civilian victimisation by rebel groups. Warring actors motivated by these various reasons choose civilian targeting rather than battling combatants as the former is an appealing strategy to attain victory in armed conflict. For instance, Valentino, Huth and Balch-Lindsay (2004) argue that incumbent governments battling with strong, well-organised guerrilla groups are attracted to mass killing of civilians regardless of regime type or ethnic difference. Moreover, Butler and Gates (2010) analyse civilian victimisation as a strategic factor that led weaker actors to defeat stronger ones.

Although ample studies explore causes and consequences of the intentional targeting of civilians with absolute numbers of civilian deaths that occurred during armed conflict, there have been fewer attempts to examine the intensity of civilian targeting in the context of total fatalities associated with warring actors. Only recently Hicks et al. (2011), presented as chapter 3 in this thesis, developed a *Civilian Targeting Index* (CTI) to describe the proportion of civilian deaths resulted from a warring actor's intentional and direct attacks among total fatalities associated with the actor. In doing so, chapter 3 demonstrates under what conditions warring actors intentionally used their lethal force against civilians as opposed to battling with combatants. Building upon chapter 3, this chapter further explores behavioural patterns of warring actors in the intentional targeting of civilians in

global conflict with the updated datasets documented by the same source, the UCDP, and with the same compiling methods. The UCDP datasets available for chapter 3 contains 226 actors who were involved in armed conflict at least one year between 2002 and 2007 whilst the updated datasets used for this chapter embraces 536 actors during the 1989-2010 time period. The number of actors therefore doubles and the maximum duration of conflict quadruples.

Apart from replicating the testing methods used in chapter 3, this chapter additionally employs a dynamic panel approach to examine determinants of the intensity of civilian targeting for the actors involved in uniquely long duration of armed conflict, covering more than 20 years. In chapter 3, analysis on duration of conflict was rather restricted as the maximum duration available for the dataset was 6 years. However, the updated UCDP dataset enables one to examine hysteresis of warring actors' behaviour in terms of the intentional targeting of civilians when they are involved in prolonged conflict as the longest duration covered in the dataset is 22 years. The term hysteresis was coined to denote a persistence of previous states in describing the magnetisation of ferric materials by a physicist Ewing (1885), and has been often used in economics to explain the degree of persistence in unemployment rates. The dynamic panel method adopted for this chapter is expected to measure to what extent, if any, warring actors adjust their civilian targeting behaviour over time. If warring actors engaged in prolonged armed conflict increase the degree of the intentional targeting of civilians over time despite of the strict prohibition by the international norms, it is required to eliminate incentives or factors facilitating their lethal behaviour into civilians. This chapter, therefore, attempts to find plausible factors promoting the intentional targeting of civilians by including economic and demographic indices such as inflation rates and population growth rates in the dynamic panel analysis.

The rest of this chapter proceeds as follows. The next section presents the summary and description statistics of the updated datasets. The following sections describe testing approaches and empirical results respectively. The final section concludes.

4.2. Data Analysis

4.2.1. Data Construction

Given the procedure employed in chapter 3, chapter 4 constructs a dataset by aggregating three datasets compiled by UCDP; the One-Sided Violence Dataset, the Battle-Related Deaths Dataset, and the Non-State Conflict Dataset.[141] These three datasets contain violent death information associated with warring actors participating in international conflict and civil war. In particular, the one-sided violence dataset only includes the *direct* and *intentional* killing of civilians by warring actors, either sovereign states or formally organised non-state armed groups. The battle-related deaths dataset, on the other hand, contains both civilians and combatants killed in *battles* involving at least one state actor. As the battle-related deaths dataset records deaths only if intended targets are combatants in battles (i.e. military members), civilian deaths included in this dataset are collateral damage, not as *intentionally* targeted victims, which are counted in the one-sided violence dataset. Finally, the non-state conflict dataset only includes deaths from battles between organised *non-state* actors. The violent war deaths recorded in these three datasets, therefore, are independent (i.e. not overlapping). The three datasets encompass warring actors and their associated fatalities when violent deaths were a minimum of 25 a year.[142] UCDP documented these datasets based on various sources including the media, governmental and non-governmental organisations.[143] [144]

Given the theory of war strategies that warring actors choose between either targeting civilians or battling combatants in armed conflict (Arreguín-Toft 2001), one can compute the proportion of war deaths attributable to either strategy by combining the three UCDP datasets. When combining the datasets, loosely organised groups contained in the non-state conflict dataset are excluded as the one-sided violence dataset does not include

[141] UCDP 2011a, UCDP 2011b, UCDP 2011d.
[142] Twenty five is the minimum requirement of the number of fatalities to be recorded in the three UCDP datasets.
[143] Refer to chapter 3 for detailed sources and methods of the UCDP datasets.
[144] The UCDP datasets present three different estimates of violent deaths: 'best', 'low', and 'high' estimates. Along the lines of chapter 3, this chapter utilises the 'best' estimates, which are derived from the most reliable sources.

them. The combined dataset, therefore, include 536 warring actors, both sovereign states and formally organised armed groups, and fatalities associated with them during the overlapping periods of the three UCDP datasets between 1989 and 2010. With this newly constructed dataset, one can compute the *Civilian Targeting Index (CTI)*, a measure to identify to what extent global warring actors were involved in the intentional killing of civilians while they were engaged in armed conflict. Each actor's CTI value is defined as the proportion of the number of deaths recorded in the one-sided violence dataset to the sum of deaths recorded in all three UCDC datasets; the one-sided violence, the battle-related deaths and the non-state conflict dataset. *In extenso*, the number of deaths recorded in the three UCDP datasets for an actor is added to give 'total fatalities associated with the actor'.[145] CTI value for the actor is calculated as the proportion of the number of civilian deaths caused by the actor's intentional and direct attacks among total fatalities associated with the actor. For instance, an actor with the CTI of 100 indicates that it completely concentrated lethal force on targeting civilians, rather than on battles with combatants in armed conflict. On the other hand, CTI values of 0 imply that actors refrained from targeting civilians and completely concentrated their lethal force on fighting armed combatants.

4.2.2. Data Summary

The dataset for this chapter, constructed based on the three UCDP datasets, contains 536 warring actors, 87 states and 449 formally organised non-state armed groups.[146] In order to provide an overview of the actors' CTI values and associated total fatalities, this subsection

[145] As discussed in chapter 3, as many deaths from battles between two sides of actors are hard to be attributed to one of them, the battle-related deaths and the non-state conflict dataset do not identify which side of the actors caused the deaths. Total fatalities associated with an actor, therefore, overlap with total fatalities associated with its opponents. For brevity, total associated fatalities of an actor overlap with total associated fatalities of other actors involved in the same battles. Thus, total fatalities associated with an actor indicate scale of armed conflict in which the actor involved.

[146] There are 16 joint actors which consist of two or more actors who jointly participated in intentional targeting of civilians or in battles. A joint actor is classified as a state actor if it comprises only state actors, and as a non-state actor if only non-state armed groups. Only one joint actor is composed of a state and a non-state armed group (Serbia and Republic of Krajina in the Yugoslav Wars), and it is arbitrarily categorised as a state actor. Classifying the actor as a non-state, however, does not make a statistically significant difference in regression analyses due to its comparatively small stake in the dataset in terms of total fatalities associated with this joint actor (466, CTI=0).

firstly presents descriptive statistics of the dataset across different dimensions including regions and actors' status (i.e. states or non-states). Then it examines distribution of the actors across duration of armed conflict in which they were involved, total fatalities associated with the actors, and CTI values. Table 4-1 presents descriptive statistics of CTI values and total fatalities associated with warring actors, divided into a state and non-state groups. The mean CTI value of all 536 actors is 17, indicating that 17% of associated fatalities with the actors were, on average, from their direct and intentional targeting of civilians during 1989-2010, and 83% from battlefields. The mean CTI value of the state actor group is greater than that of the non-state group (21 vs. 16) although the overlapping confidence intervals indicate that the difference is not statistically significant. The average of the total fatalities associated with all actors is 4,425 whilst the mean of the state group is 9 times higher than that of the non-state group (17,196 vs. 1,950), implying that on average state actors were involved in a much larger size of bloodshed during armed conflicts. The figures in parentheses in Table 4-1 are the statistics excluding Rwanda, whose leverage is the highest amongst all actors due to a half million of civilian deaths intentionally targeted by the country.[147] The average of total fatalities associated with state actors decreased to 11,355 when excluding Rwanda, but still shows a conspicuous difference with that of non-state actors.

Table 4-2 presents descriptive statistics of two groups of actors; those that crossed the line into civilian targeting (CTI>0), and those that did not (CTI=0) while they were involved in armed conflict during 1989-2010. Thirty-seven percent (197 in 536) crossed the line by carrying out some degree of civilian targeting. The mean CTI of these actors is 45, indicating that almost a half of total fatalities associated with the actors who crossed the line were intentionally and directly targeted civilians. Furthermore, the average of total fatalities associated with these actors is 6 times greater than those with CTIs of 0 (9,474 vs. 1,494), implying that the actors who carried out some degree of civilian targeting appear to be engaged in larger-scale conflict than those who refrained from it. In addition, state actors, regardless of crossing the line or not, seem to have been engaged in larger-scale conflict

[147] The number of deaths recorded for Rwanda in the UCDP one-sided violent dataset during the periods of 1989-2010 accounts for 73% (511,491 in 699,837) of all deaths recorded in the dataset.

than non-state armed groups as suggested by the mean fatalities presented in Table 4-2. This may suggest a positive relation between state military involvement and scale of armed conflict.

