



Terrorism, Governance, and Development

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TRUSTEES OF PRINCETON UNIVERSITY

01/13/2016
Final Report

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Air Force Research Laboratory
AF Office Of Scientific Research (AFOSR)/ RTA2
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Air Force Materiel Command

REPORT DOCUMENTATION PAGE				<i>Form Approved</i> OMB No. 0704-0188	
<small>The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Executive Service Directorate (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</small>					
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1. REPORT DATE (DD-MM-YYYY) 12/29/2015		2. REPORT TYPE Final Technical Report		3. DATES COVERED (From - To) 05/01/2009 - 09/30/2015	
4. TITLE AND SUBTITLE Terrorism, Governance, and Development				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER AFOSR FA9550-09-1-0314	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Shapiro, Jacob N. (Lead PI, Princeton University) Berman, Eli (UC San Diego); Felter, Joseph H. (Stanford University); Laitin, David D. (Stanford University); Lyall, Jason (Yale University); Weinstein, Jeremy M. (Stanford University - on public service leave for 3 years); Additional co-PIs in extension year: Blumenstock, Joshua (University of Washington); Vanden Eynde, Oliver (Paris School of Economics)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) The Trustees of Princeton University Office of Research and Project Administration PO Box 0036 / 87 Prospect Avenue - 2nd floor Princeton, NJ 08544-0036				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) AFOSR 875 N Randolph St STE 325 RM 3112 Arlington, VA 22203				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Distribution A - Approved for Public Release					
13. SUPPLEMENTARY NOTES Funded as part of the DoD Minerva Research Initiative.					
14. ABSTRACT The "Terrorism, Governance, and Development" (TGD) collaborative project produced independent, rigorous, social science research on national security issues. A primary objective was to develop better theories about the impact of aid programs on terrorist and insurgent violence. To do so, the TGD Team designed and refined a theoretical framework that has been empirically tested with fine-grained, local data from multiple conflicts. TGD researchers implemented a range of design-based inferential approaches to rigorously evaluate newly developed models and re-examined existing theories of conflict. Conflicts from the following countries were studied: Afghanistan, Colombia, Egypt, India, Iraq, Kenya, Mexico, Northern Ireland, Pakistan, the Philippines, and Vietnam. The TGD model is now used as a benchmark game-theoretic model by other researchers, and researchers who are not part of TGD are finding results consistent with the model. Forty-four journal articles were published. The project trained a cohort of young scholars, including Assistant Professors at 20 leading universities. The investigators frequently briefed policy makers and established the Empirical Studies of Conflict (ESOC) project that will continue this research agenda. Data are available at http://esoc.princeton.edu .					
15. SUBJECT TERMS Terrorism, counterinsurgency, economics, development, foreign aid, governance, insurgent, national security, political science, political violence					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Jacob N. Shapiro, PhD, Princeton University
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (Include area code) 609-258-2256

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8. PERFORMING ORGANIZATION REPORT NUMBER. Enter all unique alphanumeric report numbers assigned by the performing organization, e.g. BRL-1234; AFWL-TR-85-4017-Vol-21-PT-2.

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“Terrorism, Governance, and Development”

Final Technical Report

AFOSR Grant #FA9550-09-1-0314

December 2015

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“Terrorism, Governance, and Development”

EXECUTIVE SUMMARY

Scope of the Project

National security policies should be informed by rigorous, independent social science research, just as domestic social policy should be. However, unlike other fields of social science which have a robust academic literature, the evaluation of military and development assistance strategies has often relied upon internal analysis conducted by government organizations or hired consultants. Consequentially, military commanders and government policy makers have not had the benefit of robust academic findings directly pertinent to developing strategies to resolve complex security crises around the world. The result is that billions of taxpayer dollars are spent on aid interventions each year in conflict zones, and billions more are spent on military assistance and military interventions; yet, these activities are rarely subject to independent, rigorous evaluation in the manner that domestic social programs have been.

As one of the recipients of the first round of Minerva Research Initiative grants, the “Terrorism, Governance, and Development” (TGD) Team has been working to produce independent, rigorous, basic research in social science on national security issues. A primary objective of the TGD Project was to develop better theories about the impact of aid programs on terrorist and insurgent violence. To do so, the TGD Team collected new data to construct integrated, empirically-validated theories to inform the strategic use of development programs and other initiatives to improve effective governance in societies experiencing political conflict. Collecting fine grained, local data in multiple conflicts has allowed TGD researchers to implement a range of design-based inferential approaches to rigorously evaluate newly developed models and re-examine existing theories of conflict. Approaches have included various forms of instrumental variable regressions, matching, panel data analysis, and regression discontinuity designs. These approaches have been applied to conflicts from the following countries: Afghanistan, Colombia, Egypt, India, Iraq, Kenya, Mexico, Northern Ireland, Pakistan, the Philippines, and Vietnam. Forty-four journal articles have been published, in addition to working papers, and other writings. Some key findings are highlighted below.

Theoretical Framework

Theoretical Framework TGD researchers have published a general theoretical framework describing “irregular” insurgencies (where government capacity exceeds rebel capacity), based upon subnational data from multiple conflicts. Better data and improved methods confirm the essential role of civilians, while challenging older theories about how they affect conflict outcomes (Berman, Felter, Shapiro, 2011; Berman and Matanock, 2015). Shapiro and Siegel (2015) extended the theoretical framework to include expanded access to Information Communication Technology (ICT); Berman, Felter, Kapstein, and Troland (2013) extend it to include investments by firms. Other scholars have used the framework as the baseline model for analyzing the relationship between development funding and conflict (e.g. Khanna and Zimmerman, 2015; Vanden Eynde, 2015).

Rebel groups often provide services The framework predicts service provision by rebels for strategic reasons (Berman, Felter, Shapiro, 2011). Data and anecdotes confirm that in all countries that they checked and for almost all rebel groups (Berman and Matanock, 2015).

Ungoverned by choice An extension of the framework predicts that government (as well as rebels) is more likely to contest territory with taxable assets, a finding confirmed in the Philippines (Berman, Felter, Kapstein, and Troland, 2013).

Key Findings

Optimal scale and design of development programs. Improved service provision can reduce insurgent violence, particularly for smaller community-based projects, but project design is crucial: development projects work best with adequate security, and security assistance works best with adequate, and expert-informed development projects. Findings are based on econometric analysis of sub-national data from Afghanistan, Iraq, and the Philippines (Berman, Felter, and Shapiro, 2011; Berman, Felter, Shapiro, and Troland, 2013, Chou, 2012; Crost, Felter, and Johnston, 2014; Crost, Felter, and Johnston, 2016).

Civilian casualties. Civilians punish both sides in insurgencies for harm to civilians by sharing or withholding information which leads to local increases or decreases in conflict intensity, but pro-government forces are held to a higher standard and therefore pay a greater cost for harming civilians (Condra and Shapiro, 2012; Blair, Imai, and Lyall, 2013; Shaver and Shapiro, 2015).

Cell phone coverage and violence. Expanded cellular coverage hurts insurgents under a broad range of conditions, based on game theoretic analysis (Shapiro and Siegel 2015) and econometric analysis using data from Iraq's cell phone data network (2004-09) and event data on violence (Shapiro and Weidmann, 2015).

Changes in unemployment are not positively correlated with changes in insurgent attacks in several important conflicts. Data from Afghanistan, Iraq, and the Philippines show no significant relationship between unemployment and the rate of insurgent attacks that kill civilians (Berman, et al., 2011a). Job-creation programs in the absence of security may be misguided.

Violent extremists find more support from the wealthy than the poor in some contexts. Wealthier regions in Pakistan see more support for violent extremist operations (Blair et al., 2013a; Fair, Malhotra, and Shapiro, 2014; Fair, et al., forthcoming).

Smart phones have potential to reduce corruption. ICT-based election monitoring displaces corruption. An experiment using Information Communication Technology (ICT) during the 2010 parliamentary elections in Afghanistan, found that smart phones at polling stations were effective in reducing a common type of election fraud (Callen and Long, 2015). An experiment introducing a novel smartphone absence monitoring technology reduced public sector absenteeism in Pakistan among workers who lacked strong political connections (Callen et al., 2015b).

Evaluation of decapitation strikes and U.S. Drone strikes. Leadership targeting against insurgent groups is an effective strategy (Johnston, 2012). U.S. Drone strikes in Afghanistan and Pakistan were associated with decreases in the incidence and lethality of terrorist attacks, as well as decreases in selective targeting of tribal elders, at least on a short-term basis (Johnston and Sarbahi, forthcoming).

Broader Impact and Transitions

From the outset, TGD Investigators endeavored to not only publish in top-tier journals, but to also (1) train a cohort of young scholars, (2) frequently share findings with top-level military and government officials, and (3) enhance the public discourse about complex, international security issues. Some examples of the impact of the TGD project are listed below.

- The TGD Team maximized the investment of the Minerva grant by establishing the Empirical Studies of Conflict (ESOC) Project, which includes synergistic activities and will continue beyond the term of the grant. ESOC is a network of researchers who identify, compile, and analyze micro-level conflict data and information on insurgency, civil war, and other sources of politically motivated violence worldwide.
- TGD-funded ESOC Alumni now hold tenure-track positions in 20 leading research universities.
- The ESOC website hosts publications, datasets (and codebooks), and other contextual information to further improve conflict analysis worldwide.
- TGD Researchers have held high-level briefings, given Congressional Testimonies, and met with many policymakers and government officials in the U.S. and other countries, including Afghanistan, Colombia, India, Mexico, Pakistan, and the Philippines.
- Various US government agencies and NGOs have adopted TGD-proven methods of data collection and analysis for assessing the efficacy of policy interventions in conflict zones.
- TGD scholars have published research-informed analysis in a range of policy journals (e.g., *Foreign Affairs* and *Foreign Policy*) and written op-eds for major national newspapers to help provide context and insight for complex and troubling events such as the November 2015 Paris terrorist attacks.

“Terrorism, Governance, and Development”

AFOSR Grant #FA9550-09-1-0314

Minerva Research Initiative

FINAL REPORT

INTRODUCTION

Rebuilding social and economic order in conflict and post-conflict areas will remain critical tasks for the United States and its allies as they seek to defeat violent organizations and prevent the emergence of new non-state threats. Three development-oriented policies dominate efforts to enhance order: (1) providing security assistance to friendly states; (2) encouraging inclusive governance; and (3) improving the population’s economic welfare. However, there has been little systematic, independent analysis to measure the impact of these policies.

Through this grant, the Minerva “Terrorism, Governance, and Development” (TGD) Team has published 44 articles in academic journals on topics relevant to enhancing economic and social order in many conflict regions. The primary objective of the TGD Project was to develop better theories and expand the knowledge base about the impact of aid programs on terrorist and insurgent violence. To do so, the TGD Team collected new data to construct integrated, empirically-validated theories to inform the strategic use of development programs and other initiatives to improve effective governance in societies experiencing political conflict.

The TGD Team studied conflicts from a range of countries including Afghanistan, Colombia, Egypt, India, Iraq, Kenya, Mexico, Northern Ireland, Pakistan, the Philippines, and Vietnam. This report will summarize what has been learned from careful analysis of subnational data from these countries. This report will also present a general framework for analyzing many subnational conflicts, review key findings, and highlight other accomplishments made during the course of the TGD grant.

