

RELATIVE PEACE IN IRAQ: A POLICY EVALUATION OF THE SURGE IN TROOP LEVELS

A Thesis
submitted to the Faculty of the
Graduate School of Arts and Sciences
of Georgetown University
in partial fulfillment of the requirements for the
degree of
Master of Public Policy
in the Georgetown Public Policy Institute

By

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Washington, DC
March 25, 2009

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ABSTRACT

The March 2003 invasion and occupation of Iraq have given rise to debate on the causes of post-invasion civilian violence and its subsequent decrease beginning in early 2007. Popular press and academic journals have pointed to the roles of U.S. troop levels, Iraqi security forces, the political environment of Iraq, and socioeconomic conditions in reducing violence. The decrease coincides with a widely publicized 2007 Bush administration policy in Iraq referred to as the *surge*, the main component of which was an increase in troop levels. This paper uses a multivariate regression analysis to examine the determinants of the decrease in civilian violence and, in particular, the effect of the surge. The empirical results show that troop levels and other policy changes associated with the surge have a significant effect on reducing levels of civilian violence. These results have policy implications for other U.S. nation-building efforts, most notably for the conflict in Afghanistan.

ACKNOWLEDGEMENTS

I would like to extend my thanks and gratitude to the following GPPI faculty who helped make this thesis possible: my advisor, John Christian, for his invaluable guidance, patience, and dedication to the learning process; Donna Morrison for her generous analysis heroism; and Rebecca Johnson for getting me excited about post-conflict reconstruction and learning in general.

I also need to acknowledge the friends and family who have supported me in this endeavor. Thanks go to my Joni for help and love, and to my mother for a lifetime of support. Brian, Tom, Erica and Brandon have been a terrific panel of advisors. Dick Olson has shown me that thinking is fun and continues to be a mentor, colleague and friend. Carey Burke provided thesis advice and introduced me to the field of public policy. Additional thanks go to Raymond Brastow, David Lehr, and Melanie Marks of the Longwood University economics faculty.

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Chapter 1. Introduction

The United States (U.S.) invaded Iraq in 2003 and deposed Saddam Hussein and the Iraqi government. From that point to the present, the U.S. has expended considerable lives and money reconstructing Iraq and attempting to restore a relative peace to the civilian population. Francis Fukuyama (2006) uses the term *nation-building* to describe the reconstruction and development of countries—generally after armed conflict—and will be used in this paper to refer to these activities¹. Though spikes in violence threatened to derail U.S. efforts altogether from 2003 to 2006, the U.S. ultimately managed to reduce violence to manageable levels. While several articles and books describe the reasons for this decline, a statistical analysis has yet to be published examining the determinants of this decrease in violence.

As Table 1 shows, according to The Iraq Index (O’Hanlon, 2008), the monthly average civilian death rate in 2008 declined significantly. While decreases in civilian deaths do not equate to peace in Iraq, as the title of this thesis suggests, the situation in Iraq is certainly more stable than it was in 2006. This relative peace that began in 2007 and came to fruition in 2008 coincides with the widely publicized *surge*—a Bush administration policy that temporarily increased troop levels and instituted several other changes in order to stabilize the country. This paper uses statistical analysis to

¹ He also refers to the term state-building, which refers to strengthening a nations institutions, but since nation-building is the more widely used term it will be used here.

examine a causal link between the increase in troop levels in Iraq and the decrease in civilian violence.

May – December 2003	912
January – December 2004	1400
January – December 2005	1680
January – December 2006	2871
January – December 2007	1963
January – December 2008	620

This empirical study controls for the other determinants of civilian violence in Iraq to isolate the effect of changes in troop levels. Existing research notes that factors such as economic growth, unemployment, political factors, Iraqi Security Forces and major violence-inducing events affect civilian violence in Iraq. The results of the multivariate regression analysis show that troop levels were statistically and substantially significant in reducing levels of violence, holding these other factors constant. This finding is important in shaping future nation-building efforts, most notably for the conflict in Afghanistan.

This analysis and the findings are organized into seven chapters. Chapter 2 surveys the relevant literature and discusses the policy implications of the proposed

analysis. Chapter 3 presents the conceptual model and Chapter 4 details the research methodology and data used. Chapter 5 presents the empirical findings and their implications. Chapter 6 presents the conclusions of the research and Chapter 7 describes limitations and potential extensions of the model for future use.

Chapter 2. Literature Review and Discussion of Policy Relevance

The results of this paper will help ensure that future nation-building efforts are effective at a minimum cost – and all indications are that nation-building will continue to be important in the future. The U.S. Special Operations Command (SOCOM) posture statement suggests that threats emanating from countries similar to Iraq will require some type of military intervention, if even of lesser magnitude as Iraq (SOCOM, 2007). These interventions may range from training indigenous security forces to nation-building aimed at strengthening the host countries' ability to deal with violent internal threats to stability.

Secretary of Defense Gates notes that, while “we are unlikely to repeat another Iraq or Afghanistan anytime soon...that does not mean that we may not face similar challenges in variety of locales” (2009, p. 3). By understanding the determinants of civilian violence in Iraq, the international community can focus on the policy tools that are most effective. The most immediate challenge facing the U.S. is Afghanistan. Given the effectiveness of increasing troop levels in Iraq, a similar approach may be effective there as well. A review of the applicable literature frames these questions in the appropriate context.

Post-Saddam Iraq became quickly overwhelmed with violence. Some authors attribute this violence to early mistakes made by the Coalition Provisional Authority

(CPA), the governing authority for the first year after the invasion². Chandrasekaran (2007) describes how the CPA disbanded the Iraqi Army and instituted the De-Baathification³ policy. Chandrasekaran calls these events strategic blunders that led to increased violence and the emergence of an organized insurgency. The CPA's policies together created large numbers of unemployed men with military training, and excluded powerful (and connected) members of the Sunni community from participating in the government. However, quantifying these events and including them in the model is outside the scope of this paper.

Post-Saddam Iraq was characterized by unemployment, looting and a weak economy (though the economy was hardly flourishing before the invasion, especially under United Nations [U.N.]sanctions). Collier (2007) summarizes years of quantitative economic analysis on the relationships between poverty, conflict and development that are pertinent here. He identifies statistically significant relationships between increased economic wealth and decreased unemployment that lead to reduced levels of armed conflict. Measures have been operationally defined in the models below to account for these effects.