Table 4-3 shows descriptive statistics across 5 regional groups of warring actors.[148] Two thirds of all 536 actors are from either Sub-Saharan Africa (n=228, 43%) or Asia (n=143, 27%). The mean CTI of the actors from Sub-Saharan Africa is the greatest amongst the five regional groups although the differences are not statistically significant considering the heavily overlapping 95% confidence interval as shown in Table 4-3. Furthermore, the mean fatalities associated with the actors from Sub-Saharan Africa (6,176) are the greatest amongst the five regional groups.

Figure 4-1, illustrating distribution of the actors across a range of CTI values, shows most actors are distributed at the extreme; 63% (339 in 536) have CTI values of 0, suggesting that they refrained from intentional and direct targeting of civilians and solely concentrated their lethal force in battles with combatants. On the other hand, 10% of the actors (56 in 536) recorded CTI values of 100, meaning that they completely used their lethal force in targeting civilians as opposed to battling with combatants in armed conflict during 1989-2010. Kernel density estimates in Figure 4-2 further verifies the concentration on CTI values of 0 or 100. Moreover, Table 4-4 shows detailed information on distribution of the actors in terms of CTI values. The mean of total fatalities associated with the actors with CTI values of 100 is comparatively small, implying that those actors that solely concentrated their lethal force onto the intentional and direct civilian targeting were involved in smaller-size of conflict.

Table 4-5 shows the distribution of varying ranges of total fatalities associated with the actors. Whilst 75% of non-state actors are associated with less than 1,000 fatalities, the majority of state actors are party to more than 1,000 fatalities, substantiating the

[148] I allocate warring actors to the following five regions: Europe, the Middle East and North Africa (MENA), Asia, Sub-Saharan Africa and Americas. State actors are allocated to the regional groups where their territories are located whilst non-state groups to their locations of incompatibility (over territories or political power). Al-Qaida is the only actor whose location of compatibility spans more than one region including the Middle East, Asia and America. Al-Qaida is allocated to the Americas regional group as most civilian deaths intentionally targeted by the actor occurred in the region (2668 in 2731).

findings from descriptive statistics that state actors on average were involved in larger-scale conflict than non-state actors. Table 4-6 and Figure 4-3 display the distribution of armed conflict in which actors are involved, varying from 1 to 22 years. About 40% of all (218 in 536) were engaged in armed conflict for one year during 1989-2010. In contrast, 9 actors (6 states and 3 non-states) were involved in conflict for 22 years, the longest period in the dataset used for this chapter.

The two plots in Figure 4-4 display all 536 warring actors' CTI values (y axis) and total fatalities associated with them on logarithmic scale (x axis). The two plots are the same but the upper one shows labels of all 87 state actors whereas the lower one of non-state actors with positive CTI values (CTI>0). The plots elucidate which warring actors concentrated their lethal force on civilian targeting as opposed to battling combatants in armed conflicts during 1989-2010 by putting information on CTIs and fatalities associated with warring actors together. Most actors with CTI values of 100, meaning that 100% of their associated fatalities were intentionally and directly targeted civilians, are found in the upper left quadrant of the plots. These actors who used civilian targeting as their sole form of lethal force account for 10% of state actors (9 in 87)[149] and 10% of non-state actors (47 in 449). A significant number of these actors (51 in 56) are involved in fewer than 500 total fatalities although a joint actor that consists of Serbian Republic of Bosnia-Herzegovina and Serbian Irregulars massacred more than 12,000 civilians during the Yugoslav Wars. Almost 80% of non-state actors with CTI values of 100 are based on either Sub-Saharan Africa (22 in 47) or Asia (15 in 47). Actors found in the upper right quadrant in the plots in Figure 4-4 are attributed to the bloodiest conflicts as well as high rates of civilian targeting during the period of interest between 1989 and 2010. For instance, Rwanda is associated with the greatest number of violent deaths, of which 98% are intentionally targeted civilians (511,491 in 519,513) as shown in the upper plot in Figure 4-4. Amongst non-state actors, Alliance of Democratic Forces for the Liberation of Congo-Kinshasa (AFDL)[150] in the Democratic Republic of the Congo (DRC) records the CTI of 86, indicating that 86% of

[149] The nine state actors with CTI values of 100 are China, Togo, Kenya, Libya, Brazil, Zimbabwe, Tanzania, South Africa and Madagascar, which are exhibited in the upper left quadrant in Figure 4-4.
[150] The original name is Alliance des Forces Démocratiques pour la Libération du Congo-Kinshasa.

fatalities associated with this armed group (35,116 in 40,868) are intentionally targeted civilians as shown in the lower plot.

On the other hand, actors who were engaged in the bloodiest conflicts but who concentrated their lethal force in battles with combatants, rather than targeting civilians are presented in the lower right quadrant in the plots in Figure 4-4. For example, Eritrea is associated with almost 100,000 violent deaths but refrained from targeting civilians, as suggested by its CTI value of 0. Only five out of twenty three state actors, including Eritrea, who are associated with more than 10,000 violent deaths record the CTI of 0, meaning that they completely concentrated their lethal force into battling with combatants rather than targeting civilians.[151] Other actors with CTI values of 0 are located in the lowest part of the plots in Figure 4-4. These actors who refrained from the intentional targeting of civilians account for 63% of all actors (339 in 536) as shown in the descriptive statistics.

4.3. Testing Strategies

To examine the determinants affecting the intensity of civilian targeting of warring actors indicated by CTI values, this chapter employs the same regression models used in chapter 3. Furthermore, this chapter adopts dynamic panel regression models, which are not attempted in the previous chapter, to explore persistence of warring actors' lethal behaviour on civilians in prolonged armed conflict. The available duration of conflict for chapter 3 is limited to 6 years whereas the longest duration covered in the updated dataset used for this chapter is 22 years. The availability of the actors engaged in uniquely long duration of armed conflict enables to examine how and to what extent warring actors adjust their lethal behaviour on civilians over time.

The basic regression model derived from chapter 3 uses the following variables available in the UCDP datasets; duration of conflict in which actors involved, scale of armed conflict, actors' status (i.e. state or non-state), and regional variation. A formal

[151] These five state actors are Eritrea (98,340 associated fatalities), Turkey (25,280), Kuwait (22,848), Algeria (19,556), and Pakistan (17,385).

regression model to capture the effect of these political and geopolitical factors associated with warring actors is given by,

$$CTI_i = \alpha + \beta Duration_i + \gamma Fatality_i + \sum_{k=1}^{n} \theta_k Z_{ki} + \varepsilon_i \quad (4.1)$$

where CTI_i is CTI values of a warring actor indicated by the subscript i. $Duration_i$ is a length of conflict in years in which an actor i was engaged during the period of interest between 1989 and 2010. It is included to examine whether the intensity of civilian targeting of warring actors is affected by duration of armed conflict. $Fatality_i$ is total fatalities associated with the actor i on common logarithmic scale to capture the scale effect of armed conflict. The coefficient γ is expected to describe degrees to which actors concentrated their lethal force on civilian targeting as opposed to battling with combatants as violence escalated. Furthermore a set of dummy variables, Z_{ki} ($k=1,\ldots, n$) are included in Model 4.1 to control various features associated with the actors. For instance, *state*, coded as 1 if state actors, 0 if non-state actors, is to examine whether both groups behave differently in terms of civilian targeting in armed conflict. Furthermore, *short-term* is a dummy variable to isolate the actors involved in conflict for a year or two. These actors account for the majority in the dataset used for this chapter (305 in 536), and most of them are distributed at the extreme in terms of CTI values; 75% (230 in 305) did not carry out civilian targeting (CTI=0) whilst 16% (42 in 305) used civilian targeting as a sole form of their lethal behaviour (CTI=100). *Short-term* is therefore expected to capture different behavioural patterns, if any, of these actors from the ones engaged in conflict for longer duration (i.e. 3-22 years). Moreover, four dummy variables to control regions of actors are also included in Model 4.1. *MENA* is coded as 1 if location of incompatibility of actors is in the Middle East or North Africa, 0 otherwise, *Asia* is 1 if Asia, 0 otherwise, *SSA* is 1 if Sub-Saharan Africa, 0 otherwise, and finally *Americas* is 1 if North and South Americas, 0 otherwise. The base region, therefore, is Europe. Finally, ε_i indicates the error term.

Model 4.1 can be modified to be a qualitative response model to examine the determinants affecting warring actors to cross the line into carrying out some degree of civilian targeting (CTI>0) as opposed to refraining from it (CTI=0). The explanatory variables are used without modification but the dependent variable is now a binary variable

that takes 1 if an actor were involved in some degree of civilian targeting, 0 otherwise. This qualitative response model can be estimated with logit and probit methods.