THEORETICAL FRAMEWORK to Analyze “Irregular” Warfare

Throughout the TGD grant, Berman has been leading an effort to develop an integrated theory to examine the complex interplay of civilians, government, and rebels during military engagements and political violence. In one of the first publications funded by this grant, Berman, Felter, and Shapiro showed that better data and improved methods confirm the essential role of civilians, while challenging older theories about how they affect conflict outcomes (Berman, Felter, Shapiro, 2011b). The Team refined this theory based upon new data from new countries, and the basic framework has proved to be an effective design. A 2013 NBER Working Paper (Berman et al., 2013b) focused on complementarities between small-scale aid spending and military effort; previously, the importance of the relationship between the scale and implication of spending and military effort was not clearly defined in policy. For example, often in Afghanistan, aid and military force were used as substitutes—the government would spend aid in places where the military did not want to put many forces. The TGD model predicted this approach would be

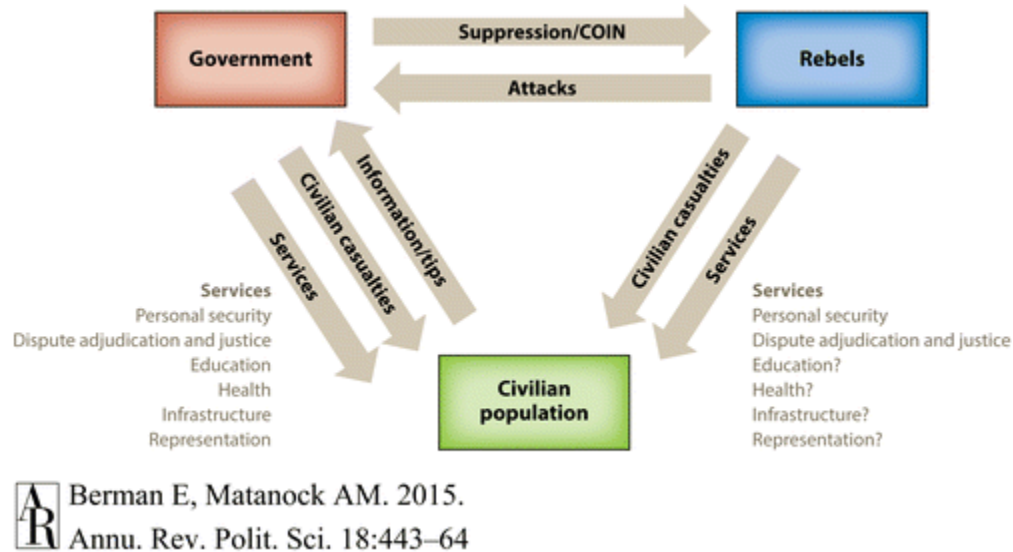
misguided. That prediction was validated empirically in a working paper written by a scholar outside of the TGD team (Sexton, 2015).

Other scholars have recently used the TGD model as a starting point for their research. For example, Khanna and Zimmerman (2015) reference the Berman, Felter, and Shapiro 2011 paper in their study that evaluates the impact of the world's largest anti-poverty program, the Indian National Rural Employment Guarantee Scheme (NREGS), on Maoist conflict intensity. In another project, Vanden Eynde (2015) considers both an opportunity cost model and the Berman et al. (2011b) information sharing model in an analysis of whether or not shocks to rural incomes intensify violence in India's Naxalite insurgency. Vanden Eynde finds income shocks in rural areas did increase violence against civilians, as the Berman et al. (2011b) model suggests. He also found that the rebels' tax base is a key factor in understanding potential implications of the opportunity cost and information sharing channels. Sexton's 2015 paper cited above about Afghanistan and these two papers on the Maoist conflict in India show that the model can be applied to new countries and datasets and that independent work has found results consistent with the predictions of the model developed by the TGD team. These papers are also examples of how the collection of academic literature has become more mature over the course of the grant and how theories that are tested with micro-level empirical data can yield important, new insights about which local variables need careful consideration when developing conflict resolution policies.

Berman and Matanock's 2015 article provides an excellent review of how research on insurgency has developed over the past decade and discusses the TGD theoretical framework in this context. Berman and Matanock apply the term, "empiricist's insurgency" to characterize how research on insurgency has been invigorated during this past decade by better data, improved methods, and the urgency of understanding active engagements in Iraq and Afghanistan.

Berman and Matanock (2015) provide a general framework describing "irregular" insurgencies (where government capacity exceeds rebel capacity), which is analytically cohesive and empirically tested using subnational data from multiple conflicts. Civilians may share information because doing so could deliver control of their neighborhood to an entity that advantages them. Civilians might have underlying attitudes and beliefs, formed by norms, grievances, ethnic or religious identity, and available information, which may or may not be pliable. Assuming that these attitudes and beliefs do not commit them irrevocably to supporting one side or another, information-sharing can be influenced by the combatants' actions: services provided by either the government or rebels and the extent to which government and rebel attacks endanger noncombatants. The government and the rebels, mindful of the consequential choice that civilians will make in sharing information, will therefore divert resources from conflict with each other in order to provide services to civilians. Services might include personal security, dispute adjudication and justice, education, health, infrastructure or even representation. Figure 1 on the following page provides a schematic description of irregular insurgency under these assumptions.

Figure 1: Theoretical Framework to Analyze “Irregular” Insurgencies



The framework shown in the figure can be formally modeled as a three-sided game (Berman et al., 2011b), which is useful to verify internal consistency and to generate testable implications. The framework has five major testable implications:

1. Both the government and the rebels have an incentive to provide services, an incentive that increases with the value of information shared.
2. Service provision by the government will reduce rebel violence because it increases information sharing with the government, which in turn increases the risk of failure for rebels, should they attack. A related implication is that projects that are (a) created to address the needs of the civilians in the local community and (b) conditioned on information sharing by the community (i.e., revoked when information is not shared) will be more effective in reducing violence. In practice, smaller projects are more likely to have these characteristics than larger projects, both because they are more likely to be developed in consultation with the local community and because they are more easily revoked. A further implication is that innovations that increase the value of projects to residents will amplify the projects' violence-reducing effect (e.g., including development professionals or community input in design and implementation).
3. From the government's perspective, providing security and providing services are complementary activities, for two reasons. First, the greater the security that the government can offer service providers, the more effective service provision will be. Second, following on the asymmetry assumption, the greater the capacity of government forces to suppress rebels, the more value they obtain from tips that flow as a result of service provision.
4. Civilian casualties reduce civilian support for whichever side caused the casualties, allowing the other side to increase its efforts—either attacks (for rebels) or attack suppression (for the government). This occurs because casualties influence the calculation of civilians in deciding whether to share tips.

5. Innovations that make anonymous tips to the government easier for civilians can reduce rebel violence. These are often technical innovations, though, in the U.S. experience in Iraq, they sometimes involved tactical.

The testable implications of this framework have been analyzed in a number of publications completed by the TGD Team over the course of the grant, and some are presented in the Key Findings section below. The framework¹ is also robust enough to be adapted to include other variables that may be of key interest in a particular research project. For example, Shapiro and Siegel (2015) have extended the theoretical framework to include Information Communication Technology (ICT) innovations and Berman, Felter, Kapstein, and Troland (2013) extend the model to include firms making investment decisions.

Shapiro and Siegel (2015) used this framework to explore how the introduction of mobile communications can substantially alter the course of conflict. In Afghanistan and India targeting mobile communications is a central part of the insurgent campaigns. The opposite was true in Iraq. In Iraq, insurgents instead threatened providers who did not do enough to maintain mobile phone networks. These differences likely arise from two competing effects of mobile communications: they make it easier for antigovernment actors to coordinate collective action, thereby increasing violence, and for pro-government civilians to collaborate with security forces allowing them to more effectively suppress rebels, thereby decreasing violence. To study these competing effects, they analyzed a formal model of insurgent action in which changes in the communications environment alter both (i) the ability of rebels to impose costs on civilians who cooperate with the government and (ii) the information flow to government forces seeking to suppress rebellion with military action. Their analysis highlights the importance of the threat of information sharing by non-combatants in reducing violence and offers some guidelines for policymakers in thinking about how much to support ICT development in conflict zones. In particular, they show that officials can generate reasonable expectations about whether expanding ICT access will exacerbate conflict or reduce it by assessing the relative gains to both sides from changes in ICT access along several simple dimensions.

Overall, the framework developed by the TGD team may enable policy-makers to design better conceived and implemented interventions, including foreign engagements with and without troop deployment, depending on the type of insurgency and mindful of political limitations. The framework will continue to be refined as econometric modeling continues to examine new data. Already, there is evidence that this framework has become an important part of the academic literature in the following ways:

1. The TGD model is used as a benchmark game-theoretic model by others.
2. Researchers who are not part of the team are finding results consistent with the model in countries not initially analyzed in developing the model (i.e. Afghanistan and India).

¹ Other scholars have also tested the Berman et al. (2011b) model with new empirical datasets and in other country contexts and found this to be a valid framework. Examples are Karrar and Zimmerman (2015), Sexton (2015), and Vanden Eynde (2015).

KEY FINDINGS

Optimal Scale and Design of Development and Military Aid Interventions (AFG, IRQ, PHL)

Utilizing the framework above, the TGD Team has tested the implications of service provision with data from real-world conflicts. For example, over years of careful econometric analysis of sub-national data from Afghanistan, Iraq, and the Philippines, they have found that improved service provision can reduce insurgent violence, particularly for smaller community-based projects, but project design is crucial. Or, stated in another way, the evidence shows that many types of service provisions had no measurable impact of reducing insurgent violence or reducing poverty. These empirical findings are contrary to widely held assumptions that steer billions of dollars of aid to conflict regions around the world, and suggest that further research and more careful implementation planning is essential in order to make aid or development programs attain their intended goals. Below is a summary of relevant, key studies that demonstrate these findings.

Utilizing the theoretical framework discussed above, Berman, Felter, and Shapiro (2011b) modeled a three-way contest between violent rebels, a government seeking to minimize violence by mixing service provision and coercion, and civilians deciding whether to share information about insurgents. They tested the model using panel data from Iraq on violence against Coalition and Iraqi forces, reconstruction spending, and community characteristics (sectarian status, socio-economic grievances, and natural resource endowments). The results found that improved service provision reduced insurgent violence, particularly for smaller projects and since the “surge” began in 2007.

In recognition of the complexity and unique characteristics of each political conflict, the TGD Team searched for another region to empirically test the implications of the theoretical framework. A TGD graduate student examined data from Afghanistan to better understand the implications of this prevalent military doctrine that emphasizes the importance of development spending in reducing insurgent violence. Chou (2012) used data from three distinct development programs, the Afghan National Solidarity Program, USAID’s Local Governance and Community Development Program, and the U.S. military’s Commander’s Emergency Response Program (CERP), combined with military records of insurgent-initiated events, to explore whether development aid in Afghanistan was violence-reducing. Chou found that overall spending had no clear effect on rebel attacks. Moreover, the type of development program most effective at reducing violence in Iraq—small CERP projects—did not appear to do so in Afghanistan. Possible reasons include troop strength, conditionality of aid, effectiveness of aid in producing benign outcomes, and measurement issues.

To further explore the connection between aid and violence, Berman et al. (2013) again examined the prevalent counterinsurgency strategy that assumes increasing government services will reduce rebel violence. Using new panel data on development spending in Iraq, the TGD authors show that violence reducing effects of aid are greater when (a) projects are small, (b) troop strength is high, and (c) professional development expertise is available. These findings are consistent with a “hearts and minds” model, which predicts that violence reduction will result when projects are secure, valued by community members, and implementation is conditional on the behavior of non-combatants.

The studies above focused on whether or not aid or development programs were effective in reducing violence, and the evidence shows mixed results. Recognizing that regions that have endured years of

political violence also face high poverty, TGD researchers explored whether or not aid was effective in reducing poverty. Crost, Felter, and Johnston (2014) estimated the causal effect of a large development program on conflict in the Philippines through a regression discontinuity design that exploited an arbitrary poverty threshold used to assign eligibility for the program. They found that barely eligible municipalities experienced a large increase in conflict casualties compared to barely ineligible ones. This increase was mostly due to insurgent-initiated incidents in the early stages of program-preparation. Their results are consistent with the hypothesis that insurgents tried to sabotage the program, because its success would weaken their support in the population.

Crost, Felter, and Johnston (2016) applied this framework to study a popular development tool that was implemented in the Philippines. Conditional cash transfer (CCT) programs are an increasingly popular tool for reducing poverty in conflict-affected areas. Despite their growing popularity, there is limited evidence on how CCT programs affect conflict and theoretical predictions are ambiguous. Crost, Felter, and Johnston (2016) estimated the effect of conditional cash transfers on civil conflict in the Philippines by exploiting an experiment that randomly assigned eligibility for a CCT program at the village level. They found that cash transfers caused a substantial decrease in conflict-related incidents in treatment villages relative to control villages. Using unique data on local insurgent influence, they also found that the program significantly reduced insurgent influence in treated villages. The results are consistent with Berman, Shapiro, and Felter (2011) and Berman et. al. (2013a) in that a substantial portion of villagers believed the transfers to be conditional on the state of the insurgency in their area.