² The Office of Reconstruction and Humanitarian Assistance was briefly the governing body before being replaced.

³ Under this policy, even low-ranking or technical government employees who were a part of Saddam's Baath party were precluded from working in the new Iraqi government. Since many of these officials were also Sunni, the rationale is that many of them joined violent Sunni insurgent elements.

In addition to other stated reasons for reducing violence in Iraq, for example fighting terrorism and spreading democracy, the U.S. perhaps has ethical obligations to restore order and reduce violence in Iraq. Feldman (2004) discusses these ethical obligations and maintains that the U.S. is responsible for providing security for the Iraqi population given that the U.S. invasion essentially deconstructed the institutions formerly responsible for those functions. His work is complemented by Walzer's (1977) classic work describing how soldiers in armed conflict necessarily accept an increased risk to themselves to reduce the risk to innocents and the civilian population. These concepts structure how violence will be operationally defined as a dependent variable in Chapter 4.

A separate body of knowledge in the literature on counterinsurgency describes how order is restored in the face of insurgencies. Nagl (2002) writes about the historical lessons of counterinsurgency campaigns through the lens of Vietnam and Malaysia. He writes that influencing and securing relevant populations and operating alongside the general populace are key factors in success. Nagl was also one of the key authors of the revised Army/Marine Core Counterinsurgency Field Manual⁴, a document that influenced the military approach to Iraq around the surge time period. He concludes here that a high ratio of troops to the occupied population is critical in reducing violence and fighting insurgent elements.

⁴ Army FM 3-24 and MCWP 3-33.5.

In light of the theories about counterinsurgency efforts, other authors have suggested that the surge was a key element in profiting from the Awakening movements in the Anbar province⁵. The Awakening movements refer to the collaboration of the U.S. military and Iraqi Security Forces with local tribes and militia elements (especially Sunni tribes in Anbar) to provide security. West (2008) writes that the beginning of the decrease in violence began with these Awakening movements in the Anbar province and eventually spread to Baghdad. This program was more formally expanded over 2007 where these militia and tribal elements were paid by the U.S. to provide security (and additionally to *not* fight as insurgents). West credits the decrease in violence in 2007-2008 to the dual effect of this partnering with indigenous security forces and the increased U.S. military presence in Anbar and throughout Iraq. By teaming the U.S. military with police forces, insurgents could be quickly identified using less intrusive methods. Since the local militias and tribal groups knew who the insurgents were (in part from having worked with them in the past in some cases), they could identify the insurgents more quickly than their U.S. counterparts and without adverse tactics like frequent and invasive home searches. For this thesis' research design, the focus on partnering at the local level supports a focus on police forces specifically rather than the overall size of the Iraqi Army.

⁵ Also referred to as the Sunni Awakening or the Anbar Awakening, etc.

As the surge was suggested and debated, there was not immediate agreement in the U.S. government on the potential effectiveness of the policy. While there was support for an increase in troop levels from many high-level administration officials, there was uncertainty as to whether or not there would be a resulting decrease in violence. Woodward (2008) points to the fragmented nature of the rationales for the surge and the lack of clarity as to which specific actions would be most effective. Additionally, opinion among Bush administration officials was divided concerning the readiness of Iraqi Security Forces. While most agreed that increasing Iraqi Security Forces would eventually lead to reduced violence and would reduce the perceived role of U.S. forces as occupiers, there was concern that the Iraqi Security Forces were largely sectarian and varied widely in effectiveness. He also notes how electricity was viewed by the Iraqi people. As a highly visible and nation-wide instrument of the national government, electricity was seen by the Iraqi population as an indicator of the overall strength and legitimacy Iraqi government.

Biddle, O'Hanlon and Pollack (2008) also examine the apparent success of the surge and provide statistical evidence to support their claims, in part using Brookings Institution's Iraq Index to support their claims (the same data used for this paper). They credit the decrease in violence to general mistakes made by al Qaeda in Iraq (for

which data was unavailable),⁶ the increase in U.S. troop levels, the improved capabilities of Iraqi Security Forces and the subsequent decline of the Shiite militias for decreasing civilian violence in Iraq. They also note that violence has strong inertial effects, meaning that once violence begins it is difficult to stop and can be self-sustaining. For example, violence leads to reprisal killings and more violence, while peace leads to more stability and cooperation and in turn less violence. Thus, as part of the regression model, statistical control for violence in a previous time period must be included.

⁶ For example, they discussed how using brutality and appropriating Sunni smuggling networks tactics in the Anbar region alienated Al Qaeda's Sunni allies there. Sunni tribesmen saw Al Qaeda as being as repressive as Saddam Hussein, albeit in a different form. This was one of the factors they credit as leading to the Awakening movement.

Chapter 3. Conceptual Model

The conceptual model incorporates three thematic areas that are hypothesized to affect civilian violence in Iraq (described in detail in Chapter 4):

Civilian Violence = f(Stability, Socioeconomic Conditions, Political Conditions)

Stability factors include items such as, U.S. military, Iraqi Security Forces (ISF) and Coalition military actions taken to increase stability, the efforts of violent and insurgent elements, and the effects of indigenous law enforcement efforts.

Socioeconomic factors include the occurrence of significant events that may incite violence (e.g. the Samarra Mosque bombing), the effects of income and wealth, future employment prospects, and the availability of basic goods. Political factors speak to the efficacy of Iraq's public institutions and their ability to deliver basic goods and services, as well as their perceived effectiveness and legitimacy by the population.

Viable proxies and measures for these variables have been operationally defined in the model as described in Chapter 4, and some of the potential omitted variable effects are described in Chapter 7. Civilian violence in a previous time period is controlled for as well. All of these factors form the following model equation, with the subsequent symbols and measurements shown in Table 2:

Model Equation: $CIV_t = \beta_0 + \beta_1 CIV_{t-1} + \beta_2 TRP_{t-1} + \beta_3 SURG_t + \beta_4 ELEC_t + \beta_5 MAJ_t + \beta_6 KER_t + \beta_7 POL + \beta_8 OIL_t + \epsilon_t$

Table 2: Variable Units of Measurement		
Variable	Measure	Symbol
Civilian Deaths	# of deaths per month	CIV
Troop Levels	Thousands of U.S. troops in Iraq	TRP
Surge	Binary	SURG
Electricity	Megawatts produced nationally per month	ELEC
Major Events	Binary	MAJ
Kerosene	Millions of liters/day produced & imported in a given month	KER
Police	Thousands of Iraqi police reported on duty	POL
Oil Revenue	U.S. \$Billions	OIL

Chapter 4. Research Design: Data and Method

This section provides a method overview, a data source overview (including limitations of the data), and detailed variable descriptions. It also describes the theory and relevant literature behind the thematic areas in the conceptual model.