Estimations with Model 4.1 provides how and to what extent factors associated with warring actors affect their lethal behaviour on civilians as opposed to battling with combatants. This cross-sectional approach, however, does not render how the actors adjust their lethal behaviour against civilians over time when they were engaged in prolonged armed conflict covering 20 years or more. To examine whether persistence in the intentional targeting of civilians is present in prolonged armed conflict, this chapter utilises a dynamic panel model as follows.

$$CTI_{it} = \alpha + \beta CTI_{it-1} + \gamma Fatality_{it} + \delta Population_{it} + \mu Inflation_{it} + \pi GDP_{it} + u_i + \varepsilon_{it} \quad (4.2)$$

where the dependent variable, CTI_{it}, is CTI value of actor *i* at time *t*. The explanatory variable of interest is the lagged dependent variable to explore a short-term memory of warring actors' lethal behaviour onto civilians in prolonged armed conflict. $Fatality_{it}$ indicates total fatalities associated with actor *i* at time *t* on common logarithmic scale. As in the cross-sectional analysis with Model 4.1, $fatality_{it}$ is included to measure the scale effect of armed conflict on the intensity of civilian targeting proxied by CTI values.[152] Furthermore, macroeconomic and demographic variables are newly included in the dynamic panel model to investigate whether these non-political factors influence the intensity of civilian targeting in prolonged armed conflict. $Population_{it}$ is the annual growth rate of population of a country where actor *i* contended to dominate territories or population (i.e. location of incompatibility). $Inflation_{it}$ *and* GDP_{it} are the annual inflation rates and annual GDP growth rates of a location of incompatibility to control the economic

[152] In regression analysis using model 4.2 in section 4.4., I also present the results excluding $fatality_{it}$ in consideration of the simultaneity issue arising from this explanatory variable used as a proxy of scale of armed conflict. As a CTI value of an actor is defined as the number of civilian deaths by direct, intentional attacks divided by total fatalities associated with the actor, and $fatality_{it}$ indicates total fatalities associated with actor, the presence of $fatality_{it}$ in model 4.2 brings about the simultaneity problem. To lessen this econometrics concern, I present the regression results with and without the variable in dynamic panel analysis.

circumstances under which warring actors may have faced during armed conflict.[153] These demographic and macroeconomic indices are obtained from the World Bank and the IMF.[154] [155] Finally, u_i is an unobserved actor-specific time-invariant effect which may be correlated with other explanatory variables and ε_{it} is the disturbance.

Estimating Model 4.2 requires different econometric methods from static panel analyses due to the endogeneity of lagged dependent variable. A basic model for a dynamic panel analysis to highlight the econometric concerns is given by,

$$y_{it} = \alpha + \gamma y_{it-1} + \beta x_{it} + u_i + \varepsilon_{it}$$

where u_i is an unobserved heterogeneity and ε_{it} is a random disturbance assumed to be normal, independent and identically distributed (i.e. $\varepsilon_{it} \sim iid(0, \sigma_\varepsilon^2)$). As the equation includes a lagged dependent variable as an explanatory variable, static panel estimation methods such as fixed effect or random effect are not applicable. Assuming that the heterogeneity, u_i, is a fixed effect, the within transformation of the equation above gives

$$y_{it} - \overline{y_{it}} = \gamma(y_{it-1} - \overline{y_i}) + \beta(x_{it} - \overline{x_i}) + (\varepsilon_{it} - \overline{\varepsilon_i})$$

where $\overline{y_i} = T^{-1} \sum_{t=1}^{T} y_{it}$ and similarly for $\overline{x_i}$ and $\overline{\varepsilon_i}$. Although the unobserved heterogeneity is eliminated with the within transformation, the explanatory variable $y_{it-1} - \overline{y_i}$ is now correlated with the compound disturbance $\varepsilon_{it} - \overline{\varepsilon_i}$,[156] leading to a bias in the estimates of the coefficient of the lagged dependent variable. First-differencing is also not a solution to address the correlation between the explanatory variable and the

[153] The correlation coefficient between inflation rates and GDP growth rates in the dataset for this study is -.09 (p=.07) which lessens the concern on the high correlation between the two macroeconomic indices.
[154] IMF (World Economic Outlook Database), World Bank (World Development Indicators). Although frequently referenced macroeconomic indices such as unemployment rates are not available for some countries involved in prolonged conflict, GDP growth rates and inflation rates are available in the World Bank and IMF datasets for most of the countries used for the dynamic panel analysis.
Annual population growth rates are the exponential rate of growth of mid-year population from year t-1 to t. Inflation rates are computed based on the consumer price index (annual %) using the Laspeyres formula. Annual percentage growth rates of GDP are calculated based on constant local currency.
[155] Time-invariant variables (i.e. regional variation) are not included in the dynamic panel model as these actor specific variables are eliminated in the estimation procedure.
[156] As $\overline{\varepsilon_i}$ includes ε_{it-1}, the explanatory variable, $y_{it-1} - \overline{y_i}$, is consequently correlated with the compound error term $\varepsilon_{it} - \overline{\varepsilon_i}$ (i.e. $cov(y_{it-1} - \overline{y_i}, \varepsilon_{it} - \overline{\varepsilon_i}) \neq 0$).

disturbance. The basic dynamic panel model above can be rewritten to give the first-differenced equation as follows.

$$y_{it} - y_{it-1} = \gamma(y_{it-1} - y_{it-2}) + \beta(x_{it} - x_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1})$$

Given the explanatory variable, $\Delta y_{it-1} = y_{it-1} - y_{it-2}$, and the first order moving average disturbance $\Delta\varepsilon_{it} = \varepsilon_{it} - \varepsilon_{it-1}$ in the first-differenced equation, Δy_{it-1} is correlated with $\Delta\varepsilon_{it}$ as $cov(y_{it-1}, \varepsilon_{it-1}) \neq 0$. Moreover, assuming the random effect model that treats the unobserved heterogeneity, u_i, as a part of the disturbance, this error component enters every value of the dependent variable by assumption, so that the lagged dependent variable cannot be independent of the error component.

To address these econometrics concerns arising from dynamic panel estimations, this chapter employs the GMM difference and GMM system methods which replace lagged dependent variable with instruments. The GMM difference method was initially introduced by Arellano and Bond (1991) who argue that the use of instrument variables produces consistent estimators if the error term is not serially correlated. The GMM difference settings firstly require the first-differencing transformation to eliminate the unobserved heterogeneity. Then one can use lagged dependent variables in levels (i.e. y_{it-2}) as instruments to avoid correlation between the explanatory variables and the compound error term.[157] This method is called GMM difference estimation as it is based on first-differencing. Arellano and Bover (1995) and Blundell and Bond (1998), however, state that the use of lagged dependent variables in levels as instruments may cause a small sample bias when the time periods is not long and the dependent variable is highly persistent.[158] They suggest the alternative GMM system method that takes both first-differenced instruments for the equation in levels, and instruments in levels for the first-differenced equation. This chapter further employs bias-corrected Least Squares Dummy Variable (LSDV) methods for the robustness of the estimates of dynamic panel regression. As Bruno (2005a, 2005b, Lokshin 2009) indicates, the bias corrected LSDV estimators often outperform GMM estimators in dynamic unbalanced panel with a small sample size, which

[157] As the error term in the first-differenced equation is $\Delta\varepsilon_{it} = \varepsilon_{it} - \varepsilon_{it-1}$, lagged dependent variables in levels (i.e. y_{it-2}, y_{it-3} ...) are not correlated with the error.
[158] A random walk process $y_{it} = y_{it-1} + v_{it}$ where v_{it} is white noise.

applies for this chapter as the number of warring actors involved in armed conflict for 20 years or more is not numerous in the dataset used for this chapter.

4.4. Regression Analysis

This section presents regression results estimated with the models described in the previous section. Table 4-7 contains the two set of regression results estimated based on Model 4.1; the left panel (column 1-4) shows the OLS regression results and the right panel (column 5-8) probit and logit estimates. Looking at the OLS results first, column 1 presents the estimates when all actors in the dataset used for this chapter are taken into account whilst column 2 only considers the actors who carried out some degree of civilian targeting (CTI>0). The regression results excluding Rwanda are also presented in column 3 and 4 in consideration of the leverage of this country due to its half a million of associated fatalities. The factors associated with warring actors appear to poorly explain the intensity of intentional, direct civilian targeting when all actors are taken into account (column 1). With regard to the variables concerning duration of armed conflict, neither *duration* nor *short-term* does have a statistically significant effect on the intensity of civilian targeting. It implies that the length of armed conflict in which warring actors involved is not correlated with actors' lethal behaviour against civilians. Furthermore, the scale of armed conflict is also not a significant determinant of the intensity of civilian targeting, as suggested by *fatality*. Holding sovereignty, however, is a significant factor influencing the intensity of civilian targeting, suggesting that state actors recorded significantly higher CTI values than non-state actors by 9 percentage points. Amongst regional dummies, *Asia* and *SSA* suggest that actors whose location of incompatibility is in Asia or Sub-Saharan Africa have significantly higher CTI values than the actors in the base region, Europe.

Excluding the actors that refrained from civilian targeting renders a substantial change in regression results as shown in column 2 in Table 4-7. Although *duration* remains as an insignificant determinant on the intensity of civilian targeting, *short-term* and *fatality* turn to be significant when only the actors who carried out some degree of civilian targeting

(CTI>0) are taken into account. *Short-term* can be interpreted that the actors involved in armed conflict for a year or two have significantly higher CTI values than actors involved in conflict for three years or more. It implies that degrees to which actors concentrated their lethal force into targeting civilians were substantially higher when they were engaged in a very short-term period of conflict than those in a longer-term conflict. This may be because actors engaged in one or two years of conflict were associated with a smaller number of fatalities, and were likely to concentrate on less costly war strategy by targeting unarmed civilians rather than battling with combatants. The scale effect of armed conflict is also significant and its magnitude is strong for the actors who crossed the line into targeting civilians (CTI>0). The negative sign of *fatality* in column 2 implies that these actors decreased their concentration into civilian targeting as opposed to battling with combatants as violence escalated. Specifically, holding other factors constant, CTI values decreased by approximately 14 percentage points whenever total fatalities associated with actors increased by a factor of ten (i.e. 100 to 1,000 or 1,000 to 10,000). Holding sovereignty, however, is not a significant factor influencing the intensity of civilian targeting any more, suggesting that state and non-state actors do not differently behave once they crossed the line into civilian targeting. Moreover, the intensity of civilian targeting is unaffected by actors' location of incompatibility, implying that there is no regional idiosyncrasy for the actors who carried out some degree of civilian targeting. An exclusion of Rwanda does not make a great difference in magnitude or significance of each explanatory variable.