Berman, Felter, and Shapiro are currently working on another project to refine their understanding further by evaluating small-scale directly-executed aid projects in Afghanistan, Iraq, and Pakistan. Prior research from Afghanistan and Iraq found evidence that, where insurgents are not labor constrained, policies that use small amounts of aid money in targeted ways to earn local goodwill are more likely to help reduce violence than are large-scale economic development projects (Adams, 2014; Berman et al., 2011b; Berman et al., 2013c). Berman, Felter, and Shapiro have tested this further by using USAID OTI data that became available for Afghanistan and Pakistan, and data the team received in late-2013 for Iraq. OTI is unique within USAID as it is the only part of the agency which directly executes projects. The researchers were hoping these data would allow them to assess whether the well-documented challenges of contracting in conflict zones are partly responsible for the null effects they found for larger projects in previous work. The preliminary analysis found no observable effect, but it's not yet clear whether that is because the projects were not effective or because it's not possible to control for selection well enough econometrically. Given that the USAID OTI projects were implemented in some of the harder places, it will require further research to tease out the potential reasons for these results. Further research will also include analysis in Pakistan that will leverage an original database of political violence in Pakistan, developed partly with TGD support (Fair et. al., 2015), as well as surveys separately funded by the State Department.

Understanding Support for Militancy and Extremism (AFG, IRQ, PAK, PHL)

Just as there are commonly held assumptions that development aid will reduce violence and poverty in conflict regions, there are also many assumptions about what type of economic and social circumstances lead people to support militancy and extremism in either their own country or around the world. Yet, again, there is little empirical evidence to support some prevalent assumptions. Many assume that poverty

is a key indicator for militancy and extremism. TGD researchers have probed this assumption in several countries.

Most aid spending by governments seeking to rebuild social and political order is based on an opportunity-cost theory of distracting potential recruits. The logic is that gainfully employed young men are less likely to participate in political violence, implying a positive correlation between unemployment and violence in locations with active insurgencies. Berman, Callen, Felter, and Shapiro (2011) tested that prediction in Afghanistan, Iraq, and the Philippines, using survey data on unemployment and two newly available measures of insurgency: (1) attacks against government and allied forces and (2) violence that kill civilians. Data from Iraq were SIGACT reports submitted by Coalition forces. Afghanistan data were incident-level data in two databases submitted by Joint Operations Center. The Philippines data included unclassified reports of 22,000+ security incidents maintained by the Armed Forces. Contrary to the opportunity-cost theory, the data emphatically reject a positive correlation between changes in unemployment and changes in attacks against government and allied forces ($p < .05$ percent). There is no significant relationship between unemployment and the rate of insurgent attacks that kill civilians in these conflicts. The authors identify several potential explanations, introducing the notion of insurgent precision to adjudicate between the possibilities that predation on one the hand, and security measures and information costs on the other, account for the negative conditional correlation. The evidence is most consistent with information costs going down when the economy weakens (i.e. a dollar in human intelligence spending buys more information when unemployment is high).

Similarly, policy debates on strategies to end extremist violence frequently cite poverty as a root cause of support for the perpetrating groups. Shapiro and his colleagues recognized that Pakistan's urban poor are more exposed to the negative externalities of militant violence and may in fact be less supportive of the groups. In synergistic research, Shapiro and his colleagues conducted a 6,000-person, nationally representative survey of Pakistanis that measured affect toward four militant organizations (funded by a separate grant). Blair, Fair, Malhotra, and Shapiro (2013) applied a novel measurement strategy, the endorsement experiment, which mitigates the item nonresponse and social desirability biases that plagued previous studies due to the sensitive nature of militancy. Contrary to expectations, poor Pakistanis dislike militants more than middle-class citizens. This dislike is strongest among the urban poor, particularly those in violent districts, suggesting that exposure to terrorist attacks reduces support for militants. This measurement approach has since been applied by other scholars and NGOs conducting surveys in Afghanistan, Colombia, Iraq, and the United States.

Shapiro and colleagues found further evidence of this negative relationship between poverty and support for militancy with a much larger survey ($n > 16,000$) that was in Pakistan in 2012 (funded by a separate grant). In Fair Littman, Malhotra, and Shapiro (forthcoming), the authors discuss results from an original, large-scale survey experiment in Pakistan in which the team randomly manipulated feelings of poverty and perceptions of violence. Consistent with their theoretical argument, they found that relative poverty and perceived violence reduce support for violent militant organizations. Further, in initial work supported by TGD using six years of monthly public opinion data from Baghdad (surveys funded by Multi National Corps Iraq from 2004-2010), researchers also found poorer people are less likely to support attacks on Coalition forces and are more reactive to recent events. These findings have important implications not only for scholarship on political violence but also for national security and counterterrorism policy.

Civilian Casualties (AFG, IRQ)

TGD studies have found that civilians punish both sides in insurgencies for harm to civilians by sharing or withholding information which leads to local increases or decreases in conflict intensity, but pro-government forces are held to a higher standard and therefore pay a greater cost for harming civilians.

Scholars of civil war and insurgency have long posited that insurgent organizations and their state enemies incur costs for the collateral damage they cause. Shapiro and Shaver (2015) provide the first direct quantitative evidence that wartime informing is affected by civilian casualties. Using newly declassified data on tip flow to Coalition forces in Iraq they found that information flow goes down after government forces inadvertently kill civilians and it goes up when insurgents do so. These results have strong policy implications; confirm a relationship long posited in the theoretical literature on insurgency; and are consistent with a broad range of circumstantial evidence on the topic.

This latest research builds upon an earlier study conducted by TGD researchers. Using precise geo-coded data on violence in Iraq from 2004 through 2009, Condra and Shapiro (2012) showed that both sides are punished for the collateral damage they inflict. Coalition killings of civilians predicted higher levels of insurgent violence and insurgent killings predicted less violence in subsequent periods. This symmetric reaction was tempered by pre-existing political preferences; the anti-insurgent reaction was not present in Sunni areas, where the insurgency was most popular, and the anti-Coalition reaction was not present in mixed areas. These findings provide support for the argument that information civilians share with government forces and their allies is a key constraint on insurgent violence, and suggest theories of intrastate violence must account for civilian agency.

In a synergistic study, Lyall and colleagues examined how civilian attitudes toward combatants are affected by wartime victimization in Afghanistan. Are these effects conditional on which combatant inflicted the harm? Blair, Imai, and Lyall (2013) investigated the determinants of wartime civilian attitudes towards combatants using a survey experiment across 204 villages in five Pashtun-dominated provinces of Afghanistan—the heart of the Taliban insurgency. They used endorsement experiments to indirectly elicit truthful answers to sensitive questions about support for different combatants. They demonstrated that civilian attitudes are asymmetric in nature. Harm inflicted by the International Security Assistance Force (ISAF) was met with reduced support for ISAF and increased support for the Taliban, but Taliban-inflicted harm did not translate into greater ISAF support. They combined a multistage sampling design with hierarchical modeling to estimate ISAF and Taliban support at the individual, village, and district levels, permitting a more fine-grained analysis of wartime attitudes than previously possible.

Information Communication Technology in Conflict and Post-Conflict Zones (AFG, IRQ, PAK)

TGD Researchers have led efforts to understand how new technologies, such as expanded mobile phone coverage in conflict zones or expanded access to smart phones can influence outcomes on the ground. For example, does improved communication provided by modern cellphone technology affect the rise or fall of violence during insurgencies? A priori predictions are ambiguous; introducing cellphones can enhance insurgent communications but can also make it easier for the population to share information with counterinsurgents and create opportunities for signals intelligence collection.

Shapiro and Weidmann (2015) provided the first systematic micro-level test of the effect of cellphone communication on conflict using data on Iraq's cellphone network (2004–2009) and event data on violence. They showed that increased mobile communications reduced insurgent violence in Iraq, both at the district level and for specific local coverage areas. The results provide support for models of insurgency that focus on noncombatants providing information as the key constraint on violent groups and highlight the fact that small changes in the transaction costs of cooperating with the government can have large macro effects on conflict.

The impact of cellular coverage on insurgent activity is also being explored in Afghanistan by TGD researchers. With grants from the Development Impact Lab at University of California, Berkeley, the National Science Foundation, and the Army Research Office, Blumenstock and Shapiro have studied the relationship between cellular communications and violence in Afghanistan. During the extension year of this grant, Dr. Blumenstock and a research assistant at University of Washington developed methods and algorithms to mine transactional mobile phone log data from South Asia. The research team received several terabytes of additional data, and the primary focus was on data extraction, transformation, and structuring. The result of these efforts is several thousand lines of computer code that can be used to analyze incoming mobile phone operator logs. With TGD support, Blumenstock and Felter explored the potential of extending the analysis of cellular infrastructure's impact on conflict to the Philippines. While this would have allowed the team to assess the relationship in a less extreme context, the required data were not forthcoming from the major telecommunications firms operating in the conflict-affected parts of the Philippines. Blumenstock and Shapiro are continuing to explore the use of cellphone data to measure the impacts of conflict on development in Afghanistan, including initial results that suggest cellphone records can be used to assess the long-run impacts of conflict on community cohesion.

In synergistic studies, TGD researchers designed a novel experiment to test whether monitoring results with smart phones applications can reduce election fraud. Elections in developing countries commonly fail to deliver accountability because of manipulation, often involving collusion between corrupt election officials and political candidates. Callen and Long (2015) report the results of an experimental evaluation of Quick Count Photo Capture—a monitoring technology designed to detect the illegal sale of votes by corrupt election officials to candidates—carried out in 471 polling centers across Afghanistan during the 2010 parliamentary elections. The intervention reduced vote counts by 25% for the candidate most likely to be buying votes and reduced the stealing of election materials by about 60%. They explain these results in the context of a theory of corrupt vote transactions in which the capacity of candidates to protect corrupt officials from prosecution determines equilibrium levels of spatial and temporal substitution. Callen et al. (2015a), also demonstrated that a cost-effective citizen and ICT intervention can improve electoral integrity in emerging democracies, based upon a random control trial in Uganda.

In another synergistic study, Callen and colleagues collected measurements of public sector performance through an ICT-enabled experiment. Callen et al. (2015b) examined the relationship between policymaker personalities, job performance, and response to reforms in Punjab. They designed and implemented a smartphone technology that verifies whether officials are performing regular facility inspections across Punjab, which they evaluated using a randomized control trial spanning the province. Among other things, the researchers were looking to see if the personality measures can predict responses to a reform that changes incentives. Their paper provides evidence that the personality traits of policy actors matter for policy outcomes in the context of two large-scale experiments in Punjab, Pakistan. Three results

support the relevance of personalities for policy outcomes. First, doctors with higher Big Five and Perry Public Sector Motivation scores attend work more and falsify inspection reports less. Second, health inspectors who score higher on these personality measures exhibit a larger treatment response to increased monitoring. Last, senior health officials with higher Big Five scores are more likely to respond to a report of an underperforming facility by compelling better subsequent staff attendance.

Evaluation of Leadership Targeting and U.S. Drone Strikes (AFG, PAK)

In the set of counterinsurgency campaigns between 1975 and 2005 insurgent attacks go down following successful decapitation strikes compared to following unsuccessful ones, and successful strikes reduce the duration of conflict relative to unsuccessful ones (Johnston, 2012). This empirical approach relies on the randomness inherent in the success or failure of particular attempts, a natural experiment, to show that leadership targeting against insurgent groups is an effective strategy. U.S. Drone strikes in Afghanistan and Pakistan were associated with decreases in the incidence and lethality of terrorist attacks, as well as decreases in selective targeting of tribal elders, at least on a short term basis (Johnston and Sarbahi, forthcoming).

Historical Analysis of U.S. Counterinsurgency (VNM)

The Vietnam War is one of the most important sources of US counterinsurgency doctrine and lessons. The micro-level econometric methods available today allow researchers to revisit this case to test these lessons as well as more recent hypotheses on insurgency mostly having to do with conditions favoring the flow of information about insurgents from civilians to COIN intelligence. Many analysts argue that the fundamental dynamics of counterterrorism and counterinsurgency have changed in the last 20 years due to various geopolitical factors—the end of the Cold War, rise of transnational Islamist activism, and others—and technological factors—cell phones, the internet. The secular backdrop and Cold War time period of the Vietnam War is helpful for identifying whether hypothesized explanations of terrorism and insurgency are conditional on various intervening geopolitical and technological factors of the current period.

Rex W. Douglass, a graduate student supported by the TGD grant at Princeton utilized previously-untapped U.S. government data collected during the Vietnam War make it possible to study the relationships between governance, development, and terrorism in Vietnam using the same econometric techniques that the TGD team has been applying in Iraq, Afghanistan, and the Philippines. In Douglass' upcoming book chapter (Douglass, forthcoming), he discusses his investigation of a contemporary government database of civilians targeted during the Vietnam War. The data are detailed, with up to 44 attributes recorded for 73,712 individual civilian suspects. He employed an unsupervised machine learning approach of cleaning, variable selection, dimensionality reduction, and clustering. He found support for a simplifying typology of civilian targeting that distinguishes different kinds of suspects and different kinds targeting methods. The typology is robust, successfully clustering both government actors and rebel departments into groups that mirror their known functions. The exercise highlights methods for dealing with high dimensional found conflict data. It also illustrates how aggregating measures of political violence masks a complex underlying empirical data generating process as well as the complex institutional reporting process.