Method Overview:

This paper examines the magnitude, sign and statistical significance of the conceptual model factors and their impact on civilian violence. The empirical work will isolate and analyze the effect of troop levels on civilian violence in Iraq. To accomplish this, a multivariate regression model will be applied that correlates the effects of troop levels on civilian violence in Iraq. By holding factors such as economic growth and the strength of political institutions constant, the partial effects of troop levels are assessed. Interpretation of these variables and their significance will form basis for the findings and conclusions.

Data Source Overview:

The Iraq Index (O'Hanlon, 2008) is a Brookings Institution research effort capturing data on Iraq from March 2003 to the present. This work compiles a multitude of government reports and publicly available data sources into one statistical resource book. These data are compiled into a report that is updated monthly with newly available information. For example, the index of political freedom in Iraq

compared to other countries does not vary over the timeframe captured. However, significant portions of the data are collected monthly and show clear changes over time. The data used for this paper were captured in October 30, 2008 and have not been revised to include updates since that time.

A research team at Brookings collated and structured the data set based primarily on U.S. Government sources, supplemented by NGOs and other sources as applicable. No sampling or other statistical techniques were applied by that team. The authors in many cases had to make assumptions that may even materially affect the values of each variable. The Iraq Index (O’Hanlon, 2008) measure of civilian deaths combines crime-related murders with conflict-related deaths. As the conflict continued, it became infeasible to distinguish the two. However, this data set is the best available unclassified data in terms of comprehensiveness, and is directly relevant to the topic of this paper. Even given the possible data limitations, it would be difficult to argue that the relevant data, compiled by credible institutions, is so unreliable that inferences from statistically significant relationships should not be made.

The month-level variables provide the backbone of the data source. Due to limitations on available data, certain elements of the conceptual model have been operationally defined using variables that do not fit precisely into the discrete thematic areas, such as electricity. The electricity variable has both socioeconomic effects, such

as supporting economic growth by providing improved infrastructure, and political effects, as described below.

Detailed Variable Descriptions

The specific variables chosen to measure the thematic areas discussed in the conceptual model are described below. Table 3 presents descriptive statistics for each variable. Of particular note is the range in values for civilian deaths and Troop Levels.

Table 3: Descriptive Statistics					
Variable	Unit	Mean	Standard Deviation	Low	High
Civilian Deaths	# of deaths	1,671	914	490	3,709
Troop Levels	Thousands of troops	143	11.7	115	171
Surge	Binary	0.19	N/A	N/A	N/A
Electricity	Megawatts	3967	435	3193	4860
Major Events	Binary	0.234	N/A	N/A	N/A
Kerosene	Millions of liters/day	6.75	2.68	2.60	17.28
Police	Thousands of police	134	66	30	249
Oil Revenue	Billions of dollars	2.65	1.62	0.20	7.01

A. Civilian Violence (Dependent Variable)

The monthly number of civilian deaths was chosen as the most comprehensive and appropriate measure of violence and the impact of violence on the Iraqi population. Other measures of violence in Iraq exist as well, such as enemy attacks against the coalition, or the number of multiple fatality bombings. These measures

would more precisely focus on the nature of the insurgency and military conflict itself. However, civilian deaths more accurately measures progress in the Iraq conflict toward overall stability, as well as the ethical obligations of the U.S. to protect the Iraqi population.

Nagl (2002) notes the role of winning the support of the population as key to overall success and to counterinsurgency in particular. This support is predicated on the ability to protect and secure the population—a concept more accurately measured in civilian deaths than attacks against military forces. In addition, Feldman (2004) addresses the ethical obligations that an occupying power (the U.S. and coalition) has towards the occupied country (Iraq). By invading Iraq, dismantling the Iraqi government and institutions, disbanding the army, and creating a state incapable of defending itself, the U.S. accepted an ethical responsibility to protect the Iraqi population. Taking this position a step further, according to the principles of Just War Doctrine as described by Walzer (1977), U.S. and coalition soldiers should accept an increased risk in discharging their obligations to protect the Iraqi population. This implies that reducing levels of violence inflicted on the troops engaged in the conflict is a secondary ethical objective. Thus, from both an ethical and pragmatic perspective, reducing the level of violence exhibited on the Iraqi population is the most appropriate measure.

Collecting data for civilian deaths is challenging—as might be expected for a controversial statistic such as this one. The Iraq Index (O’Hanlon, 2008) utilizes data from a number of sources to compile a count of civilian deaths, including a New England Journal of Medicine study, the “Iraq Body Count” website, the UN Assistance Mission for Iraq, as well as Iraqi and U.S. Government figures. There is some disagreement among these sources, and The Iraq Index (O’Hanlon, 2008) attempts to accommodate each position by combining estimates together and including them all. For example, some of these estimates were upwardly adjusted to account for higher reported figures by the Iraqi government. In another example, The Iraq Index (O’Hanlon, 2008) factored in the approximately 23,000 murders in Iraq using murder rates in Baghdad to distribute them proportionally across the timeframe of the data source. The data on civilian deaths do not distinguish between violent deaths related to the occupation and insurgencies and more typical crime-related deaths.