The right panel of Table 4-7 presents the probit and logit estimates from the binary response model described in section 4.3. As anticipated, duration of armed conflict has positive effect on crossing the line into civilian targeting (CTI>0). Regardless of the presence of Rwanda, the probability that an actor on the mean value (4.17 years) carries out some degree of civilian targeting increases by about 3% when the actor is involved in conflict one more year. Furthermore, the scale of armed conflict is also a determinant for actors to cross the line into targeting civilians, as suggested by the direction of *fatality*. The marginal effect of total fatalities on its mean value[159] is .11, meaning that the probability that an actor carries out some degree of civilian targeting increases by 11% if total fatalities

[159] The mean of total fatalities is 2.574 on common logarithmic scale, which indicate 375 total fatalities.

associated with the actor increases by 10 times.[160] Moreover, the actors involved in armed conflict for a year or two do not behave differently in crossing the line into civilian targeting compared to the actors engaged in conflict for longer years (i.e. 3-22 years). Holding sovereignty and regional variation is also not a significant determinant for the actors in carrying out some degree of civilian targeting unless they are from Sub-Saharan Africa. *SSA* indicates that actors whose territories or location of incompatibility are in this region are about 20% more likely to carry out some degree of civilian targeting as opposed to none than actors from the base region (i.e. Europe). Together, the probit and logit estimators obtained from the binary response model suggest that the likelihood of crossing the line into civilian targeting is rather affected by endogenous features of war such as duration or scale of armed conflict, not by exogenous factors including actors' status (i.e. sovereign state or armed groups) and location of incompatibility with the exception of the actors from Sub-Saharan Africa.

Whilst duration of armed conflict in the dataset varies from 1 to 22 years, the majority of all actors (305 in 536) were involved in conflict for one year or two. On the other hand, 19 actors (12 states and 7 non-states) were engaged in conflict for 20-22 years, the longest time periods in the dataset used for this chapter. As shown in Figure 4-5 illustrating these 19 actors' annual CTI values, four of them refrained from intentional, direct targeting of civilians, maintaining a CTI of 0 while they were involved in armed conflict.[161] The rest of the actors carried out some degree of civilian targeting for at least a couple of years during armed conflicts. Although the number of actors engaged in prolonged armed conflict covering 20 years or more is not numerous in the dataset used for this chapter, it is worth exploring persistence of actors' lethal behaviour against civilians. A dynamic panel approach is suited to test this hypothesis of persistence as it enables to capture dynamic effects of CTI values by including lagged CTI values as explanatory variables in regression models.

[160] From 375 to 3750 total fatalities.
[161] All of these 4 actors are states; Turkey, Philippines, Algeria and Pakistan.

Table 4-8 presents the results from dynamic panel regressions using 3 different estimation methods as described in section 4.3. Looking at the GMM estimators first, the lagged dependent variable is statistically significant at the 1% level of significance, suggesting that a 1% increase in CTI values in the previous year led approximately a 0.2-0.3 % increase in the current year's CTI values. The effect of the lagged dependent variable is stable in most of the specifications regardless of the presence of the economic and demographic indices (i.e. *population, inflation, GDP*) [162] as well as year dummies.[163] Estimations based on the bias-corrected LSDV method also provide consistent results that the previous year's CTI values positively affect the current years' by about 0.3%, implying that warring actors who carried out some degree of civilian targeting in the previous year tend to increase their concentration on civilian targeting as opposed to battling with combatants in the current year. This may suggest the presence of a short-term memory that warring actors' lethal behaviour against civilians are likely to be intensified if they repeat the civilian targeting in prolonged armed conflict although this hysteresis effect persists only a year.[164] However, the scale of armed conflict, as indicated by *fatality*, does not appear to be a significant determinant of the intensity of civilian targeting for the actors involved in prolonged armed conflicts as shown in most of the specifications in Table 4-8.[165] Furthermore, macroeconomic and demographic factors do not have an immediate effect on warring actors' CTI values except inflation rates. *Inflation* is significant at the 5% level of significance in many of the specifications, suggesting that an increase in the overall price of goods and services may positively influence actors' lethal behaviour against civilians although the magnitude is small.

[162] An inclusion of economic and demographic variables requires a loss of degrees of freedom since macroeconomic indices such as GDP growth rates for Afghanistan is not available most of the years during the period of interest.

[163] Although the validity of instruments is weakened by the Sargan test, the Sargan test is not reliable in the presence of heteroskedasticity (Allelano and Bond, 1991), and when the number of instruments is greater than panel groups (Hansen et al., 1996), which applies for this chapter. However, the Allelano-Bond AR test suggesting the error term is not serially correlated.

[164] Although it is not reported in Table 4-8, lags of the dependent variable of a higher order than one are not statistically significant at the 5% level..

[165] The presence of *fatality* in regression model involves econometrics concerns on simultaneity bias as it also related with the dependent variable. Table 4-8 presents the results excluding *fatality* as well (column 3, 6, 11 and 12) which does not influence other estimates' significance.

4.5. Concluding Remarks

This chapter measures degrees to which 536 global warring actors intentionally used their lethal force against civilians as opposed to battling with combatants in contemporary armed conflict during 1989-2010. The analysis with the *Civilian Targeting Index (CTI),* defined as the proportion of civilian deaths intentionally and directly targeted by an actor to all violent deaths associated with the actor, shows that three quarters of all 536 actors are distributed at the extreme in terms of civilian targeting; 63% (339 in 536) recorded CTI values of 0, meaning that they refrained from targeting civilians whereas 10% (56 in 536) used civilian targeting as their sole form of lethal force, indicated by CTI values of 100.

A cross-sectional data analysis presents the determinants of warring actors' lethal behaviour in civilian targeting in the recent period of armed conflict. Duration and scale of conflict do not appear to be significant factors influencing the intensity of civilian targeting when all actors are taken into account. However, once the actors crossed the line into civilian targeting (CTI>0), scale of conflict negatively affect actors' lethal behaviour against civilians as opposed to battling with combatants, implying that they decreased their concentration on civilian targeting as violence escalated. Furthermore, the estimates obtained from the binary response model suggest that the probability of crossing the line into civilian targeting increased as armed conflict prolonged, and as violence escalated.

The findings from the cross-section data analysis in this chapter conforms largely to the ones suggested in chapter 3. This chapter goes a step further by employing a dynamic panel framework to examine to what extent warring actors adjust their lethal behaviour in civilian targeting over time. A dynamic panel data analysis with the actors involved in a uniquely long duration of armed conflict that covers 20-22 years shows that a 1% increase in CTI values in the previous year increases the current year's CTI values by about 0.2-0.3%. This may imply that actors' lethal behaviour against civilians is likely to be intensified if they repeat the civilian targeting in prolonged armed conflict. However, the scale of conflict does not appear to be correlated with the intensity of civilian targeting of warring actors involved in conflict for more than 20 years.

The finding from the dynamic panel analysis, which showed the presence of a short-term memory of the prohibited war strategy according to international norms, demonstrates an important political implication. Warring actors, either sovereign states or organised armed groups, engaged in prolonged conflict should be more carefully scrutinised by international civil society to prevent further violence against civilians. The causes of the persistence of actors' lethal behaviour on civilians remain as an important subject for future research. This chapter showed that an increase in overall price of goods and services may have positively affected the intensity of civilian targeting. Examination on macroeconomic circumstances under which warring actors operate could be the starting point to find the causes of the persistence of actors' lethal behaviour on civilians.

Table 4-1: Descriptive Statistics: States vs. Non-states

	CTI			Total Fatalities Associated with Actors		
	All	States	Non-states	All	States	Non-states
Mean	16.66 (16.51)	20.99 (20.09)	15.83	4424.86 (3462.08)	17195.93 (11355.03)	1950.29
Confidence Intervals for Means (95%)	13.91 to 19.42 (13.77 to 19.26)	13.93 to 28.05 (13.18 to 27.00)	12.83 to 18.83	2265.62 to 6584.11 (2418.33 to 4505.84)	4330.28 to 30061.59 (5748.31 to 16961.76)	1393.57 to 2507.01
Standard Deviation	32.48 (32.32)	33.12 (32.23)	32.32	25447.97 (12289.71)	60365.60 (26150.70)	6002.57
Number of Actors	536 (535)	87 (86)	449	536 (535)	87 (86)	449

** Figures in parentheses indicate descriptive statistics when excluding Rwanda.*

Table 4-2: Descriptive Statistics: CTI>0 vs. CTI=0

	CTI>0			CTI=0		
	All Actors	States	Non-states	All Actors	States	Non-states
Mean	45.29 (45.02)	35.11 (33.87)	49.01	0	0	0
Confidence Intervals for Means (95%)	39.71 to 50.87 (39.44 to 50.60)	24.90 to 45.32 (23.77 to 43.97)	42.42 to 55.60	0	0	0
Standard Deviation	39.69 (39.61)	36.67 (35.91)	40.16	0	0	0
Mean Fatalities	9474.30 (6872.07)	24094.92 (14380.84)	4222.54	1494.17	6946	866.49
Number of Actors	197 (196)	52 (51)	145	339	35	304