TGD research on Vietnam has focused on the role of civilians in the production of violence and whether reconstruction activities under the Civil Operations and Rural Development Support (CORDS) program worked to reduce insurgent activity and boost popular support for the government. TGD data on Vietnam include data on violence, the pacification status of villages, and measures of development and governance contained in the Hamlet Evaluation System (HES; similar to the SIGACT-III data for Iraq). An advantage of Vietnam relative to the current conflicts is that researchers can move beyond econometric analysis to detailed case studies. Records of unit positions and activities, violent events, rebel defections, and civilian targeting by both sides will be combined with qualitative accounts gathered from captured Viet Cong documents and participant interviews. Douglass has continued developing this data resource and the analysis of it using other grants, and the data is expected to become public in 2017. TGD played a critical role in seeding this unique data resource and subsequent analysis.

DYNAMICS OF POLITICAL CONFLICTS AND VIOLENCE (COL, EGY, IND, KEN, MEX)

The research projects in this section explore a broad range of dynamics surrounding political conflict and violence in specific countries. These projects received funding from multiple sources, but were brought under the TGD umbrella during the project, with written approval from the AFOSR Program Manager, because these studies offer key insights and opportunities for understanding the complex dynamics at work in communities experiencing conflict and offer interesting opportunities for advancing new methodologies.

Colombia – Examining a Long-Running Internal Conflict

Colombia has one of the world's longest running internal conflicts. While the country's security situation has improved over the past decade, multiple insurgent groups and remnant emerging "criminal bands" (BACRIM) involved with drug-trafficking and other illegal economic activities remain active and continue to threaten both the civilian population and government institutions. Given the rough terrain, drug trade, variation in state capacity, and external insurgent support networks found in the Colombian context, insights drawn from this case may have relevance for other conflicts. Further, the high-quality quantitative data available for its roughly 1,100 municipalities extending over long periods of time make the country an ideal setting for testing theories of conflict. TGD researchers working on Colombia are involved in a number of projects to better understand patterns of conflict and development.

In a synergistic study, Kaplan and Nussio (2015) explored potential explanations to understand the social reintegration of ex-combatants from armed conflicts. Community-level programs to reintegrate ex-combatants into society are based on the theory that the participation of ex-combatants in their communities can promote reconciliation and minimize recidivism to illegal activities. They evaluated community and security-related opportunities for and constraints on social reintegration using a survey of ex-combatants from Colombia (separately funded). They found that ex-combatants in more participatory communities tend to have an easier time with social reintegration and feel less of a need to organize among themselves. These findings suggest that to help ex-combatants, reintegration processes should also work to improve the social vibrancy of receptor communities.

Daly (2014) conducted a retrospective project that set out to explain sub-national, spatial, and temporal variation in the return to violence following civil war termination in Colombia. In 1958, La Violencia ended in negotiated settlement, but peace was short-lived with violence recurring within several years.

However, violence resumed in only 45% of the municipalities affected by prior conflict, while 55% consolidated peace. This article argues that power-sharing's success at solving elite commitment problems undermined the accords between the commanders and mid-tier officers. As a result, betrayed and resentful officers faced incentives to rearm. Where these middle managers had built their units on local social infrastructures, they proved able to remobilize. Where the factions were non-local to their regions of operation, the organizations disintegrated, and peace was preserved.

Shapiro, with his colleagues Abbey Steele and Juan F. Vargas have been working on a project entitled “State-building at the Community Level: Evaluating the Impact of Colombia’s Consolidation Program” which uses quarterly panel data collection of observable indicators to measure the impact of a large government program in Colombia. The large-scale policy initiative is called The Política Nacional de Consolidación y Reconstrucción Territorial (The National Policy for Territorial Consolidation and Reconstruction - PNCRT) and it aims to “consolidate” (or build) state presence in regions of the country where it has not had full control through a combination of counterinsurgency, counter-narcotics, and development programming (Ministerio de Defensa, 2009). Critically, the development portion of the program is being implemented by the Government of Colombia in some areas and by USAID in others, creating an opportunity to explicitly compare domestically-supported state-building efforts to externally-supported ones. Their key research question is whether the kinds of combined military and development programs currently being supported by the U.S. government and its allies lead to state-building, and if so where and how? This work began during Abbey Steele’s postdoc appointment at Princeton under the TGD grant, and has continued under a grant of approximately \$900k awarded by the Office of Naval Research.

Egypt - Violence in Transition: Political Violence in post-Mubarak Egypt

Periods of intense political change are characterized by uncertainty that can be violence producing. TGD supported Stanford Professor Lisa Blaydes’ project assessing the climate for political violence in Egypt after the fall of former president Hosni Mubarak in 2011. The project examined electoral violence as well as acts of ‘traditional’ violence that emerge during periods of uncertain rule or weakened state capacity. The team collected all incidents of violence in Egypt as reported by the two main daily newspapers sources (Al-Ahram, the major government daily, and Al-Masry Al-Youm, the major independent daily) for the period January 2010 until December 2012. These events of violence were geocoded and identified for type with additional information about deaths and casualties. The total data include approximately 1,500 individual observations per year. These data are currently being analyzed along with other datasets of Egyptian census data and electoral data. Initial results suggest that violence across Egyptian electoral districts during the Arab Spring varied as a function of pre-existing political factors (and thus were somewhat predictable). Ongoing analysis is exploring whether the degree of violence observed is related to fraud that might be perpetrated during the election itself. Theories of affective violence suggest that electoral fraud should be positively correlated with higher levels of violence during the election period; and it is possible that this effect will be magnified when fraud is being perpetrated against certain types of classes of candidates or in a way that is heterogeneous across districts. Ultimately, these studies provide insight as to where policy interventions should be targeted within countries experiencing the transition from autocratic rule to democracy, an important topic for defense and civilian policy.

India – Infrastructure Provision in Conflict Zones

The domestic nature of India's Maoist insurgency and India's federal structure and democratic institutions make the country a particularly rich context for testing how existing findings on development in conflict zones translate to new settings. Also, India's infrastructure development efforts offer a unique opportunity to study the interactions and differences between different development programs in the same conflict.

The Indian government began using development to address internal security problems in an extensive way in 2005. India's fight against the Maoist insurgency also allows researchers to test how important it is that development activities win local good will (as opposed to simply enhancing employment) if they are to reduce violence. India rolled out four types of rural infrastructure projects as part of nation-wide schemes with standard criteria: road construction (PMGSY), electrification (RGGVY), telecommunication (USOF), and Rural Drinking Water (NRDWP). These four large-scale, top down projects can be compared with projects undertaken under the "Integrated Action Plan" (IAP). IAP is managed by District Magistrates in each locality and responds to specific local needs. Comparing IAP's impact to that of projects rolled out according to standardized criteria will allow an additional test of theories predicting that large-scale development projects will be less cost-effective for violence reduction than targeted local programs coordinated with security forces.

Shapiro and Vanden Eynde are leading this research project with funding from several sources. Research conducted under this grant has contributed to the coding of small-scale infrastructure projects built under the IAP and the NRDWP in regions affected by the Maoist conflict, as well as the purchase and cleaning of data from the recently-released Economic Census to study whether rural infrastructure projects impact conflict by shifting economic opportunities. Shapiro and Vanden Eynde are continuing this project with funding from the International Growth Centre (IGC) and through another collaborative Minerva grant entitled "Deterrence with Proxies" (DwP) led by Eli Berman, University of California, San Diego.²

Kenya – Election-Related Violence in Kenya, 2007-08

In a synergistic project, James D. Long (a PhD candidate at UCSD at the time), was studying whether and how elections in Africa's emerging democracies support political accountability. Promoting elections is part of the standard package used by the U.S. and its allies for managing conflict; yet, findings show that democratization in multi-ethnic and under-developed societies often produces significant domestic and even international violence. For example, surrounding Kenya's December 2007 general elections, observers estimate that between 1,500-2,500 Kenyans died during the campaign and the resulting post-election crisis, along with numerous other human rights violations and 700,000 internally displaced people (South Consulting 2009). To better understand the violence, Long and colleagues collected observational data on political violence and human rights violations before and after Kenya's 2007 election. To get a broader picture over a longer time period, data has also collected from original news stories on reported violence in Kenya from 2009 ongoing to the present day. Data collection is complete through 2012, and incidents of violence events are being coded and a dataset is being built. This data since 2009 captures electoral violence around the 2013 race, as well as continued ethnic violence,

² IGC awards: "Connecting the Red Corridor: Infrastructure Provision in Conflict Zones" (35,000 GBP), "Rural Infrastructure Provision in India: Mapping the Bharat Nirman Programme" (14,978 GBP), and "Bidding for Roads" (19,599 GBP); Minerva DwP subproject: "Suppression of Naxalites by State Governments" (\$524,244).

violence from non-state insurgents (mostly in Coast province), and now terrorist violence from al-Shabaab. Researchers will merge these data with panel public opinion data from multiple surveys that were conducted in the 2013 election (Ferree, Gibson and Long, 2014) to see how actual violent events affect political and social attitudes. These data are also planned to be used in an upcoming paper with TGD alumni Danielle Jung (now at Emory University) on how violence affected the propensity for electoral fraud in 2013. The data analysis is also expected to be part of Long's book project that is an expansion of his dissertation. Long's dissertation, which was funded by multiple funding sources, found that ethnic differences in isolation did not cause electoral violence in Kenya, but fraud causes violence, which ethnic differences exacerbate (Long, 2012).

Mexico – Government Strategies to Contain Violence

Studying Mexico's drug war provides an opportunity to learn more about the dynamics of violence in "criminal insurgencies" and the impact of counter-narcotic interventions. These wars are different from regular civil wars in that Drug-Trafficking Organizations (DTOs) do not seek to supplant the state but are organized to maximize profits from the trafficking of drugs. Stanford Professor Beatriz Magaloni is working with the government of Mexico to have data released that will enable the construction of an original dataset to assess the impact of government interventions to contain drug cartels in Mexico that will span the entire duration of the drug war since 2006 and include information on different kinds of violence, population demographics, basic infrastructure, and more.

Magolina and co-authors studied the Mexican government's approach to limiting DTOs (Calderon, et al. 2015). In 2006, the Mexican government launched an aggressive campaign to weaken drug trafficking organizations (DTOs). The security policies differed significantly from those of previous administrations in the use of a leadership strategy (the targeting for arrest of the highest levels or core leadership of criminal networks). While these strategies can play an important role in disrupting the targeted criminal organization, they can also have unintended consequences, increasing inter-cartel and intra-cartel fighting and fragmenting criminal organizations. What impact do captures of senior drug cartel members have on the dynamics of drug-related violence? Does it matter if governments target drug kingpins versus lower-ranked lieutenants? They analyze whether the captures or killings of kingpins and lieutenants have increased drug related violence and whether the violence spills over spatially. To estimate effects that are credibly causal, they use different empirical strategies that combine difference-in-differences and synthetic control group methods. They find evidence that captures or killings of drug cartel leaders have exacerbating effects not only on DTO-related violence but also on homicides that affect the general population. Captures or killings of lieutenants, for their part, only seem to exacerbate violence in "strategic places" or municipalities located in the transportation network. While most of the effects on DTO-related violence are found in the first six months after a leader's removal, effects on homicides affecting the rest of the population are more enduring, suggesting different mechanisms through which leadership neutralizations breed violence.

The projects described in this section represent the breadth of the TGD Team's experience and the importance of the collecting micro-level data from a range of conflicts around the world. By collecting and analyzing data across conflicts through a similar theoretical lens using multiple methods, researchers gain three important inferential advantages. First, it's possible to distinguish results that are common to counterterrorism and counterinsurgency from those that are specific to a particular country or historical

period. Second, by examining how results vary across conflicts they can identify which aspects of the environment—technology, availability of foreign support, ideologies, and the like – explain important variation in the efficacy of governance and development interventions. Third, it’s possible to gain greater confidence in findings throughout the project.