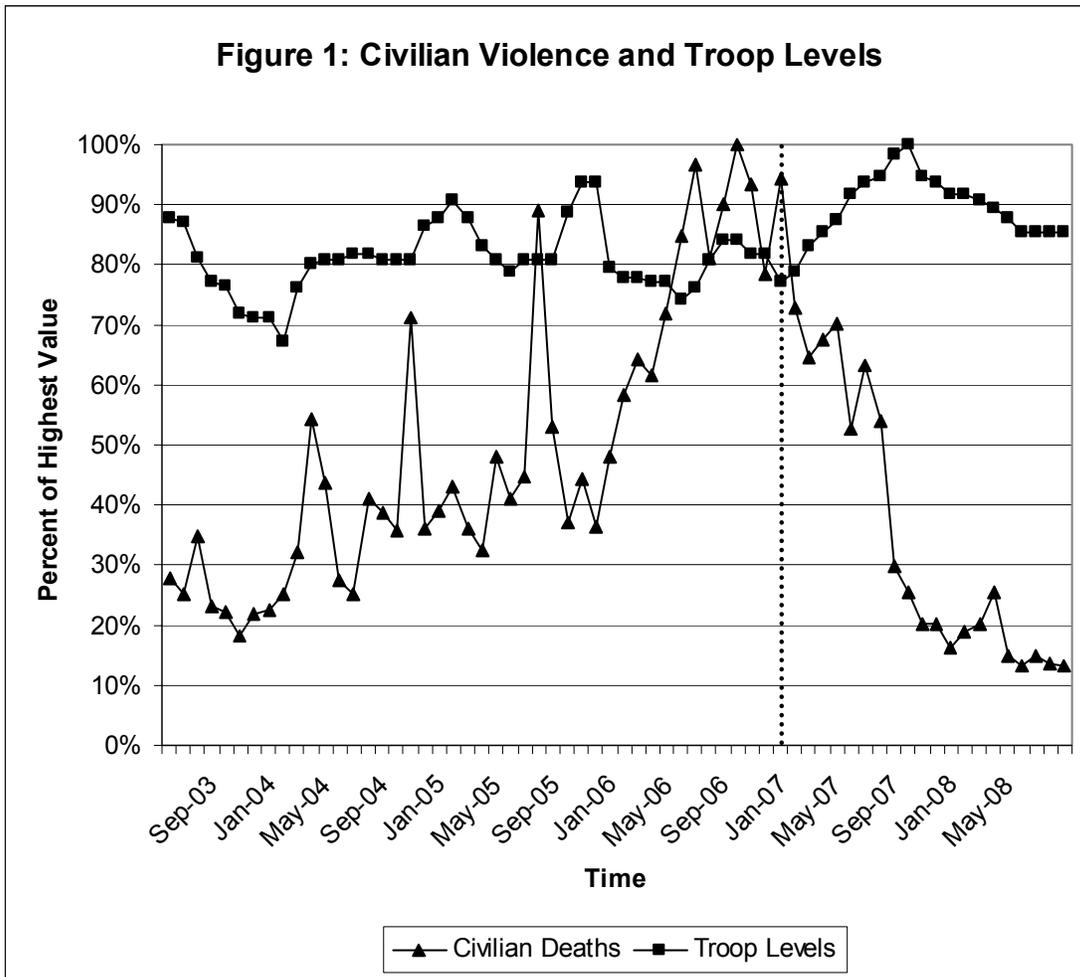
B. Stability (including Troop Levels, the variable of interest)

The primary independent variable of interest, troop levels, is included here and captures the monthly total number of U.S. troops in Iraq from July 2003 to October 2008. Since this paper examines the impact of the U.S. surge policy, the number of coalition troops is not included in troop levels. Additionally, noted by Sharp & Blanchard (2007), coalition contributions were principally in the training arena and did

not directly affect the ongoing operations to the same degree as U.S. forces. However, fluctuations in overall coalition troop levels could have some effects that are not accounted for as a result.

Figure 1: Civilian Violence and Troop Levels plots civilian violence and troop levels on the same figure as percentages of their highest value to allow direct comparison. Troop levels are at their highest value in October 2008 at 171,000, and civilian deaths in October of 2006 at 3,409. The dotted line is the month in which the surge policy began (February 2007). In some instances, such as around May of 2004 and May of 2005, troop level increases follow increases in Civilian Violence, validating the lagged approach. It is also clear that violence decreased significantly over the duration of the surge as troop levels reached their maximum value (since the invasion) and then gradually declined.⁷

⁷ The maximum value was actually 173,000 in May of 2003, which was not included in the model calculations due to missing values for Iraqi police forces.



Empirical results reveal that the best specification for troop levels is lagged by one time period (a month), which is also consistent with theory. Since the data are for troop levels and not changes, it may take up to a month for the total change in troop levels to be felt and for information to travel throughout the population. The lagged approach also ensures that the model measures the impact of troop levels on violence,

whereas a model that used troop levels in the same period as levels of civilian violence may also capture the effect of civilian violence on troop levels as well (a problem with simultaneity). The model should only measure troop levels' impact on civilian violence, not the other way around. This specification is discussed in the Chapter 5.

The Stability factor also captures the effects of Iraqi police forces on reducing violence. As discussed in the literature review, it is likely that Iraqi police forces are the most directly applicable measure for population security. As noted by West (2008), while Iraqi Army forces were working with coalition forces to conduct operations, the greatest effect of the Awakening movements was found with the cooperation of U.S. forces with local police and tribal elements. Also, as discussed in the empirical results section, the data for police forces caused the least amount of multicollinearity (compared to other types of ISF).

As Biddle, O'Hanlon, & Pollack (2008) illustrate, there could be substantial inaccuracies and embellishments in the actual levels of readiness of ISF. In addition, in November of 2007 the data move from U.S. numbers to Iraqi Ministries of Defense and Interior numbers, resulting in a significant jump in the number of all type of ISF. However, while readiness may not be directly proportional to numbers of ISF, these data should still serve as a valid proxy. It is reasonable to expect that numbers of Iraqi

police forces will trend upwards together with the overall readiness of Iraqi police forces, even if not perfectly.

To isolate the effects of fluctuations in troop levels, a binary variable was created to identify the effects of surge policy beginning in February 2007. This variable isolates the impact of troop levels outside of other policy changes that occurred during the surge timeframe (e.g. the Awakening Movements, changes in the disposition of U.S. forces, etc.). This isolates the surge as a distinct program that was implemented in February 2007, to examine whether or not levels of civilian violence were significantly different before or after the surge was implemented.

To further isolate the impact of troop levels themselves, a variable for lagged civilian deaths (civilian deaths in time period $t-1$) is included in each model to account for the self-sustaining nature of violence and control for inertial effects. By including this variable, the model captures acts of retribution and retaliation that creates a cycle of violence that feeds an increase in future violence. This allows the model to estimate civilian deaths in the current period by holding civilian deaths in the previous period constant.