** Figures in parentheses indicate descriptive statistics when excluding Rwanda.*

Table 4-3: Descriptive Statistics of Five Regional Groups of Warring Actors

CTI															
	Europe			Middle East and North Africa			ASIA			Sub-Saharan Africa			Americas		
	All	State	Non-state	All	State	Non-state	All	State	Non-state	All	State	Non-state	All	State	Non-state
Mean	7.86	6.78	8.20	9.83	1.68	11.74	16.40	16.03	16.47	21.28 (20.94)*	35.95 (34.05)*	18.70	13.64	17.65	12.30
Confidence Interval (95%)	1.02 to 14.70	-1.97 to 15.54	-.52 to 16.91	3.08 to 16.59	-.40 to 3.76	3.46 to 20.02	11.05 to 21.76	1.66 to 30.40	10.63 to 22.26	16.63 to 25.93	22.09 to 49.81	13.83 to 23.56	5.77 to 21.50	-1.63 to 36.94	3.51 to 21.09
Standard Deviation	24.32	13.78	26.89	25.69	3.10	28.21	32.39	26.97	33.11	35.66	39.73	34.37	29.37	33.40	28.21
Total Fatalities Associated with Actors															
	Europe			Middle East and North Africa			ASIA			Sub-Saharan Africa			Americas		
	All	State	Non-state	All	State	Non-state	All	State	Non-state	All	State	Non-state	All	State	Non-state
Mean	2456	4795	1736	3997	12565	1992	3581	15659	2059	6176 (3915)*	29716 (14873)*	2052	1683	2816	1305
Confidence Interval (95%)	1078 to 3833	154 to 9437	530 to 2943	1616 to 6379	1811 to 23319	546 to 3438	1750 to 5412	2671 to 28646	859 to 3260	1269 to 11084	-3033 to 62464	1129 to 2973	735 to 2630	193 to 5438	337 to 2273
Standard Deviation	4898	7305	3722	9056	16008	4925	11079	24373	6838	37607	93859	6514	3537	4543	3107
Number of Actors	51	12	39	58	11	47	143	16	127	228	34	194	56	14	42

** Note: Statistics without Rwanda in parentheses*

Table 4-4: Distribution of Warring Actors across CTI values

	All actors				State actors				Non-state actors			
Range of CTI	N	% (in total)	Mean CTI	Mean Fatalities	N	% (in state)	Mean CTI	Mean Fatalities	N	% (in non-state)	Mean CTI	Mean Fatalities
0%	339	63.25	0	1,494	35	40.23	0	6,946	304	67.71	0	866
0<CTI<10%	55	10.26	4.24	16,728	19	21.84	3.51	29,909	36	8.02	4.63	9,771
10≤CTI<20%	23	4.29	14.11	7,524	7	8.05	14.38	15,003	16	3.56	13.99	4,252
20≤CTI<30%	18	3.36	25.11	3,994	5	5.75	25.07	4,170	13	2.90	25.13	3,927
30≤CTI<40%	15	2.80	34.24	2,674	3	3.45	36.42	8,390	12	2.67	33.69	1,245
40≤CTI<50%	14	2.61	46.34	3,750	5	5.75	46.52	1,174	9	2.00	46.25	5,181
50≤CTI<60%	5	0.93	55.00	1,775	2	2.30	54.09	925	3	0.67	55.61	2,342
60≤CTI<70%	3	0.56	66.87	1,324	0	0	-	0	3	0.67	66.87	1,324
70≤CTI<80%	2	0.37	74.93	1,659	0	0	-	0	2	0.45	74.93	1,659
80≤CTI<90%	4	0.75	85.54	11,084	1	1.15	84.57	2,592	3	0.67	85.87	13,915
90≤CTI<100%	2	0.37	96.24	261,562	1	1.15	98.46	519,513	1	0.22	94.02	3,611
100%	56	10.45	100	428	9	10.34	100	422	47	10.47	100	429
Total	536	100	16.66	4,425	87	100	20.99	17,196	449	100	15.83	1,950

Table 4-5: Distribution of Total Fatalities Associated with Warring Actors

Range of Fatalities	All Actors (State + Non-state)				State				Non-state			
	N	%	Mean Fatalities	Mean CTI	N	%	Mean Fatalities	Mean CTI	N	%	Mean Fatalities	Mean CTI
Less than 100	173	32.28	51	19.20	11	12.64	51	45.45	162	36.08	51	17.42
100 - 999	203	37.87	339	16.29	26	29.89	404	23.90	177	39.42	329	15.18
1000 - 9,999	116	21.64	3539	14.13	27	31.03	4243	17.33	89	19.82	3326	13.16
10,000 - 49,999	36	6.72	21327	14.69	16	18.39	19654	6.58	20	4.45	22665	21.17
Over 50,000 (without Rwanda)	8 (7)	1.49	139484 (85194)	16.88 (5.23)	7 (6)	8.05	150853 (89410)	18.75 (5.47)	1	0.22	59901	3.76
Sum (without Rwanda)	536 (535)	100	4425 (3462)	16.66 (16.51)	87 (86)	100	17196 (11355)	20.99 (20.09)	449	100	1950	15.83

Table 4-6: Distribution of Duration of Armed Conflict during 1989-2010

Duration	All Actors	State	Non-state	% in total	Duration	All Actors	State	Non-state	% in total
1 year	218	16	202	40.67	12 years	7	0	6	1.31
2 years	87	13	74	16.23	13 years	2	0	2	0.37
3 years	57	7	50	10.63	14 years	5	1	4	0.93
4 years	36	6	30	6.72	15 years	7	4	3	1.31
5 years	15	1	14	2.80	16 years	3	1	2	0.56
6 years	22	7	15	4.10	17 years	1	1	0	0.19
7 years	16	5	11	2.99	18 years	5	3	2	0.93
8 years	9	1	8	1.68	19 years	3	2	1	0.56
9 years	9	3	6	1.68	20 years	6	2	4	1.12
10 years	9	3	6	1.68	21 years	4	4	0	0.75
11 years	6	1	5	1.12	22 years	9	6	3	1.68
					Total	536	87	449	100

Table 4-7: Cross-section Data Analysis on the Intensity of Civilian Targeting in Armed Conflict

Dependent variable	CTI values				Outcome: 1 if CTI>0, 0 if CTI=0			
Actors	CTI≥0	CTI>0	CTI≥0 except Rwanda	CTI≥0 except Rwanda	All Actors	All Actors	Excluding Rwanda	Excluding Rwanda
Estimation Methods	OLS	OLS	OLS	OLS	Probit	Logit	Probit	Logit
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Duration (1-22 years)	-.15 (.29)	-.51 (.44)	-.14 (.29)	-.38 (.43)	.027** (.009)	.030** (.010)	.027** (.008)	.030** (.010)
Fatality (Log_{10})	-.82 (2.60)	-13.83** (4.78)	-1.64 (2.52)	-16.95** (4.97)	.115** (.040)	.118** (.040)	.114** (.039)	.117** (.040)
Short-term	6.34 (3.58)	31.54** (7.48)	5.66 (3.53)	28.98** (7.19)	.027 (.064)	.038 (.066)	.026 (.064)	.037 (.066)
State	9.47* (4.10)	3.29 (4.41)	8.95* (4.08)	-1.69 (4.19)	.118 (.068)	.135 (.073)	.118 (.068)	.134 (.073)
MENA	3.98 (5.02)	-.27 (9.55)	3.92 (5.01)	-1.98 (9.48)	-.025 (.103)	-.036 (.109)	-.025 (.103)	-.036 (.108)
Asia	10.60* (4.64)	7.80 (9.16)	10.35* (4.64)	6.13 (9.01)	.109 (.089)	.110 (.093)	.109 (088)	.110 (.093)
SSA	14.51** (4.27)	7.19 (8.99)	14.03** (4.26)	5.01 (8.76)	.196* (.078)	.198* (.080)	.195* (.078)	.198* (.081)
Americas	5.71 (5.24)	2.68 (11.29)	5.57 (5.23)	1.05 (11.13)	.046 (.103)	.037 (.108)	.046 (.103)	.037 (.108)
Constants	4.24 (8.29)	71.78** (17.86)	6.92 (8.00)	82.91** (15.16)				
Number of actors	536	197	535	196	536	536	535	535
R^2	.04	.54	.04	.58				
pseudo R^2					.16	.16	.15	.17

Note: Standard errors robust to heteroskedasticity in parentheses. The estimates for probit and logit results are marginal effects estimated at sample mean.
*** p<.01, *p<.0.05*

Table 4-8: Dynamic Effects of Civilian Targeting in Prolonged Armed Conflict

	Difference GMM	Difference GMM	Difference GMM	System GMM	System GMM	System GMM	Bias-corrected LSDV (BB)	Bias-corrected LSDV (AB)	Bias-corrected LSDV (BB)	Bias-corrected LSDV (AB)	Bias-corrected LSDV (BB)	Bias-corrected LSDV (AB)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
CTI_{t-1}	.25** (.05)	.20** (.03)	.21** (.03)	.36** (.05)	.29** (.04)	.29** (.04)	.38** (.06)	.36** (.06)	.34** (.07)	.32** (.07)	.34** (.07)	.32** (.07)
Fatality (Log_{10})	-.17 (2.85)	-.97 (2.60)		3.36* (3.23)	.47 (2.79)		-.51 (2.21)	-.49 (2.01)	-1.13 (2.02)	-1.11 (1.91)		
Population		2.64 (3.25)	2.80 (3.18)		7.67 (4.88)	7.59 (5.24)			-.59 (3.54)	-.27 (3.29)	-.29 (3.46)	.04 (3.22)
Inflation		.14** (.05)	.14** (.05)		.15* (.07)	.15* (.07)			.13 (.07)	.13* (.06)	.12 (.06)	.12* (.06)
GDP		-.21 (.29)	-.20 (.30)		.18 (.39)	.17 (.42)			.07 (.27)	.08 (.25)	.09 (.25)	.11 (.24)
Year Dummies	-	Included	Included	-	Included	Included			Included	Included	Included	Included
Number of Observations	345	328	328	372	353	353						
Number of Actors	19	18	18	19	18	18	19	19	18	18	18	18
Sargan Test (p-value)	278.70 (.000)	277.73 (.000)	278.16 (.000)	343.36 (.000)	323.66 (.000)	324.61 (.000)						
Arellano-Bond AR(1) Test (p-value)	-2.49 (.013)	-2.37 (.018)	-2.32 (.020)	-2.34 (.019)	-2.45 (.014)	-2.43 (.015)						
Arellano-Bond AR(2) Test (p-value)	.74 (.461)	.44 (.662)	.50 (.616)	1.30 (.195)	.77 (.44)	.66 (.51)						

*Note: ** p<.01, *p<.0.05*

Robust standard errors in parentheses for the GMM estimators. Bootstrapped standard errors for bias-corrected LSDV estimators.