SURVEY RESEARCH

The TGD proposal included a research track on field research and surveys to examine violent and nonviolent political organizations in settings that have experienced political violence. Two surveys were directly supported by the TGD grant: one survey in Colombia (SGHARP# FOS20100003H) and one survey in Northern Ireland (SGHARP# FOS20100012H). Apart from the two surveys discussed in this Survey Research section, any other research conducted by the TGD team that involved research with human subjects was not paid for through this grant. Hence, in other sections of this report, some projects are described as synergistic activities, because they address the core research agenda of this grant, but are multifaceted with multiple funding sources for various research components. In addition, Appendix I includes short summaries of other field research, where the TGD-supported component did not involve human subject research.

Explaining Why Militant Groups Participate in Elections (Colombia)

Directly measuring social support for terrorism or insurgency is problematic, because individuals likely falsify their preferences to some extent due to fear of coercion or social sanctioning. Aila Matanock, a PhD student at Stanford during the TGD grant, and her colleague Miguel García-Sánchez of Universidad de los Andes explored this issue in Colombia. Data on Colombia suggests that individuals may be more likely to falsify their expressed preferences when performing some actions, such as answering poll questions, than in others, such as voting. Thus, revelation of true preferences may alter the strategies of one or more of the actors involved. Additionally, existing work on revolutions suggests that falsification can end rapidly once a threshold in the population is reached leading to a massive shift in demonstrated popular support, so revelation of true preferences may occur rapidly and thus change the entire strategic environment. Distinguishing between true versus falsified support for terrorist groups thus reveals important information about the expected fighting environment if there is a shift in control, but also about the electoral environment if a terrorist or insurgency group decides to participate in the elections, for example. Accurately estimating these expected outcomes is important in understanding the effect of tactical shifts in civil conflict, and crucial in designing an effective counterterrorism campaign. Thus, distinguishing and measuring true versus falsified support for terrorist and insurgency groups is important but very difficult.

To study the difference between true versus falsified support, a survey was designed to ask a series of both experimental and direct questions to coincide with electoral participation in an open polling context. In Colombia, a former militant group leader, Gustavo Petro, was running as the candidate of one of the three major parties, Polo Democrático Alternativo, in the presidential election on May 30, 2010. Thus, the project was set up to compare the support expressed for Mr. Democrático Alternativo, his group, other militant groups, and the tactics they use as measured by both direct and experimental questions to his actual vote count. Matanock and García-Sánchez’s working paper (2013) assesses support for the military through experimental methods compared to direct methods. They theorized that individuals in general may feel pressure from the state to report high rates of support for the military, but that their

preferences—which they may reveal with less intrusive questions, like the list experiment—may actually be lower, especially in regions where their survival depends on an illegal organization or an illegal product. Their results suggest that such preference falsification is present in estimating support for the military. It is lower when measured experimentally than directly. The difference is present in state-controlled and peaceful municipalities, but it is largest in guerrilla-controlled municipalities, as well as those with coca cultivation. These results suggest that situations like revolutions in which public support collapses suddenly may actually be predictable by better measuring “private” support through more sophisticated experimental questions on surveys.

Insurgents in Neighborhoods: An Investigation of Rebel Tactics (Northern Ireland)

The field research project in Northern Ireland included a survey that assessed the degree to which violent paramilitary groups provided goods and services to various communities during the conflict there. This was the first methodical collection of such evidence, and formed the centerpiece of the PhD thesis of Lindsay Heger. Through the survey, Heger also found evidence that individuals who received dispute adjudication services from paramilitary groups are particularly unlikely to hold the current government in high regard.

The survey asked questions about social service provision which might be considered illegal, if dispute adjudication was conducted by rebel groups. Even though these were retrospective questions, a history of loyalty to those groups might still not be answered accurately. The researchers developed an indirect approach to the topic, by asking about a hypothetical problem in law enforcement or dispute resolution, and then asking whether the respondent would have had a solution to the problem. Then, respondents were asked to choose from a list of possible sources of solution, including family, friends, police, courts, etc., leaving a write-in option for other. In open-ended questions and in cross-validation researchers found that nonresponse on the list question is associated with rebel provision of services.

NEW METHODS

The TGD project has made notable methodological contributions in two areas. The first is the Team’s focus on micro-level empirical work in conflict zones, enabled by careful use of government-collected administrative data, often data that are released through collaboration with researchers. The TGD researchers were trailblazers on this approach, and many other researchers are now embracing it, in part, because this project has demonstrated what’s possible by working closely with government partners working in insecure areas.

A second contribution is an advancement of new methods for eliciting sensitive attitudes. These methods had been used primarily in US contexts previously, but the TGD team expanded the scope of application dramatically and demonstrated such methods can be applied in conflict zones. The survey in Northern Ireland developed an indirect approach to ask sensitive questions. The same method was subsequently used in other studies (separately funded) in Afghanistan and the Philippines.

NEW DATA

TGD researchers have compiled detailed micro-data on a variety of conflicts in nine countries (Afghanistan, Colombia, Egypt, Kenya, Iraq, Mexico, Pakistan, the Philippines, and Vietnam). The TGD grant supported the development of ESOC’s website to host micro-level data, GIS data, publications, and

supporting information (<http://esoc.princeton.edu>). The ESOC network includes researchers beyond those who were supported by the TGD grant, but this grant made it possible to establish a core research team and the collaborative resources necessary to collect data on a large scale. To date, ESOC has declassified or otherwise collected data on more than 1,000,000 discrete geo-located incidents of violence in ten wars over seven countries in conflict since 1950. The project has produced 95 original datasets building on these data and other sources, including: precise information on aid spending in five conflicts; surveys of more than 225,000 respondents across five countries; intelligence flows to government forces in three; insurgent payments to thousands of individual fighters; various administrative minutiae, and extensive insurgent personnel records in one; interviews with thousands of surrendered rebels in one; and government force levels over time and space in four. The result is a data compilation that is unprecedented in its depth of objectively-measured information about the dynamics of armed conflict in the modern world. The collection is growing all the time, as most datasets (along with codebooks) are posted with the first publication that utilizes a particular dataset(s).

PUBLICATIONS

Over the course of the grant, TGD researchers published 44 articles in academic journals, including 17 in the top two or three journals for economics and political science (American Economic Review, American Journal of Political Science, American Political Science Review, International Security, Journal of Political Economy, and Journal of Politics). This is evidence that the TGD researchers were successful in bringing top-tier, innovative and rigorous methods on security topics into a more prominent place in the academic literature. All publications supported by this grant are posted on the ESOC website with replication data. ESOC publications have collectively been cited over 2,700 times, according to the google scholar account <http://scholar.google.com/citations?user=bqKSAqEAAAJ&hl=en>. The full list of TGD publications is in Appendix IV; in addition to the peer-reviewed published articles, the list includes selected working papers and other works. A selection of press articles is included further below in the Transitions and Broader Outreach Section of this report.

TRAINING

An explicit part of the proposed TGD agenda was to provide training. The TGD Investigators made it one of their top priorities to equip young scholars with the theoretical tools, background, data and contacts necessary to execute fresh research on the political economy of terrorism and insurgency. This training was accomplished through active participation in data collection and analysis by post-doctoral fellowships and graduate students funded by this project and through formal workshops. Throughout the TGD grant policy makers were involved in these workshops whenever possible. A number of these individuals are now in senior positions and have started to reach out more broadly to the academic community studying conflict, suggesting the TGD grant's training mission was met both with students and, to some extent, with the next generation of policy makers working at the intersection of conflict and development.

TGD Alumni Placements

The TGD project has trained a new cohort of scholars. Researchers who were supported under the grant as graduate students or post-docs now hold tenure-track faculty appointments at 20 leading research universities. The list below shows the TGD alumni and the university where s/he is currently appointed as an Assistant Professor.

- Graeme Blair | University of California Los Angeles
- H. Zeynep Bulutgil | Tufts University
- Michael Callen | Harvard University
- Luke N. Condra | University of Pittsburgh
- Sarah Zukerman Daly | University of Notre Dame
- Tarek Ghani | Washington University
- Danielle F. Jung | Emory University
- Oliver Kaplan | University of Denver
- Eric Kramon | George Washington University
- Patrick M. Kuhn | Durham University
- James D. Long | University of Washington
- Aila Matanock | UC Berkeley
- Christopher Paik | New York University, Abu Dhabi
- Anoop Sarbahi | University of Minnesota, Twin Cities
- Peter Schram | Vanderbilt University
- Abbey Steele | University of Amsterdam
- Seiki Tanaka | University of Amsterdam
- Oliver Vanden Eynde | Paris School of Economics
- Nils B. Weidmann | University of Konstanz
- Austin B. Wright | University of Chicago

PhD Dissertations Supported Under This Grant

The TGD grant provided partial support to many students and young scholars. In addition to the placements noted above, some provided research assistance with a Bachelor or Master's degree went directly onto graduate programs at Harvard or Stanford. Other graduate students or postdocs went directly to placements such as RAND, the U.S. Treasury, or the World Bank. The table below highlights PhD students who received some support from the grant that contributed to part of his/her dissertation.

Table 1: Student Dissertations Partially Supported by TGD Grant

Name	Degree, Date, University	Current Employment	Key Findings*
Callen, Michael	PhD, Economics, 2011, UC San Diego	Assistant Professor, Public Policy, Harvard Kennedy School	Employment is often associated with increased violence (Berman et al., 2011a). Violence increases “certainty bias,” an extreme form of risk aversion (Callen et al., 2014). Natural disasters increase “impatience” (Callen, 2015). Informational intervention can reduce election fraud (Callen and Long, 2015).
Chou, Tiffany	PhD, Economics, 2011, UC San Diego	Economist, US Treasury Department's Office of Economic Policy	Development assistance in Afghanistan reduced violence, if properly administered (Chou, 2012).
Douglass, Rex	PhD, Politics, 2012, Princeton University	Postdoctoral Scholar, UC San Diego	When faced with powerful and wealthy governments, rebel cohesion is most clearly threatened by brute military force. This

Name	Degree, Date, University	Current Employment	Key Findings*
			argument was tested and illustrated using remarkably detailed microlevel evidence from the Vietnam War (Douglass, forthcoming).
Ghani, Tarek	PhD, Business and Economics, 2015, UC San Diego	Assistant Professor, Washington University (2016-); Post-doc (2015-16), Princeton University	Exposure to previous violence - and expectations of future violence - impede the adoption of mobile financial technology in Afghanistan.
Heger, Lindsay	PhD, Political Science, 2010, UC San Diego	Associate Director, One Earth Future	Terrorist targeting is predictable by political leverage with government. Rebels provide services in territory they control. Small ruling coalitions are more violent in suppressing rebellion.
Keister, Jennifer	PhD, Political Science, 2011, UC San Diego	Assoc. Research Fellow, University of Notre Dame's Initiative for Global Development	Among Philippine rebel groups, the larger aspire to control territory and provide more social services (MILF and MNLF). The smallest (ASG) choose only terrorist tactics.
Long, James	PhD, Political Science, 2012, UC San Diego	Assistant Professor, Political Science, University of Washington	Ethnic differences in isolation did not cause electoral violence in Kenya, but fraud causes violence, which ethnic differences exacerbate (Long, 2012).
Matanock, Aila	PhD, Political Science, 2012, Stanford University	Assistant Professor, Political Science, UC Berkeley	Research focuses on the role of electoral competition between militant groups and governments and finds that, when inclusive elections are part of an agreement, peace is more durable. Specifically, international actors are able to engage in monitoring and sanctioning noncompliance with a peace agreement through the transparency that elections provide (book project).
Troland, Erin	PhD, Economics, 2015, UC San Diego	Economist, US Treasury Department Office of Economic Policy	Development assistance in Iraq reduced violence if modest, secure and informed (Berman et al., 2013c). Investment invites both government and rebel initiated violence in the Philippines (Berman et al., 2013a).

Name	Degree, Date, University	Current Employment	Key Findings*
Wright, Austin	PhD, Department of Politics, expected June 2016, Princeton University	Assistant Professor, University of Chicago	Dissertation studies the relationship between local economic shocks and changes in the types of violence that rebel organizations produce. Using novel microdata on Colombia's ongoing insurgency, he finds that shocks to coffee, oil, and coca production exert substantial influence on how rebels fight state forces.

*Note: Dissertations are available from the library of the university, where the degree was earned.