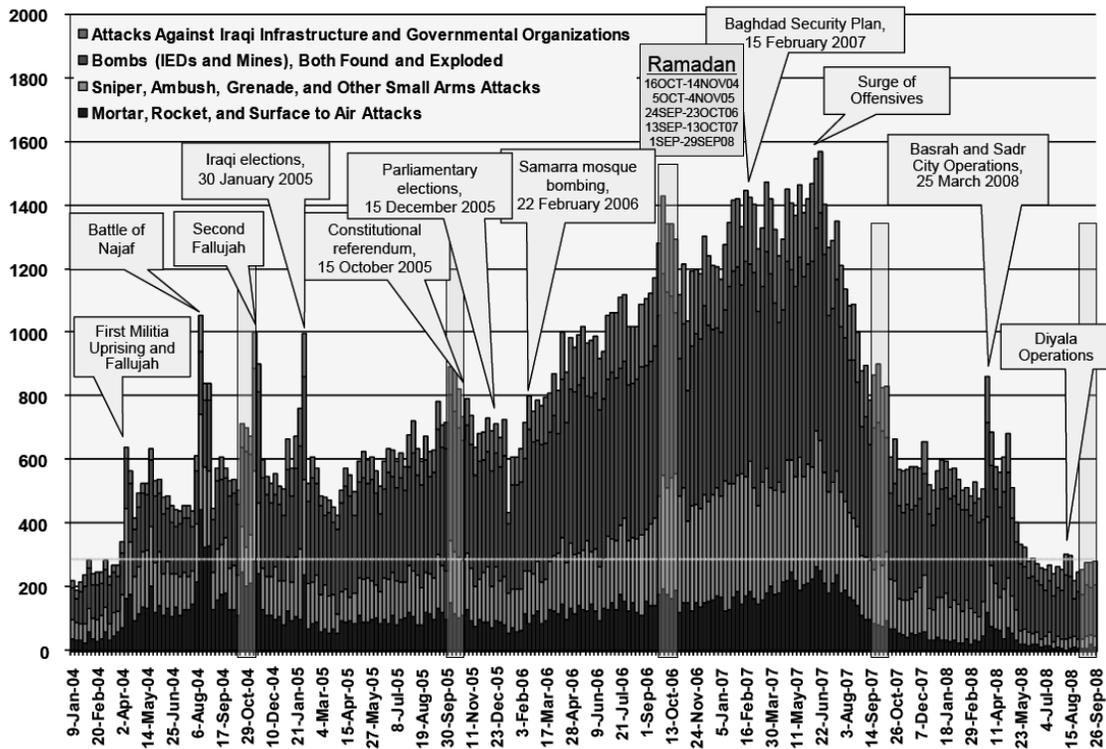
C. Socioeconomic and Political Factors

In conjunction with the Stability factors, socioeconomic and political factors have the potential to both increase and decrease levels of civilian violence. Religious

events, such as Ramadan, or spectacular attacks, such as the Samarra Mosque bombing in February 22, 2006, may have a broad cultural and societal effect on levels of civilian violence. To control for some of these major societal events, the Major Events variable was developed as a binary variable. To preclude bias in defining what a “Major Event” was, the coding was based on events identified in Figure 2, developed by the U.S. Department of Defense (DoD)⁸ and appearing in The Iraq Index (O’Hanlon, 2008) in October 2008. Months in which a major event has occurred are identified on the figure by a text box with an event description.

⁸ Originally from: Measuring Stability and Security in Iraq, U.S. Department of Defense Quarterly Report to Congress, March 2008, p. 18.

Figure 2: Enemy Initiated Attacks by Week



Collier (2007) also noted that economic factors such as income/wealth and economic growth can affect the strategic calculus of violent elements by raising the opportunity costs of violence—if Iraqis have a better economic future then they are less likely to risk that future by engaging in violent acts. Since direct measures of these variables such as Gross Domestic Product (GDP) and unemployment rates were either not available or unreliable, other measures were selected. Oil Revenue from exports is used to measure income, as this influx of revenue affects the general sentiment of the population. If the government coffers are flush with oil revenue, then

secondary effects and an increased sense of optimism will be felt by the people. This measure is problematic, however, as one of the key disputes in the Iraqi government is how to share oil wealth and revenue. Regardless, it still serves as a valid proxy and should trend together with general economic development. Kerosene import and production was also selected as a measure of the availability of basic implements of subsistence, the lack of which may induce civilian violence.

Political conditions can also either reduce or increase levels of civilian violence. As Fukuyama (2006) illustrates, the strength and perceived legitimacy of political institutions will impact the strategic calculus of violent organizations and their members. If the Iraqi government is incapable of providing basic services, civilians may join violent organizations to secure basic needs for themselves and their families. A perceived governmental weakness may also provide violent organizations with perceived legitimacy, under the premise of fighting an illegitimate government. If the Iraqi government is perceived as capable of providing basic services, it could lead to a decrease in civilian violence. As Chandrasekaran (2007) illuminates, for many Iraqis this perception of the government is embodied by its ability to provide electricity to the population. To capture this effect, the Electricity variable measures the amount of megawatts generated nationally.

Chapter 5. Empirical Findings

This chapter presents four models of determinants of civilian violence in Iraq and describes the quantitative results. This chapter also describes pertinent statistical issues, how they are treated in the model iterations, and their implications. The chapter begins with a foundational model of the determinants of civilian violence and progresses incrementally to examine the effects of troop levels and the surge policy.

Before describing the results, it should be noted that time series regression models can experience issues when one or more explanatory variables trend upwards or downwards over time along with the dependent variable. However, a bivariate regression of time on civilian deaths does not reveal a statistically significant relationship between the two. In addition, civilian deaths may be postulated to exhibit seasonality; perhaps by diminishing in the cold months and picking up again over the summer. However, regressions using month dummy variables on civilian deaths shows that no month's coefficient is statistically significant, and the month dummies are not jointly significant at any conventional level. One possible explanation is that while major insurgent operations may, for example, decrease over the winter, there are other ways of affecting civilian deaths during the cold months, such as a car bomb. In addition, the major events variable controls for Ramadan, elections, and other events.