GMM estimators are one-step estimators without an intercept.

Bias-corrected LSDV-AB indicate one-step Arellano-Bond estimators without an intercept whereas bias-corrected LSDV- BB Blundell-Bond estimators without an intercept.

Figure 4-1: Distribution of Warring Actors across CTI Values

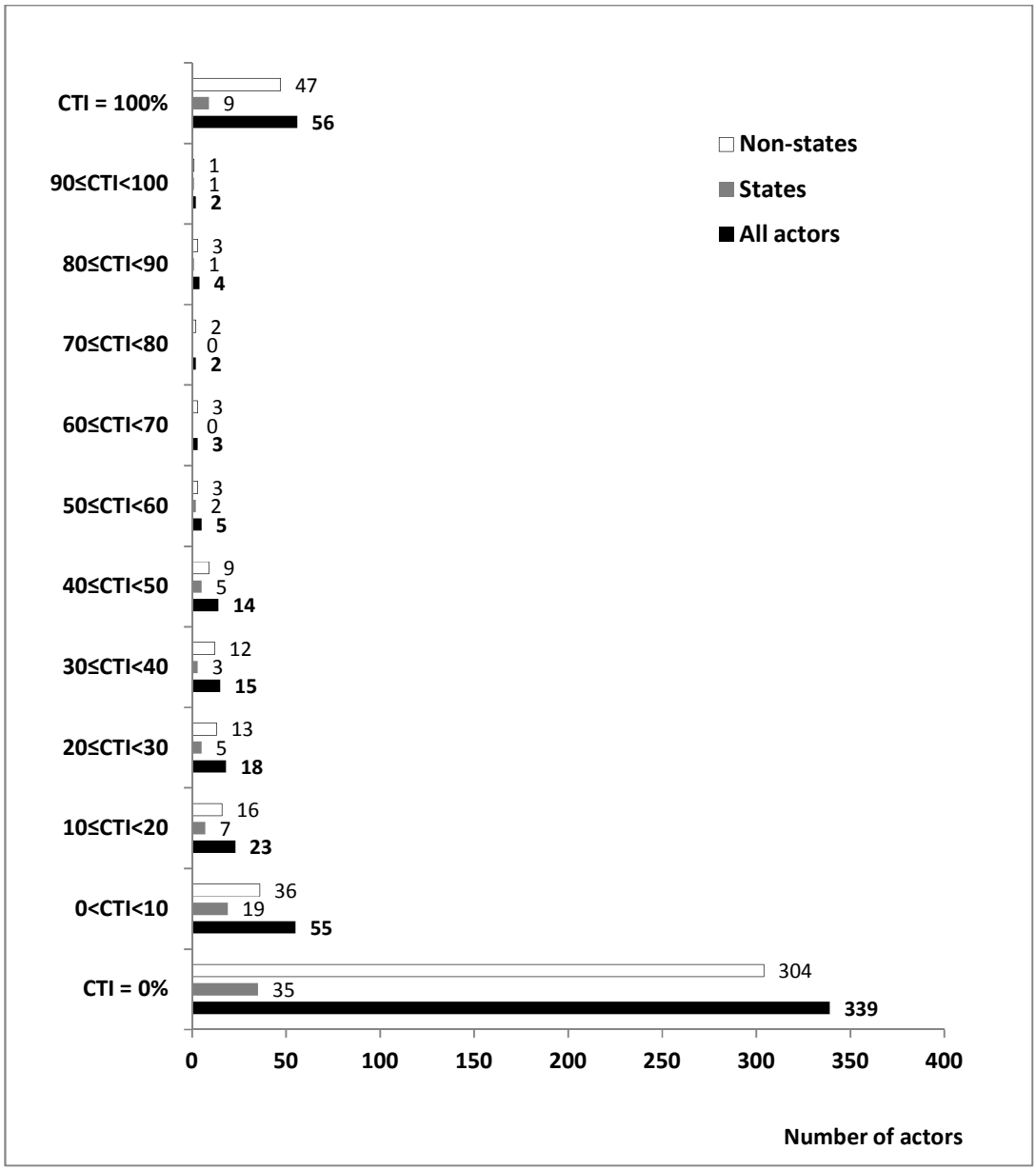


Figure 4-2: Kernel Density Estimates of Actors' CTI Value

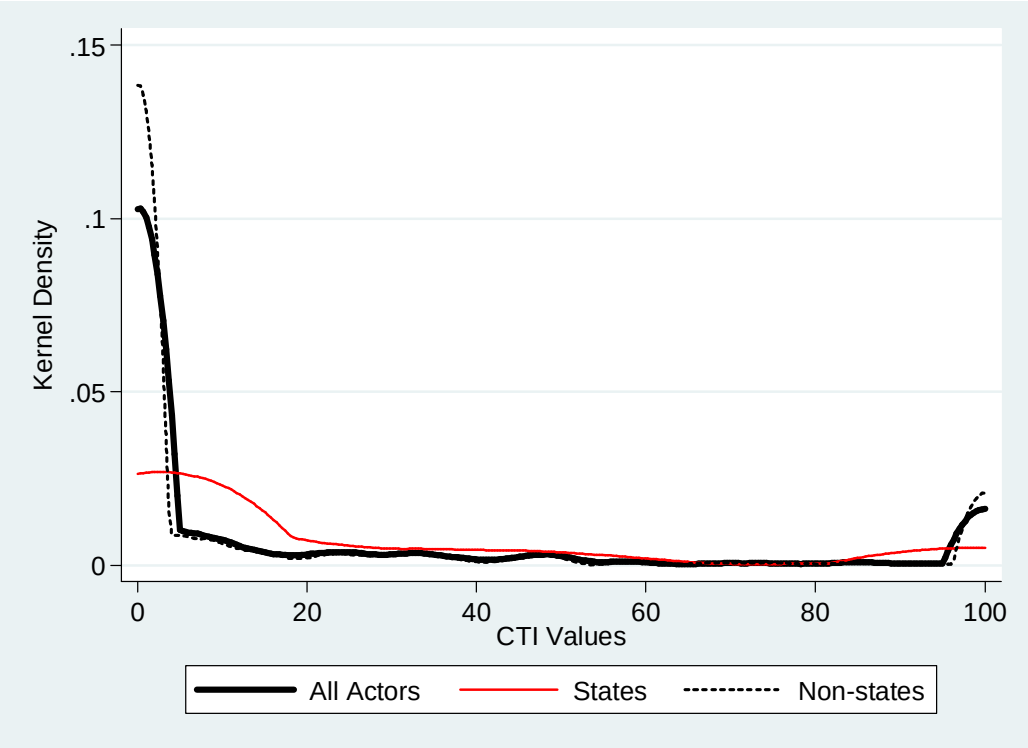


Figure 4-3: Distribution of Duration of Armed Conflict during 1989-2010

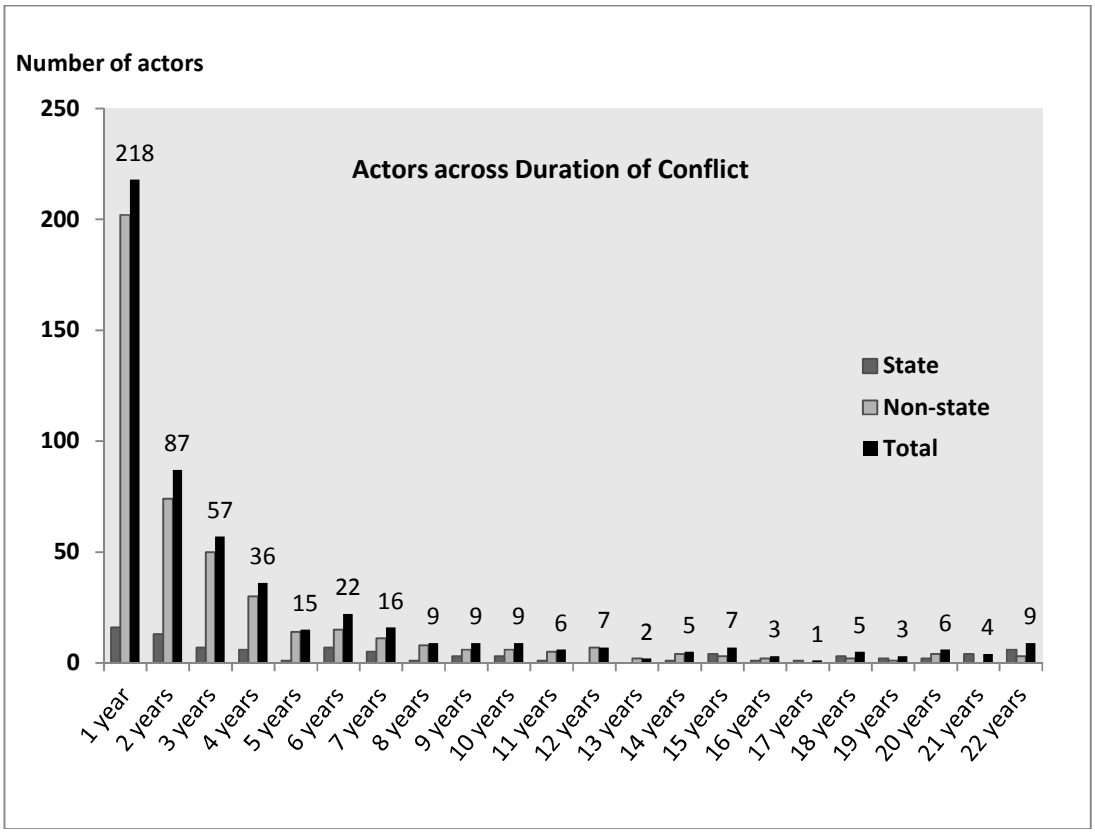
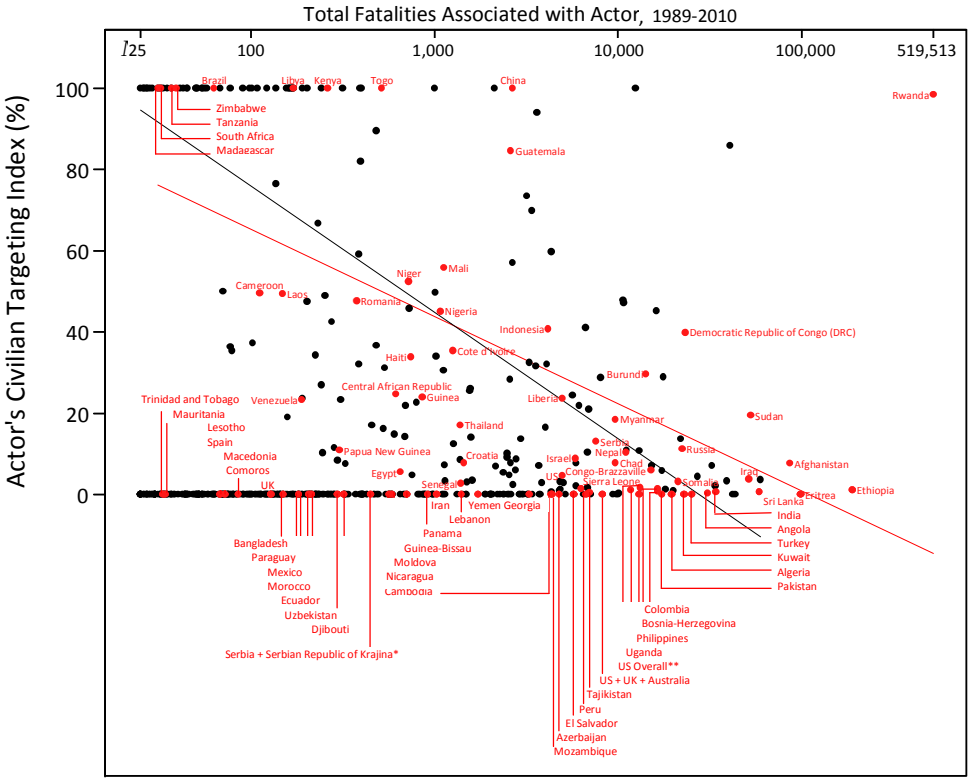


Figure 4-4: Global Comparison of Warring Actors' War Strategies between Targeting Civilians and Battling Combatants in Armed Conflict during 1989–2010