Research Meetings

The TGD project held annual meetings to provide a forum for discussions of methodological advances and networking opportunities with a diverse range of colleagues. During meetings, senior and junior scholars interacted with invited leading academics, as well as experts from the U.S. military, USAID, World Bank, NGOs, and industry. This interdisciplinary, cross-boundary annual meeting has proven successful each of the last six years at sparking collaborative projects, bridging differing research methodologies, exposing students to new research, training emerging scholars, and exposing practitioners to research-based perspectives. The location of annual meetings rotated among the universities (Princeton University, Stanford University, UC San Diego) and Washington DC.

Some Annual Meetings were held in conjunction with related meetings that received supplemental funding from other sources.

- June 21–28, 2009: Governance, Development and Political Violence Summer Training Workshop and Conference. Sponsored by National Science Foundation. Brought together the TGD team to train graduate students and young faculty.
- June 19–25, 2011: Governance, Development and Political Violence Summer Training Workshop and Empirical Studies of Conflict / Minerva Terrorism, Governance, and Development Annual Meeting. Brought together the TGD Team to train graduate students and young faculty.

Other meetings led by TGD researchers focused on specific topic, such as the following:

- June 8-9, 2012: Evaluating Mobile Innovations for Security and Accountability. The workshop brought together researchers, policymakers, and businesspeople from across the globe to discuss research on mobile technology, security and governance issues in developing countries.
- February 26-28, 2013: Transforming Security Research Workshop. Eli Berman organized and co-facilitated a workshop hosted by the Department of Defense Minerva Research Initiative, National Science Foundation, and the UK Research Councils. A select group of scholars met to discuss developments and new directions in security related research within social and behavioral science.
- February 8, 2014: Workshop on India's Maoist Insurgency. Shapiro and Vanden Eynde led this workshop at Princeton to promote the emerging empirical work on India's Maoist conflict. It was funded by the Princeton Institute for International and Regional Studies (PIIRS) Global Seminar series, while Vanden Eynde was a visiting researcher at Princeton, supported by the TGD grant.

HIGH-LEVEL BRIEFINGS

TGD Researchers have given briefings to high-level officials including the following: Commander International Security Assistance Force Afghanistan; Chairman of the Joint Chief of Staff; Counterinsurgency Training Center (Afghanistan); National Intelligence Council; National Intelligence Management Council; NCTC; Director of Joint Staff/J-7 Directorate; OSD-Policy; RAND Insurgency Board; US Department of Treasury Offices: Terrorist Financing and Intelligence; World Bank; and USAID. TGD Researchers have also presented TGD findings to government and policy communities outside of academic settings. See Appendix III for selected examples.

CONGRESSIONAL TESTIMONIES

Joseph Felter testified on July 24, 2012 before the U.S. House Armed Services Committee's Subcommittee on Oversight and Investigations on whether the Afghan National Security Forces are capable of taking over the security lead after U.S. and NATO troop withdraw in 2014. His testimony was informed by his Minerva sponsored research on employing locally recruited forces supervised by specially trained SOF forces in the Philippines.

Patrick B. Johnston. November 13, 2014. "Countering ISIL's Financing." Testimony presented before the House Financial Services Committee. (Patrick Johnston is currently a Political Scientist at RAND; he was supported as a postdoc by the TGD grant.)

Patrick B. Johnston. May 5, 2015. "Terrorist Financing in Canada and Abroad," Testimony presented before the Canadian Parliament House of Commons Standing Committee on Finance. (Patrick Johnston is currently a Political Scientist at RAND; he was supported as a postdoc by the TGD grant.)

TRANSITIONS AND BROADER OUTREACH

The TGD grant supported the development of the ESOC website that hosts micro-level data, GIS data, publications, and supporting information to further improve conflict analysis from more than seven countries including Afghanistan, Colombia, Iraq, Mexico, Pakistan, the Philippines, and Vietnam. By providing research-ready data (and codebooks) and compiling publications and other contextual information on one website, ESOC has reduced the barriers to entry for other researchers to conduct fresh research on these important national security issues. Professors who are not part of the TGD grant have said they have incorporated data from the website into their classroom exercises.

The TGD grant has supported the manuscript for a new book entitled, *Information in Counterinsurgency*. This book will provide an integrated overview of lessons learned for a broad audience. More than half of the chapters are drafted, and the authors are continuing work and aiming to publish in late 2016.

TGD Research influenced these initiatives:

- DARPA N7, XDATA and XFIN projects draw on TGD research.
- DARPA is funding CTC/ESOC/RAND to build data from insurgent records captured in Iraq and to test theories developed by TGD regarding insurgent organization and compensation practices.
- Defense R&D Canada is using TGD data to study relative importance of doctrine versus force levels in explaining 2007 events in Iraq.

- ISAF and USAF data audits were motivated by interactions with TGD team.
- Philippines: Joseph Felter had multiple engagements with senior defense officials from the Armed Forces of the Philippines (August 2013 through January 2014) and provided feedback and insights gained from ongoing Minerva sponsored research.
- RAND study on impact of CERP in Afghanistan was modeled on TGD work.
- Afghanistan is working with TGD team on survey instruments and impact evaluation projects.
- EVIDINCE Collaboration with USAID/CMM contributed to stronger requirements for evaluation plans in USAID contracts in conflict zones. USAID-Colombia and the Government of Colombia are working with TGD team to evaluate program bringing state presence in former FARC areas.
- USAID OTI released data to TGD team to evaluate their programs in Iraq and will do so for Pakistan once OTI finishes work there. USAF released data to facilitate research in Afghanistan.
- USAID-Afghanistan worked with members of the TGD team on survey instruments and impact evaluation projects.
- Mercy Corps is applying TGD-developed data in collaboration with graduate students trained by TGD scholars to analyze surveys on support for violent extremism in Iraq as well as to design new impact evaluation projects on CVE programming in Morocco and Tunisia.

TGD Researchers have taken on new roles that enable them to transition their expertise into new domains:

- Radha Iyengar led a TGD subaward at London School of Economics in an early phase of the project. After LSE, Dr. Iyengar worked at the White House as the Director for Defense Personnel, Readiness, and Partnerships on the National Security Council. She then served as member of the Department of Energy Chief of Staff team and the Deputy Chief of Staff to the Deputy Secretary at the Department of Energy. Dr. Iyengar is currently a senior economist at RAND.
- Jason Lyall (co-PI) became the Director of the Political Violence FieldLab at Yale University (September 2014-).
- Jeremy Weinstein (co-PI), Professor of Political Science and Senior Fellow at the Freeman Spogli Institute for International Studies, Stanford University was a TGD Investigator but subsequently completed two service leaves. Dr. Weinstein served as Director for Development and Democracy on the National Security Council staff at the White House between 2009 and 2011. Between 2013 and 2015, Weinstein served as the Deputy to the U.S. Ambassador to the United Nations and before that as the Chief of Staff at the U.S. Mission to the United Nations.

TGD Researchers have written press articles, op-eds, and conducted media interviews to share their research findings with a broader audience and to provide insight on news events. TGD writings have been cited in the Kerry Report, CRS reports, WB Reports, among others. Some examples are listed below.

- “To Defeat ISIS, Focus on Its Real Sources of Strength.” By Benjamin Bahney and Patrick B. Johnston. *The National Interest*, December 4, 2015.
- “Islamic State’s New Strategy is Suicidal.” By Eli Berman and Jacob Shapiro. *BloombergView*, December 2, 2015.
- “Here’s Why We Can Only Contain the Islamic State—Not Bomb it Back to the Stone Age.” By Stephen Biddle and Jacob Shapiro. *The Washington Post*, Monkey Cage Blog, December 1, 2015. (Note: This article was cited in CRS Report No. R43612, “The Islamic State and U.S. Policy.”)

- “Why ISIS Will Fail on Its Own.” By Eli Berman and Jacob Shapiro. *Politico Magazine*, November 29, 2015.
- “The Enemy You Know and the Ally You Don't.” By Benjamin Bahney, Patrick Johnston, and Patrick Ryan. *Foreign Policy*, June 23, 2015.
- “Who Runs the Islamic State Group? By Benjamin Bahney and Patrick B. Johnston. *US News and World Report*, May 22, 2015.
- “New York Times Explainer on ISIL Finances.” Contributions by Patrick Johnston, Benjamin W. Bahney, and Howard J. Shatz from RAND Corporation for: <http://www.nytimes.com/interactive/2015/05/19/world/middleeast/isis-finances.html>, May, 2015.
- “How Empirical Studies of Political Violence (Can) Help Policymakers.” By Eli Berman, Joseph H. Felter, Ethan B. Kapstein and Jacob N. Shapiro. *The Washington Post*, Monkey Cage Blog, March 16, 2015.
- “The Super Smart Way to Dismantle ISIS.” By Eli Berman, Joseph H. Felter, and Jacob N. Shapiro, *The National Interest*, February 27, 2015.
- “Aid for Peace: Does Money Buy Hearts and Minds?” By Eli Berman, Joseph H. Felter, and Jacob N. Shapiro, *Foreign Affairs*, January 21, 2015.
- “Terror in France: Implications for Muslim Integration,” By Claire Adida, David Laitin and Marie-Anne Valfort. *The Washington Post*, Monkey Cage, January 14, 2015.
- “A Discussion on the Motivations Behind the Paris Terror Attacks,” Interview with Eli Berman: *KPBS Midday Edition*. January 12, 2015.
- “Managing a Transnational Insurgency: The Islamic State of Iraq’s ‘Paper Trail,’ 2005-2010.” By Danielle F. Jung, Pay Ryan, Jacob N. Shapiro, and Jon Wallace. Occasional Paper Series of the *Combating Terrorism Center at West Point*, December 16, 2014.
- “The Terrorist Bureaucracy: Inside the Files of the Islamic State in Iraq.” By Jacob N. Shapiro and Danielle F. Jung, *The Boston Globe*, December 14, 2014.
- “Hit the Islamic State in the Pocketbook.” By Benjamin Bahney and Patrick Johnston. *Newsday*, October 5, 2014.
- “Hitting ISIS Where It Hurts: Disrupt ISIS' Cash Flow in Iraq.” By Benjamin Bahney and Patrick B. Johnston, *New York Times*, The Opinion-Pages, August 13, 2014.
- “Obama's Iraq Dilemma: Where Did ISIS Come From, and Can Anything be Done About It?” By Benjamin Bahney and Patrick B. Johnston. *US News & World Report*, June 17, 2014.
- “Can Colombia Build on Its Democratic Opening?” By Oliver Kaplan, *CNN World Website*, November 19th, 2013.
- “Why Assume the Taliban Will Always be so Violent?” By Jacob N. Shapiro, *Financial Times*, August 13, 2013.
- “The Business Habits of Highly Effective Terrorists.” By Jacob N. Shapiro. *Foreign Affairs – Snapshots*. August 11, 2013.
- “Effective Aid in Conflict Zones.” By Eli Berman, Joe Felter, Jacob N. Shapiro, and Erin Troland. *VOX*, May 26, 2013.
- “Colombia’s Rebels and Land Reform.” By Oliver Kaplan and Mike Albertus. *New York Times*, The Opinion-Pages, October 9, 2012.
- “Constructive COIN: How Development Can Help Fight Radicals.” By Eli Berman, Joseph Felter, and Jacob N. Shapiro. *Foreign Affairs* online, June 1, 2010.

CONCLUSION – IMPACT ON DOD CAPACILITIES AND BROADER IMPLICATIONS FOR NATIONAL DEFENSE

Preventing terrorism and reducing the negative impacts of political violence are key national security goals. Policies to support these goals have received high levels of funding without substantial social scientific research to support the methods chosen. This project has contributed to basic social scientific knowledge, as well as to the evaluation of tactical, operational, and strategic issues in national security policy. This project has expanded the academic research on these important issues with forty-four articles in top-tier academic journals. Some key findings run contrary to the broadly held assumptions about what works. This demonstrates the need for additional funding to support the type of rigorous, independent research conducted by this project.

The Principal Investigators of the TGD grant maximized the investment by the Department of Defense by establishing a research network called the Empirical Studies of Conflict project (ESOC). ESOC researchers have compiled detailed micro-data on a variety of conflicts in nine countries (Afghanistan, Colombia, Egypt, Kenya, Iraq, Mexico, Pakistan, the Philippines, and Vietnam), and the ESOC website hosts micro-level data, GIS data, publications, and supporting information (<http://esoc.princeton.edu>). ESOC Alumni are now bringing an evidence-based approach to studying conflict to 20 different universities as tenure-track faculty.