Foundational Model without Troop Level or Surge Policy Effects

This section begins with Model 1: Foundational, showing the determinants of civilian deaths without the effects of U.S. troop levels and the surge. Model 1 looks at the natural log of civilian deaths as a function of electricity, kerosene production, Iraqi police forces, the natural log of oil revenues, and controls for whether or not a major event is occurring. As described in Chapter 3, subsequent models include lagged civilian deaths as an explanatory variable. Analysis shows that the best specification for civilian deaths is the natural log form, capturing any non-linearity in civilian deaths and allowing for coefficient interpretations in percentage terms. Regressing Model 1 provides the following results, presented in Table 4:

Table 4: Model 1 – Foundational

	Model 1 Foundational	Model 2 Surge Only	Model 3 Surge and Troop Levels	Model 4 Troop Levels Only
Constant	2.23*** (.787)	-	-	-
Troop Levels in t-1	-	-	-	-
Surge	-	-	-	-
Electricity	-.00013 (.0001)	-	-	-
Major Events	.092 (.083)	-	-	-
Kerosene	-.035** (.016)	-	-	-
Police	-.00096 (.001)	-	-	-
Oil Revenues (natural log form)	.045 (.125)	-	-	-
Civilian Violence in t-1 (natural log form)	.803*** (.074)	-	-	-
R ²	.80	-	-	-
N	63	-	-	-

*Significant at the 90% confidence level. **Significant at the 95% confidence level.

***Significant at the 99% confidence level. Standard errors are in parentheses

Model 1 acts as a baseline that the additional effects of U.S. Troop Levels and the surge policy can be measured against. With an R-squared of .80, Model 1 explains a substantial amount of the variation in civilian deaths. However, time series regressions including lagged dependent variables often have large R-squared values. The underlying causes of violence that persist through time are now captured in the

lagged dependent variable, though they cannot be examined directly. Model 1 also shows that Kerosene and lagged civilian deaths are statistically significant but electricity is not. These results are analyzed in more detail in Section D.

Model 1 includes other surprising results that merit further analysis. Reported numbers of Police and Oil Revenues are not statistically significant. However, these variables are highly correlated with both time⁹ and with each other – each with at least a .80 correlation coefficient. In addition, since the Surge variable has a high correlation coefficient with respect to time (since the surge is active in later time periods), the Oil and Police are highly correlated with the Surge variable. This means higher standard errors resulting from multicollinearity.

A bivariate regression between civilian deaths and Police reveals that the Police variable is not significant in explaining civilian violence. In addition, several variants of the above model show the predicted sign for the Police variable as positive, and the effects of Iraqi Security Forces remain statistically insignificant across most specifications.¹⁰ Future iterations of the model drop the Police variable due to its statistical insignificance and correlation with the Surge variable.

⁹ Time is a count of the numbers of months that have passed since the first period measured in the model, July 2003. Thus it begins at 1 and ends at 63. Correlation with the time variable indicates that the variables in question trend upward or downward over time.

¹⁰ These transformations include: including lagged versions of the police forces, aggregate numbers of Iraqi Security Forces (adding Iraqi Army, National Guard and Border Patrol), versions that take natural logs of the above, and a transformed variable that accounts for discrepancies between U.S. and Iraqi figures.

Several factors may explain these results. First, there is no reliable measure of how much the Iraqi police forces have been infiltrated by insurgents, terrorists, and members of violent sectarian groups. For example, it is plausible that as enrollment increased, members of Shia death squads have an easier time infiltrating the police forces which leads to more violence. Second, as described in the research design section, the reported number of ready police forces may not be indicative of their overall readiness. Their correlation with time (.96) means that numbers of police on duty are almost a perfect linear function of the number of months gone by. This suggests that reported numbers are seen as a way to demonstrate progress for political purposes.

The Oil Revenue variable is also highly correlated with both the Surge variable and time. A bivariate regression also reveals that Oil Revenue is not statistically significant in explaining civilian deaths. Since the Kerosene variable also captures socioeconomic factors, Oil Revenue is also removed from the model in future iterations. As discussed in Section D, when the Oil Revenue, Police and the surge variables are removed from the model, Electricity becomes significant at the 90% level of confidence. Therefore, Electricity is included in all future iterations.

Surge Policy Effects

Model 2: Surge Only adds the surge variable to the foundational model described above. As discussed in the literature review and research design chapters, the surge marks a policy shift in Iraq and captures several broad changes happening at once (e.g. the Awakening Movements, disposition of coalition forces, etc.). The statistical significance and magnitude of the Surge variable provides insight into the effectiveness of policies and other actions occurring during the Surge time frame in reducing levels of civilian violence. This approach is similar to a program evaluation, measuring the status of civilian violence before and after the Surge treatment. Table 5 shows the results:

Table 5: Model 2 – Surge Only

	Model 1 Foundational	Model 2 Surge Only	Model 3 Surge and Troop Levels	Model 4 Troop Levels Only
Constant	2.23*** (.787)	2.54*** (.732)	-	-
Troop Levels in t-1	-	-	-	-
Surge	-	-.230*** (.080)	-	-
Electricity	-.00013 (.0001)	-.00007 (.00008)	-	-
Major Events	.092 (.083)	.115 (.079)	-	-
Kerosene	-.035** (.016)	-.043*** (.016)	-	-
Police	-.00096 (.001)	-	-	-
Oil Revenues (natural log form)	.045 (.125)	-	-	-
Civilian Violence in t-1 (natural log form)	.803*** (.074)	.734*** (.074)	-	-
R ²	.80	.82	-	-
N	63	63	-	-

*Significant at the 90% confidence level. **Significant at the 95% confidence level.
***Significant at the 99% confidence level. Standard errors are in parentheses

The Surge variable is statistically significant at the 99% level of confidence, and is predicted to decrease civilian deaths by 23 percent. This appears to corroborate the analysis provided by West (2008) that civilian violence began with the Awakening Movements in the Anbar province and spread across Iraq. Of course, the Surge variable does not distinguish between the different changes occurring during that time

period. It is now apparent that changes in troop levels during the Surge period had an impact, but there are additional results that provide a deeper explanation.