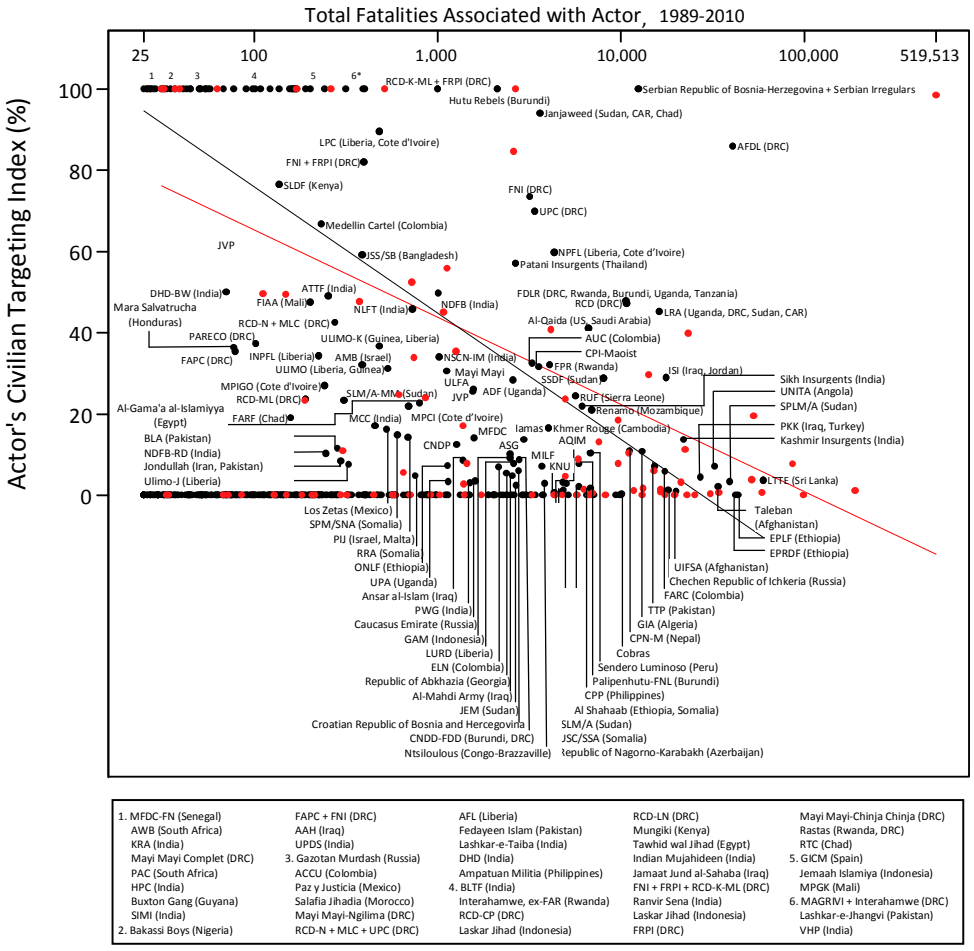


Note: The red and black lines indicate the point estimates for state and non-state actors respectively from a bivariate regression analysis when CIT values are regressed with total fatalities associated with actors. The estimates for both state and non-state actors are statistically significant at the 1% level, suggesting an inverse correlation between the intensity of civilian targeting and scale of armed conflict.

** A state actor associated with a non-state actor*

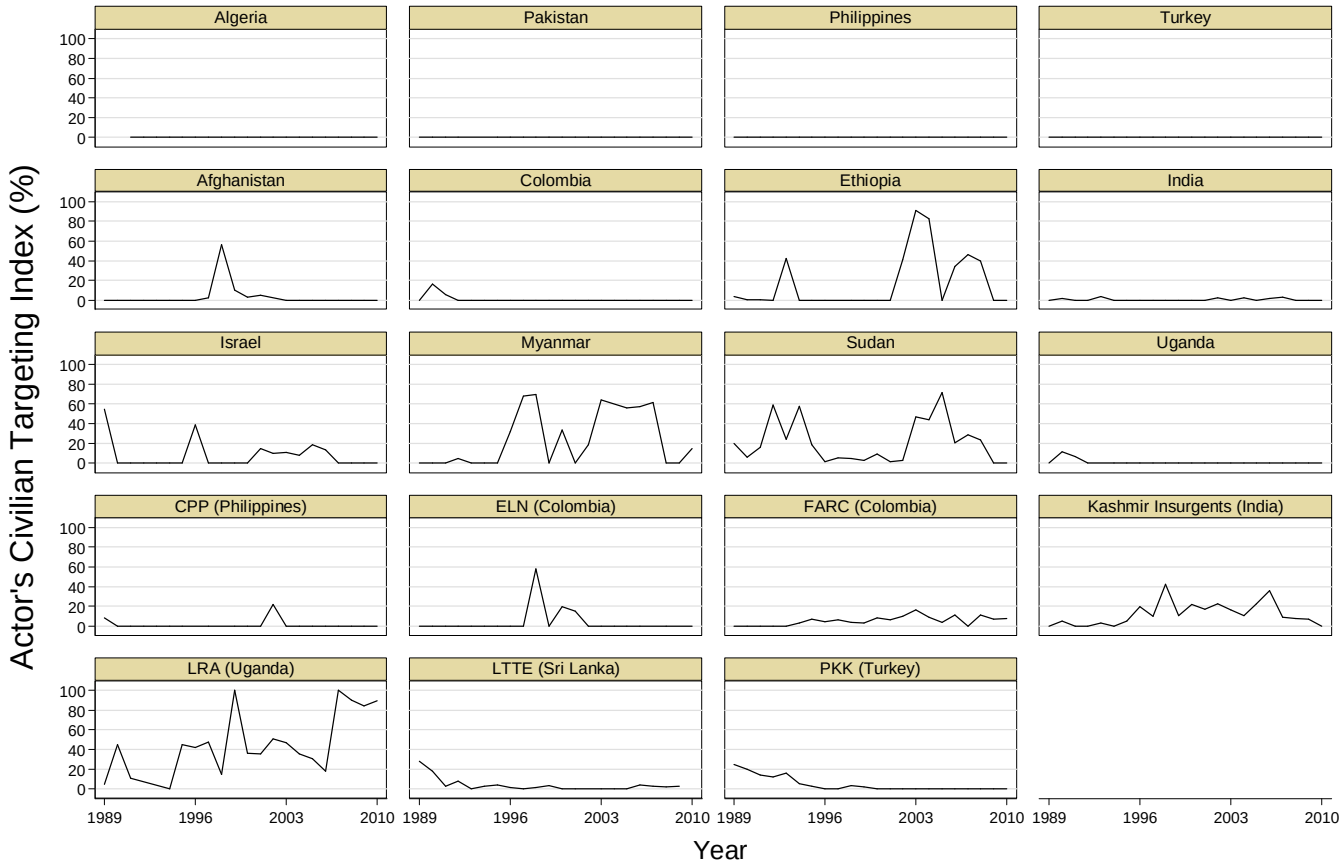
*** Comprising US as a sole actor as well as a joint actor (i.e. US associated with UK and Australia)*