TGD researchers have also worked carefully to share their research beyond academic settings. TGD-supported researchers have provided many high-level briefings over the past five years to senior U.S. and allied nation leaders. TGD researchers, former post-docs, and former graduate students are engaged in research with policy makers from the Defense Department to SIGAR to USAID. While hard to quantify, a number of notable successes suggest that precedents on data sharing set by the TGD team have been used to secure release of a broad range of administrative data from the U.S. and other governments, dramatically enhancing the knowledge base for social science research on conflict. To reach a much broader audience, a book is in progress entitled, “Information in Counterinsurgency” which draws on the TGD team's work over the last six years to explain how and why development contributes to COIN and CT under certain conditions and not others.

REFERENCES

- Adams Greg. 2014. "Conflict of Interest: Military-led Development Insights from Afghanistan for Warfighters, Development Practitioners, and Policy Makers." Master's thesis, Harvard Univ.
- Berman, Eli, Michael Callen, Joseph H. Felter, Jacob N. Shapiro. 2011a. "Do Working Men Rebel? Unemployment and Insurgency in Afghanistan, Iraq, and the Philippines." *Journal of Conflict Resolution* 55(4): 496-528.
- Berman, Eli, Joseph H. Felter, and Jacob N. Shapiro. 2011b. "Can Hearts and Minds be Bought? The Economics of Counterinsurgency in Iraq." *Journal of Political Economy* 119(4): 766-819.
- Berman, Eli, Joseph Felter, Ethan Kapstein and Erin Troland. 2013a. "Predation, Taxation, Investment and Violence: Evidence from the Philippines," NBER Working Paper 19266, July 2013.
- Berman, Eli, Joseph Felter, Jacob N. Shapiro, and Erin Troland. 2013b. "Modest, Secure and Informed: Successful Development in Conflict Zones," NBER Working Paper 18674, February 2013.
- Berman, Eli, Joseph H. Felter, Jacob N. Shapiro, and Erin Troland. 2013c. "Modest, Secure and Informed: Successful Development in Conflict Zones." *American Economic Review: Papers and Proceedings* 103(3): 512-517.
- Berman, Eli and Aila M. Matanock. 2015. "The Empiricists' Insurgency." *Annual Review of Political Science* 18: 443-464.
- Blair, Graeme, C. Christine Fair, Neil Malhotra, and Jacob N. Shapiro. 2013a. "Poverty and Support for Militant Politics: Evidence from Pakistan." *American Journal of Political Science* 57(1): 30-48.
- Blair, Graeme, Kosuke Imai and Jason Lyall. 2013b. "Explaining Support for Combatants in Wartime: A Survey Experiment in Afghanistan." *American Political Science Review* 107(4): 679-705.
- Blanchard, Christopher M. and Carla E. Humud. 2015. *The Islamic State and U.S. Policy* (CRS Report No. R43612). Washington, DC: Congressional Research Service.
<https://www.fas.org/sgp/crs/mideast/R43612.pdf>.
- Calderon, Gabriela, Gustavo Robles, Alberto Diaz-Cayeros, and Beatriz Magaloni. 2015. "The Beheading of Criminal Organizations and the Dynamics of Violence in Mexico." *Journal of Conflict Resolution*, doi: 10.1177/0022002715587053, advanced publication online June 1, 2015.
- Callen, Michael, Mohammad Isaqzadeh, James D. Long, and Charles Sprenger. 2014. "Violence and Risk Preference: Experimental Evidence from Afghanistan." *American Economic Review*, 104(1): 123-48.

- Callen, Michael. 2015. "Catastrophes and Time Preference: Evidence from the Indian Ocean Earthquake," *Journal of Economic Behavior and Organization* 118: 199–214.
- Callen, Michael, Clark C. Gibson, Danielle F. Jung, and James D. Long. 2015a. "Improving Electoral Integrity with Information and Communications Technology." *Journal of Experimental Political Science*, doi: 10.1017/XPS.2015.14, advanced publication online October 26, 2015.
- Callen, Michael, Saad Gulzar, Ali Hasanain, Yasir Khan, and Arman Rezaee. 2015b. "Personalities and Public Sector Performance: Evidence from a Health Experiment in Pakistan." NBER Working Paper 21180.
- Callen, Michael and James D. Long. 2015. "Institutional Corruption and Election Fraud: Evidence from a Field Experiment in Afghanistan." *American Economic Review* 105(1): 354-81.
- Chou, Tiffany. 2012. "Does Development Assistance Reduce Violence? Evidence from Afghanistan." *Economics of Peace and Security Journal* 7(2): 5-13.
- Condra, Luke N. and Jacob N. Shapiro. 2012. "Who Takes the Blame? The Strategic Impact of Collateral Damage." *American Journal of Political Science* 56(1): 167–187.
- Crost, Benjamin, Joseph Felter, and Patrick Johnston. 2014. "Aid Under Fire: Development Projects and Civil Conflict." *American Economic Review* 104(6): 1833-56.
- Crost, Benjamin, Joseph H. Felter, and Patrick B. Johnston. 2016. "Conditional Cash Transfers, Civil Conflict and Insurgent Influence: Experimental Evidence from the Philippines." *Journal of Development Economics* 118: 171-182.
- Daly, Sarah Zukerman. 2014. "The Dark Side of Power-Sharing: Middle Managers and Civil War Recurrence." *Comparative Politics* 46(3): 333-353.
- Douglass, Rex. Forthcoming. "Understanding Civil War Violence through Military Intelligence: Mining Civilian Targeting Records from the Vietnam War." Chapter in C.A. Anderton and J. Brauer, eds., *Economic Aspects of Genocides, Mass Atrocities, and Their Prevention*. New York: Oxford University Press.
- Fair, C. Christine, Ethan Bueno de Mesquita, Jenna Jordan, Rasul Bakhsh Rais, and Jacob N. Shapiro. 2015. "Measuring Political Violence in Pakistan: Insights from the BFRS Dataset." *Conflict Management and Peace Science* 32(5): 536–558.
- Fair, C. Christine, Rebecca Littman, Neil Malhotra, and Jacob N. Shapiro. Forthcoming. "Relative Poverty, Perceived Violence, and Support for Militant Politics: Evidence from Pakistan." *Political Science Research and Methods*.

- Fair, C. Christine, Neil Malhotra, and Jacob N. Shapiro. 2014. "Democratic Values and Support for Militant Politics: Evidence from a National Survey of Pakistan." *Journal of Conflict Resolution* 58(5): 743-770.
- Ferree, Karen, Clark Gibson, and James D. Long. 2014. "Voting Behavior and Electoral Irregularities in Kenya's 2013 Election." *Journal of Eastern African Studies* 8(1): 153-172.
- Johnston, Patrick B. 2012. "Does Decapitation Work? Assessing the Effectiveness of Leadership Targeting in Counterinsurgency Campaigns." *International Security* 36(4): 47-79.
- Johnston, Patrick B. and Anoop Sarbahi. Forthcoming. "The Impact of U.S. Drone Strikes on Terrorism in Pakistan and Afghanistan." *International Studies Quarterly*.
- Kaplan, Oliver and Enzo Nussio. 2015. "Community Counts: The Social Reintegration of Ex-combatants in Colombia." *Conflict Management and Peace Science*. doi: 10.1177/0738894215614506, advanced publication online November 24, 2015.
- Khanna, Gaurav and Laura Zimmerman. 2015. "Guns and Butter? Fighting Violence with the Promise of Development." Accessed 12/28/15 from: <https://sites.google.com/site/lauravanessazimmermann/research>.
- Long, James Dunaway IV. 2012. *Voting, Fraud, and Violence: Political Accountability in African Elections*. La Jolla: University of California, San Diego.
- Matanock, Aila M. and Miguel García-Sánchez. 2013. "Controlling Civilians? Examining Support for the Military in Colombia." Working paper can be requested from author's website: <http://matanock.berkeley.edu/research/>.
- Sexton, Renard. 2015. "Aid, Insurgency and the Pivotal Role of Control: Evidence from Afghanistan." Accessed 12/28/15 from: http://aalims.org/uploads/Aid_violence_Afghanistan_Sexton.pdf.
- Shapiro, Jacob N. and David A. Siegel. 2015. "Coordination and Security: How Mobile Communications Affect Insurgency." *Journal of Peace Research* 52(3): 312-322.
- Shapiro, Jacob N. and Nils B. Weidmann. 2015. "Is the Phone Mightier than the Sword? Cell Phones and Insurgent Violence in Iraq." *International Organization* 69(2): 247-274.
- South Consulting. 2009. Report. The Kenya National Dialogue and Reconciliation Monitoring Project. Online. <http://dialoguekenya.org/>.
- Vanden Eynde. 2015. "Targets of Violence: Evidence from India's Naxalite Conflict." Accessed 12/28/15 from: http://www.parisschoolofeconomics.eu/docs/vanden-eynde-oliver/version_2015_11.pdf.

APPENDIX I – Field Research with Partial Support from the Minerva TGD grant

Appendix I provides short summaries of other field research that did not involve human subject research or was conducted with only partial funding from this TGD grant.

Guatemala and El Salvador – Aila Matanock traveled to Guatemala and El Salvador for an exploratory trip to meet in person with officials from the International Commission against Impunity in Guatemala to establish contacts there and in El Salvador for a project examining whether governance delegation agreements may be a mechanism for overcoming corrupt security sectors in post-conflict states.

Palestinian Territories – Field research was conducted and the survey assessed the extent to which the Palestinian population in the West Bank and Gaza turn to religious groups for social services provision. This was the first methodical collection of evidence of this type in this area. Social service provision by these groups is much lower than previously believed, based on largely anecdotal evidence. (Partial funding from this Minerva grant.)

Philippines – Field research in the Southern Philippines, combined with survey evidence revealed the extent of service provision among three rebel groups, and the shift to government provision in the context of a peace agreement. This was the first methodical collection of evidence of this type in the Philippines. (Partial funding from this Minerva grant.)

APPENDIX II – Researchers Supported by the TGD Grant

Name	Role	Affiliation during TGD Support
Jacob N. Shapiro	PI	Princeton University
Eli Berman	Co-PI	UC San Diego
Joseph H. Felter	Co-PI	Stanford University
David D. Laitin	Co-PI	Stanford University
Jason Lyall	Co-PI	Yale University
Jeremy M. Weinstein	Co-PI	Stanford University
Joshua Blumenstock	Co-PI, extension year	University of Washington
Oliver Vanden Eynde	Co-PI, extension year	PSE; Princeton (Visiting Scholar)
Lisa Blaydes	Senior Researcher	Stanford University
Radha Iyengar	Senior Researcher	London School of Economics
Beatriz Magaloni	Senior Researcher	Stanford University
Tarek Ghani	Graduate Student and Post-doc	UCSD (gs); Princeton (Post-doc)
Lindsay Heger	Graduate Student and Post-doc	UC San Diego
Aila Matanock	Graduate Student and Post-doc	Stanford (gs); UCSD (Post-doc)
H. Zeynep Bulutgil	Post-doc	Princeton University
Luke Condra	Post-doc	UC San Diego
Sarah Zukerman Daly	Post-doc	Stanford University
Daniel Egel	Post-doc	UC San Diego
Patrick B. Johnston	Post-doc	Stanford University
Danielle F. Jung	Post-doc	Princeton University
Oliver Kaplan	Post-doc	Princeton University
Eric Kramon	Post-doc	Stanford University
Patrick Kuhn	Post-doc	Princeton University
Nicholai Lidow	Post-doc	UC San Diego
Christopher Paik	Post-doc	Princeton University
Anoop Sarbahi	Post-doc	Stanford University
Bilal Siddiqi	Post-doc	Stanford University
Abbey Steele	Post-doc	Princeton University
Nils B. Weidmann	Post-doc	Princeton, Yale
Seiki Tanaka	Visiting postgraduate	Princeton University
Graeme Blaire	Graduate Student	Princeton University
Michael Callen	Graduate Student	UC San Diego
Tiffany Chou	Graduate Student	UC San Diego
Rex W. Douglass	Graduate Student	Princeton University
Mitch Downey	Graduate Student	UC San Diego
Edgar Franco Vivanco	Graduate Student	Stanford University
Elizabeth Hastings	Graduate Student	UC San Diego
Jennifer Keister	Graduate Student	UC San Diego
Marlette Jackson	Graduate Student	Stanford University
Carrie Lee	Graduate Student	UC San Diego
Melissa M. Lee	Graduate Student	Stanford University
Carrie Ann Lee Lindsay	Graduate Student	Stanford University
James D. Long	Graduate Student	UC San Diego
Niall Keleher	Graduate Student	University of Washington
Saurabh Pant	Graduate Student	Princeton University
Louise Paul-Delvaux	Graduate Student	Paris School of Economics

Name	Role	Affiliation during TGD Support
Arman Rezaee	Graduate Student	UC San Diego
Gustavo Robles	Graduate Student	Stanford University
Andrew C. Shaver	Graduate Student	Princeton University
Tom Scherer	Graduate Student	Princeton University
Prakhar Sharma	Graduate Student	Syracuse University (PI at Yale)
Paolo Santini	Graduate Student	Bologna University (PI at PSE)
Erin Troland	Graduate Student	UC San Diego
Choon Wang	Graduate Student	UC San Diego
Austin Wright	Graduate Student	Princeton University
Joshua Borkowski	Research Specialist*	Princeton University
Mathilde Emeriau	Research Specialist*	Princeton University
Jonathan Furszyfer	Research Specialist*	Princeton University
Jamie Hansen-Lewis	Research Specialist*	Princeton University
Joshua Martin	Research Specialist*	Princeton University
Zachary Romanov	Research Specialist*	Princeton University
Peter Schram	Research Specialist*	Princeton University
James Landin Smith	Research Specialist*	Princeton University

*Research Specialists were hired for one-year term appointments so they could be trained in the specialized data management required for this project. Research Specialists came to the project with BA-level or MA-level degrees and with econometric, statistical, or GIS analysis skills. Three Research Specialists went into a PhD or MA program directly after the Research Specialist appointment (two to PhD programs at Stanford University, one to Harvard Kennedy School, and returned to a PhD program at Brown University). Other Research Specialists took positions in policy or tech companies.