U.S. Troop Level Effects

Model 3: Surge and Troop Levels adds the Troop Levels variable to examine the impact of higher troop levels in addition to the Surge policy effects. Table 6 shows the results of adding troop levels into the model on top of the Surge:

Table 6: Model 3 – Surge and Troop Levels

	Model 1 Foundational	Model 2 Surge Only	Model 3 Surge and Troop Levels	Model 4 Troop Levels Only
Constant	2.23*** (.787)	2.54*** (.732)	3.75*** (.978)	-
Troop Levels in t-1	-	-	-.0062** (.0034)	-
Surge	-	-.230*** (.080)	-.139 (.09)	-
Electricity	-.00013 (.0001)	-.00007 (.00008)	-.00009 (.00008)	-
Major Events	.092 (.083)	.115 (.079)	.124 (.077)	-
Kerosene	-.035** (.016)	-.043*** (.016)	-.051*** (.015)	-
Police	-.00096 (.001)	-	-	-
Oil Revenues (natural log form)	.045 (.125)	-	-	-
Civilian Violence in t-1 (natural log form)	.803*** (.074)	.734*** (.074)	.705*** (.074)	-
R ²	.80	.82	.83	-
N	63	63	63	-

*Significant at the 90% confidence level. **Significant at the 95% confidence level.

***Significant at the 99% confidence level. Standard errors are in parentheses

Troop levels are significant at the 90% level of confidence, but surprisingly the Surge variable is now not significant until the 85% level of confidence, and the Surge is now predicted to reduce civilian deaths by only 13 percent when active. It appears that a large amount of the surge's effect is felt through the change in troop levels – which makes theoretical sense. If a major component of the surge is the increase in troop levels and their role in stabilizing the Iraq's centers of violence, then its effect should be expected to diminish when controlling for Troop Levels themselves. It is also noteworthy that this model has an extremely high explanatory power with an R-squared of .83, given the caveats described above.

However, dismissing the surge effects outright would be incorrect. Since the Surge variable was statistically significant in the model excluding troop levels and the correlation coefficient between troop levels and the surge is $r = +0.6$, it is likely that Ordinary Least Squares (OLS) is having difficulty assigning partial effects to both variables and multicollinearity is increasing variance and reducing confidence in the results. However, a test of troop level and surge joint significance reveals that they are both jointly significant at the 99+% level of confidence. Thus, the policy effects associated with the Surge variable have an impact, but caution should be used in interpreting the coefficient. Given the Surge variable's interaction with troop levels, it is helpful to examine a model that removes the Surge variable to fully examine the

troop levels variable. The final iteration, Model 4: Troop Levels Only interprets the coefficient and significance of the Troop Levels variable in both models.

U.S. Troop Level Effects without the Surge Policy Effect

Model 4: Troop Levels Only removes the Surge variable to examine the effect of Troop Levels directly. This iteration explains the most variation in civilian deaths and also includes the most significant variables, as shown in Table 7:

Table 7: Model 4 –Troop Levels Only

	Model 1 Foundational	Model 2 Surge only	Model 3 Surge and Troop Levels	Model 4 Troop Levels only
Constant	2.23*** (.787)	2.54*** (.732)	3.75*** (.978)	4.09*** (.96)
Troop Levels in t-1	-	-	-.0062** (.0034)	-.0087*** (.003)
Surge	-	-.230*** (.080)	-.139 (.09)	-
Electricity	-.00013 (.0001)	-.00007 (.00008)	-.00009 (.00008)	-.00014* (.00008)
Major Events	.092 (.083)	.115 (.079)	.124 (.077)	.116 (.078)
Kerosene	-.035** (.016)	-.043*** (.016)	-.051*** (.015)	-.048*** (.016)
Police	-.00096 (.001)	-	-	-
Oil Revenues (natural log form)	.045 (.125)	-	-	-
Civilian Violence in t-1 (natural log form)	.803*** (.074)	.734*** (.074)	.705*** (.074)	.725*** (.074)
R ²	.80	.82	.83	.83
N	63	63	63	63

*Significant at the 90% confidence level. **Significant at the 95% confidence level.

***Significant at the 99% confidence level. Standard errors are in parentheses

Electricity is now significant at the 90% level of confidence and Troop Levels is highly significant at the 99% level of confidence. The coefficient for Troop Levels also changes from -.0062 to -.0087 (measured in 1,000s of troops), confirming that a large part of the effect of the surge is felt through troop levels. The drop in the size of the effect and significance in the Surge variable from model 2 to model 3 and the increase in the coefficient of Troop Levels from model 3 to model 4 shows that after accounting for Troop Levels, the impact of the surge is significantly reduced. All of these results point to the idea that changes in Troop Levels had a significant part to play in reducing levels of civilian violence in Iraq, above and beyond the other changes that went along with the surge.¹¹

Given these robust results, holding political and socioeconomic factors constant, U.S. troop levels have a statistically significant impact on levels of civilian violence in Iraq. One might want to know how big the effect was to assess its impact. Given the difficulty assessing the partial effect of troop levels versus the Surge, a conservative estimate would use the lower coefficient of -.0061 from Model 3. The mean values of troop levels before and after the surge provide a sense of scope. From July 2003 to January 2007 (the month before the start of the Surge), the average U.S. troop level was 138,000. From February 2007 through October 2008 (the end of the

¹¹ Additionally, including an interaction term for the Surge and Troop Levels shows that the difference in the coefficient for the troop level variable is not statistically different before and after the Surge takes place.

data set) the average U.S. troop level was 153,000: an increase of 15,000. Using the coefficient above, this increase in average troop levels is predicted to reduce civilian deaths by 9.3 percent. Including the effects of the Surge (coefficient of -14) predicts an additional decrease in civilian deaths of 14 percent, leading to lower levels of civilian violence in 2007 and 2008.

Also of note, is the statistical significance and relatively large coefficient of the Kerosene (production) variable that is robust across all model specifications. The story here appears relatively simple: if Iraqi citizens do not have the basic means to heat their homes (and other activities associated with Kerosene) then they are more likely to engage in violent activities that cause civilian deaths. Additionally, Kerosene serves as a proxy for several other effects. The availability of food, basic hygiene and other consumer staples probably are correlated kerosene's availability.

Chapter 6. Conclusions and Policy Implications

The empirical findings suggest several policy recommendations for Iraq and other nation-building efforts. However, the external validity of the results should be considered before extrapolating to other situations. The Iraq Index (O'Hanlon, 2008) includes data for around five and a half years after the U.S. invasion, meaning other conflicts that have entered different phases or have been going on for less or more time may not fit the models used in this paper exactly. Moreover, the equation includes the surge policy effect as well as violence in previous period. These two variables will capture the highly specific effects of the surge policy in Iraq and other time-invariant factors correlated with levels of violence in Iraq that do not transfer directly to other situations.