Figure 4-4 continued



Note: All non-state actors with CTIs greater than 0 are labelled. Among the actors with CTIs of 0, only the ones with more than 10,000 total fatalities are labelled. The red and black lines indicate the point estimates for state and non-state actors respectively from a bivariate regression analysis when CIT values are regressed with total fatalities associated with actors. The estimates for both state and non-state actors are statistically significant at the 1% level, suggesting an inverse correlation between the intensity of civilian targeting and scale of armed conflict.
** The actors with CTIs of 100, presented in the box below the plot, are categorised under each number that are bounded by red dots.*

Figure 4-5: Annual CTI Values for the Actors Involved in Prolonged Armed Conflict for 20-22 Years



Conclusion

This thesis has been devoted to an empirical analysis of human cost during contemporary armed conflict. The first two chapters sought to better our understanding of the 2003 Iraq War, one of the major political phenomena in recent decades, by examining military and civilian fatalities that occurred during the war. The final two chapters explored the significant behavioural patterns of warring actors, both sovereign states and organised armed groups, with respect to the intentional targeting of civilians during the contemporary warfare.

Chapter 1 showed an unconventional relation between military fatalities and public support towards war using the 2003 Iraq war dataset. Having addressed irregular frequencies of poll data that restrict most time series application, the chapter suggested that American poll respondents were not affected by contemporaneous casualty information in forming their opinion over military withdrawal; arguably the most directly and substantially connected issue with the continuance of the US military operation in Iraq. Instead, the poll respondents were influenced by marginal casualty information from the previous time period, implying a slow adjustment in forming opinion through the error correction process. Although military casualty information did not have an immediate effect on poll respondents' prospective judgement on the prolongation of military operations, it strongly affected respondents' retrospective evaluation on the war. For instance, general war support, presidential job approval ratings and public conviction on war success captured in various poll question types were severely aggravated as military casualties accumulated, conforming to conventional wisdom. This difference in attitudes of poll respondents implies that although Americans believe the war in Iraq is not justifiable in consideration of its unexpectedly tremendous human costs, they deem the withdrawal of the troops should be approached on the basis of the other issues, including, for example, the level of security in Iraq.

Given these findings, the chapter suggest that the decision to terminate military operations should be made from a wider perspective than from entirely being impelled by public war support or presidential approval ratings, which are easily affected by national

fatality information in armed conflict. That public support towards war and incumbent leaders decline in accordance with the accumulation of military fatalities does not necessarily indicate that public prefers troops to withdraw, ending state military involvement, as shown in the time series analysis with the Iraq war dataset in the chapter. Rather, poll responses that the US troops should stay in Iraq were significantly higher when insurgency was acute than during the initial stage of the war when public security was less vulnerable. This may imply that poll respondents are likely to be more cautious in prospective judgement since the withdrawal of the troops from Iraq in the midst of uncertainty could bring about severe instability to the country. Finding more detailed reasons as to why poll respondents are not affected by contemporaneous military fatality information in forming their opinion over military withdrawal remains as an important area for future research.

Chapter 2's principal concern was to ascertain whether there is any significant difference in counting violent civilian deaths during the 2003 Iraq war between the US Department of Defense and the media employing the Pentagon archive and media-based record compiled by Iraq Body Count (IBC). Non-parametric equality tests showed that violent civilian deaths recorded in the Pentagon and the IBC dataset are consistent across 18 Iraqi governorates. This provides some degree of certainty that the number of deaths recorded in both datasets is not totally arbitrary although neither one could be a true number of violent deaths that occurred during the war. However, the comparative study also found that a substantial difference between the two datasets arose during the initial stage of the war. The difference was mainly observed during the intense battles between the US forces and insurgents or anti-coalition forces in Falluja, Najaf, and Samarra in 2004. Whilst the IBC dataset records a considerable number of violent civilian deaths during the battles in these cities, the US military authority collectively categorised almost all violent deaths as insurgent deaths. Given Iraqi government official figures on violent civilian deaths including women and children occurring in Falluja, the Pentagon in particular appears to have been less mindful in distinguishing civilian loss from insurgent deaths during the all-out assaults in the city. Furthermore, a conspicuous difference in the counting

of deaths between the Pentagon and the IBC dataset is systematically and consistently observed mainly in Baghdad and Basrah, during the initial period of the war.

Although it cannot be conclusively established which dataset is close to the actual number of civilian deaths that occurred during the war, the chapter suggested that the undercount by the US military authority regarding violent civilian deaths compared to media reports impeded US forces' ability to grasp the long term implications of war evolution. Given the sectarian violence and severe insurgency between mid-2006 and mid-2007, the media which consistently warned the onset of sectarian civil war by reporting a substantial number of violent civilian deaths during the preceding period, had a sharper understanding of the intensity of violence and its evolution than the US military authority would have had. This conclusion inevitably leads to the necessity of an effective counting system of war deaths, both combatants and civilians, in any armed conflict to better our understanding of the nature of violence, and to prevent unnecessary hostilities that increase human cost and damage social capital. Finally, although the chapter analysed war death information contained in the datasets available across various dimensions, it lacked a regression analysis to find factors that may have affected the intensity of violence during the war. This calls for further research on the relations between the occurrence of violent incidents involving human loss and the political or economic circumstances which a country is beset by the time of these incidents. Furthermore, the availability of war deaths information across 104 Iraqi districts contained in the Pentagon dataset leaves open the possibility to examine the spatial characteristics of the spread of violence, which would enhance our understanding on the geographic idiosyncrasies of violence.

Chapter 3 and 4 attempted to decipher the degree to which formally organised actors in armed conflict intentionally employed lethal force against civilian targets as opposed to armed combatants in battles. The chapters utilised the *Civilian Targeting Index (CTI)*, defined as the proportion of intentional civilian deaths by an actor to all violent deaths associated with the same actor, and found that approximately 60% of warring actors participating in armed conflict during 1989-2010 refrained from the intentional targeting of civilians (CTI=0) whereas 10% used civilian targeting as their sole form of lethal force

(CTI=100). The chapters further tried to deepen our understanding of what factors determine an actor's use of lethal force against civilians. Scale of armed conflict does not appear to be a significant factor in influencing the intensity of civilian targeting. However, once an actor crossed the line into civilian targeting (CTI>0), the scale of conflict negatively affects the intensity of civilian targeting, implying that as armed conflict escalated the intentional targeting of civilians as opposed to battling with armed combatants declined. Chapter 4 analysed the persistence of warring actors' lethal behaviour against civilians within a dynamic panel framework. A dynamic panel data analysis with a uniquely long duration of armed conflict that covers 20-22 years showed that a 1% increase in CTI values in the previous year increases the current year's CTI values by about 0.2-0.3%. It may suggest that warring actors who carried out some degree of civilian targeting in the previous year tend to increase their concentration on civilian targeting in the current year. The presence of persistency of actors' intentional targeting behaviour against civilians implies that there is a short-term memory in this prohibited war strategy.

Based on these findings, chapter 4 conveyed that warring actors, either sovereign states or formally organised armed groups, engaged in prolonged armed conflict should be more scrutinised by international civil society to prevent further violence against civilians. Although the chapter captured the dynamic effect of civilian targeting behaviour by warring actors participating in prolonged armed conflict, the number of actors available for the dynamic panel analysis was limited to an examination of only 19 warring actors, who were engaged in conflict for more than 20 years. Since further updated datasets were recently released,[166] additional studies on these datasets are required to examine whether the short-term memory of warring actors' intentional targeting behaviour against civilians is a valid determinant in the extended datasets. Furthermore, the reasons why intentional use of lethal force against civilians tends to intensify over time remain another interesting field for future research.

[166] UCDP released the updated datasets in August 2012, which contain war death information in armed conflict during 1989-2011.

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