With these caveats, it is apparent that increasing U.S. troop levels was effective in reducing civilian violence in Iraq, holding the other explanatory variables constant. The coefficient for civilian deaths in the previous period was also substantial, meaning that the effects of decreasing troop levels will be reduced at the lower levels of violence currently being seen. In terms of reducing troop levels in Iraq, this suggests that some reduction may be merited (since the effect of lower civilian deaths in the previous period will reduce violence) but will incur the risk of sparking violence again. The effect of reducing troop levels now that violence is lower will be less severe than it

would have been in 2006 when the Surge began. However, since violence exhibits self-sustaining proclivities it may be necessary to quickly reverse course if violence increases substantially. This implies that a gradual and measured reduction in troop levels is appropriate, with enough built-in slack to quickly return troops if necessary.

In terms of Afghanistan, the results predict (with the above caveat on external validity) that increasing troop levels could reduce levels of civilian violence there as well. However, the results also recommend policy-makers not forget the impact of socioeconomic factors. The Kerosene variable, a proxy for economic conditions and the availability of basic provisions and necessities, was both statistically significant and substantial in size. With the acknowledgement that it captures much more than simply the availability of heating oil, it suggests that economic policies should take at least as prominent a role as troop levels in discourse and decision-making in future nation-building efforts.

Also important, are the variables that were not significant. Given the aforementioned caveats of data quality, levels of Iraqi police forces were statistically insignificant in reducing violence. Setting measurement issues aside, these results imply that the focus of policy-makers in nation-building environments should be on producing effective police forces that are capable of working with U.S. forces as West (2008) described. Resources may be better spent improving the quality of indigenous

forces than strictly being concerned with the number of bodies on staff. As Woodward (2008) writes, there was intense pressure and scrutiny on the U.S. and Iraqi governments to show progress in the readiness of Iraqi Security Forces. It is plausible that this pressure resulted in recruiting large numbers of troops, with only pockets of units that are properly organized, trained and equipped and capable of assisting U.S. forces and truly policing the population.

This also implies that the investments of time, effort and money in Iraqi police forces yielded limited returns during the timeframe examined, but this does not mean that longer evaluation periods would yield the same results. Perhaps it simply takes longer than five years to establish an effective civilian law enforcement function, especially in a country with a history of violence and oppressive police under Saddam Hussein. Future planning efforts will be improved by planning on building capacity in indigenous police forces on a longer timeframe than a few years – or at least by planning for the worst and hoping for the best (rather than the other way around).

Finally, the results also imply that efforts aimed at restoring and preserving oil production in Iraq were not effective in reducing violence. It is possible that the government revenue and economic benefits associated with oil revenues will have a positive long-term effect in the future, but it does not immediately support strategies

dedicating limited numbers U.S. troops to preserving oil production. In the future, trade-offs may be made between protecting oil production and other infrastructure.

Chapter 7. Limitations and Extensions

As with any research concerning countries with unstable governments ravaged by conflict, conclusions are limited by the availability and fidelity data. A principle limitation is that the effects of the surge were localized in the Baghdad area, but the data was country-wide. In addition, reliable population census data was not available to calculate the ratio of U.S. Troop Levels to the Iraqi population, limiting external validity. The same troop levels may not be as effective in countries with larger populations as a result. Data should also be sought on the total number of effective Iraqi police forces are, as opposed to just the number reported.

Additionally, early iterations of the model identified variables quantifying the disposition of coalition forces, cultural factors such as a general sense of optimism or pessimism in Iraq, and the strength or efficacy of the insurgency itself. The negative omitted effects will be captured across other variables, especially in the surge variable in the case of the disposition of coalition forces. The positive omitted effects that represent the strength of the insurgency and other actions taken by those attempting to foment violence in Iraq will be captured in civilian violence in the previous period and major event variables; presenting the possibility that the coefficients for both could actually be smaller than what Ordinary Least Squares regression reports.

References

- Biddle, S., O'Hanlon, M., & Pollack, K. (2008). How to Leave a Stable Iraq: Building on Progress. *Foreign Affairs*, September/October 2008.
- Chandrasekaran, Rajiv. (2007). *Imperial Life in the Emerald City: Inside Iraq's Green Zone*. New York: Knopf.
- Collier, Paul. (2007). *The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It*. Oxford: Oxford University Press.
- Feldman, Noah. (2004). *What we Owe Iraq: War and the Ethics of Nation-Building*. Princeton: Princeton University Press.
- Fukuyama, Francis. (2006). *Nation-Building: Beyond Afghanistan and Iraq*. Princeton: Princeton University Press.
- Gates, Robert. (2009). The National Defense Strategy: Striking the Right Balance. *Joint Forces Quarterly*: 1st Quarter 2009.
- Junne, G., & Verkoren, W. (2005). *Postconflict Development: Meeting New Challenges*. Boulder: Rienner.
- Nagl, John. (2002). *Learning to Eat Soup with a Knife: Counterinsurgency Lessons from Malaya and Vietnam*. Chicago: University of Chicago Press.

O'Hanlon, Michael. *The Iraq Index*. Retrieved October 30, 2008 from Saban Center for Middle East Policy Iraq Index. Web Site:

<http://www.brookings.edu/saban/iraq-index.aspx>

Sharp, J., & Blanchard, C. (2007). *Post-War Iraq: Foreign Contributions to Training, Peacekeeping, and Reconstruction*. Washington, DC: U.S. Government Printing Office.

Simon, Steve. (2008). The Price of the Surge. *Foreign Affairs: May/June 2008 edition*

United States Special Operations Command. (2007). *U.S.SOCOM Posture Statement 2007*. Washington, DC: U.S. Government Printing Office.

Walzer, Michael (1977). *Just and Unjust Wars: A Moral Argument with Historical Illustrations*. United States: Basic Books.

West, Bing. (2008). *The Strongest Tribe: War, Politics and the Endgame in Iraq*. New York: Random House.

Woodward, Bob. (2008). *The War Within: A Secret White House History 2006-2008*. New York: Simon and Schuster.