APPENDIX III – Selected Briefings and Meetings with Government and Policy Officials

Name of principal researcher briefer	Name and position of principal recipient	Date and location of the briefing	Subject of Analysis
Radha Iyengar	GEN McCrystal, COMISAF	March 26, 2010 Kabul, Afghanistan	The effect of civilian casualties by ISAF and insurgents on future violence.
Radha Iyengar	ADM Mullen, CJCS	March 29, 2010 Kabul, Afghanistan	The effect of civilian casualties by ISAF and insurgents on future violence.
Jacob N. Shapiro	GEN McCrystal, COMISAF	May 29, 2010 Kabul, Afghanistan	Insurgent mobility and implications for distribution of IO assets.
Eli Berman	BG McMaster, Director of CJIATF SHAFAFIYAT	November 9, 2010 Kabul, Afghanistan	Relationship between perceived stability and observed violence with implications for measurement of progress.
Eli Berman	MG McHale, Commanding General, USFOR-A	November 11, 2010 Kabul, Afghanistan	Relationship between perceived stability and observed violence with implications for measurement of progress.
Jacob N. Shapiro	GEN Petraeus, COMISAF	November 17, 2010 Kabul, Afghanistan	Results of CERP utilization survey in Afghanistan. Findings on efficacy of CERP in Iraq

Other Selected Briefings by the TGD Team

Eli Berman, Joseph H. Felter, and Jacob N. Shapiro led a roundtable for Congressional staffers on “Lessons from a Decade of War: What Worked - and What Didn’t - in Iraq and Afghanistan.” April 17, 2015, U.S. Capitol Building, Washington DC.

Eli Berman presented “Predation, Taxation, Investment and Conflict: International Evidence” to the International Agricultural Trade Research Consortium (IATRC) meetings as a lunch keynote address, Dec. 7, 2014, in San Diego, CA.

<http://iatrc.software.umn.edu/activities/annualmeetings/themedays/pdfs2014/2014Dec-agenda.pdf>

Joseph Felter prepared a comprehensive briefing and presented to former Secretary of State George Shultz, General (ret., 4 star, former CENTCOM commander) James Mattis, and others on December 4, 2014 at Prof. John Taylor’s Economics Policy Seminar at the Hoover Institution, Stanford University. The brief, entitled, “The Economics of Counterinsurgency: Winning, Leasing, and Losing Hearts and

Minds,” presented the main findings on impact of aid and investment on violence/conflict based on the team’s research using Philippines data. <http://www.hoover.org/events/policy-seminar-economics-counterinsurgency-winning-leasing-and-losing-hearts-and-minds>

Joseph Felter presented research findings in the Philippines, in December 2014, over a two-day period to Philippine Special Operations Command senior leaders and staff including General Eduardo Davalan who commands the major operational units in SOCOM. Provided insights on effective counterinsurgency based on the team’s research to the commanders of multiple Scout Ranger companies prior to their deployment to southern Philippines to conduct counterinsurgency operations. Felter provided a 4 hour seminar on challenges of addressing insurgent threats in the Philippines to members of the Philippine Military Strategic Studies Group tasked with conducting a reassessment of the Philippines security strategy through 2025.

Jacob Shapiro spoke on the basis of TGD research at a meeting the National Intelligence Council put together for the NSC Af-Pak team to hear views on Afghanistan post-2014, Washington DC, January 2014.

Joseph Felter briefed TGD research to Secretary Corazon Soliman of the Philippines Department of Social Welfare and Development, October 2013.

Joseph Felter had multiple engagements with senior defense officials from the Armed Forces of the Philippines (August 2013 through January 2014) providing feedback and insights gained from ongoing Minerva sponsored research. These officials include the Chief of Staff Armed Forces of the Philippines, Deputy Chief of Staff Armed Forces of the Philippines, Commanding General Philippine Army, Commanding General of the National Development and Support Command. SOCOM Commanding General, Scout Ranger Regiment Commander, Special Forces Regiment Commander and many others. We made special efforts to help both government and military efforts to support development assistance - some of this behind the scenes.

In addition to the briefings listed above, TGD researchers have also provided briefings reflecting on the findings of the TGD project to the CNO Executive Panel, DoD COIN Board, CAC, CIA, deploying BCTs, USAID, DFID, and DoS.

APPENDIX IV: Full List of Publications Supported by the TGD Grant

AFOSR grant # FA9550-09-1-01314

December 2015

PEER-REVIEWED JOURNAL ARTICLES: 44 Total

(List is ordered by publication year and then alphabetical by author.)

2015-16

Berman, Eli and Aila M. Matanock. 2015. "The Empiricists' Insurgency." *Annual Review of Political Science* 18: 443-464.

Calderon, Gabriela, Gustavo Robles, Alberto Diaz-Cayeros, and Beatriz Magaloni. 2015. "The Beheading of Criminal Organizations and the Dynamics of Violence in Mexico." *Journal of Conflict Resolution*, doi: 10.1177/0022002715587053, advanced publication online June 1, 2015.

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[2014](#)

Blair, Graeme, Kosuke Imai and Jason Lyall. 2014. "Comparing and Combining List and Endorsement Experiments: Evidence from Afghanistan." *American Journal of Political Science* 58(4): 1043–1063.

Callen, Michael, Mohammad Isaqzadeh, James D. Long, and Charles Sprenger. 2014. "Violence and Risk Preference: Experimental Evidence from Afghanistan." *American Economic Review* 104(1): 123-48.

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Blair, Graeme, Kosuke Imai and Jason Lyall. 2013. "Explaining Support for Combatants in Wartime: A Survey Experiment in Afghanistan." *American Political Science Review* 107(4): 679-705.

Callen, Michael and Nils B. Weidmann. 2013. "Violence and Election Fraud: Evidence from Afghanistan." *British Journal of Political Science* 43(1): 53-75.

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Weidmann, Nils B. and Idean Salehyan. 2013. "Violence and Ethnic Segregation: A Computational Model Applied to Baghdad." *International Studies Quarterly* 57(1): 52-64.

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Biddle, Stephen, Jeffrey A. Friedman, and Jacob N. Shapiro. 2012. "Testing the Surge: Why did Violence Decline in Iraq in 2007?" *International Security* 37(1): 7-40.

Chou, Tiffany. 2012. "Does Development Assistance Reduce Violence? Evidence from Afghanistan." *Economics of Peace and Security Journal* 7(2): 5-13.

Condra, Luke N. and Jacob N. Shapiro. 2012. "Who Takes the Blame? The Strategic Impact of Collateral Damage." *American Journal of Political Science* 56(1): 167–187.

Fair, C. Christine, Neil Malhotra, and Jacob N. Shapiro. 2012. "Faith or Doctrine? Religion and Support for Political Violence in Pakistan." *Public Opinion Quarterly* 76(4): 688-720.

Heger, Lindsay, Danielle Jung and Wendy Wong. 2012. "Organizing for Resistance: How Group Structure Impacts the Character of Violence." *Terrorism and Political Violence* 24(5): 743-768.

Johnston, Patrick B. 2012. "Does Decapitation Work? Assessing the Effectiveness of Leadership Targeting in Counterinsurgency Campaigns." *International Security* 36(4): 47–79.

Shapiro, Jacob N. 2012. "Terrorist Decision-Making: Insights from Economics and Political Science." *Perspectives on Terrorism* 6: 5-20.

2011

Berman, Eli, Michael Callen, Joseph H. Felter, Jacob N. Shapiro. 2011. "Do Working Men Rebel? Unemployment and Insurgency in Afghanistan, Iraq, and the Philippines." *Journal of Conflict Resolution* 55(4): 496-528.

Berman, Eli, Joseph H. Felter, and Jacob N. Shapiro. 2011. "Can Hearts and Minds be Bought? The Economics of Counterinsurgency in Iraq." *Journal of Political Economy* 119(4): 766-819.

Cederman, Lars-Erik, Kristian Skrede Gleditsch and Nils B. Weidmann. 2011. "Horizontal Inequalities and Ethnonationalist Civil War: A Global Comparison." *American Political Science Review* 105(03): 478-495.

Weidmann, Nils B. 2011. "Violence 'from above' or 'from below'? The Role of Ethnicity in Bosnia's Civil War." *Journal of Politics* 73(04): 1178-1190.

BOOK

Shapiro, Jacob N. 2013. *The Terrorist's Dilemma: Managing Violent Covert Organizations*. Princeton University Press.

BOOK MANUSCRIPTS

Berman, Eli, Joseph H. Felter, David Laitin, and Jacob N. Shapiro. *Information in Counterinsurgency*. [Book is intended to share TGD results to a broad audience. Publication is expected in late 2016.]

Johnston, Patrick B., Jacob N. Shapiro, Benjamin Bahney, Danielle Jung, Howard J. Shatz, Patrick K. Ryan, Jonathan Wallace, and Barbara Sude. Forthcoming. *Foundations of the Islamic State Management, Money, and Terror in Iraq, 2005-2010*. CA: RAND Corporation.

BOOK CHAPTER

Douglass, Rex. Forthcoming. "Understanding Civil War Violence through Military Intelligence: Mining Civilian Targeting Records from the Vietnam War." Chapter in C.A. Anderton and J. Brauer, eds., *Economic Aspects of Genocides, Mass Atrocities, and Their Prevention*. New York: Oxford University Press.

SELECTED WORKING PAPERS

Berman, Eli, Joseph Felter, Ethan Kapstein and Erin Troland. 2013. "Predation, Taxation, Investment and Violence: Evidence from the Philippines," NBER Working Paper 19266.

Berman, Eli, Joseph Felter, Jacob N. Shapiro, and Erin Troland. 2013. "Modest, Secure and Informed: Successful Development in Conflict Zones," NBER Working Paper 18674.

Callen, Michael, Saad Gulzar, Ali Hasanain, Yasir Khan, and Arman Rezaee. 2015. "Personalities and Public Sector Performance: Evidence from a Health Experiment in Pakistan." NBER Working Paper 21180.

Cilliers, Jacobus, Oeindrila Dube, and Bilal Siddiqi. 2014. "'White Man's Burden'? Experimental Evidence on Generosity and Foreigner Presence." Accessed 12/27/15 from: <https://esoc.princeton.edu/files/%E2%80%98white-man%E2%80%99s-burden%E2%80%99-field-experiment-generosity-and-foreigner-presence>.

Condra, Luke N., Michael Callen, Radha K. Iyengar, James D. Long, and Jacob N. Shapiro. 2015. "Damaging Democracy? Security Provision and Turnout in Afghan Elections." Accessed on 12/27/15: http://www.lcondra.gspia.pitt.edu/wpcontent/uploads/2015/08/CCILS_22AUG2015_full.pdf.

Condra Luke N., Joseph H. Felter, Radha Iyengar, and Jacob N. Shapiro. 2010. "The Effect of Civilian Casualties in Afghanistan and Iraq." NBER Working Paper 16152.

Douglass, Rex and Kristen Harkness. 2015. "The Cost of Silence: Collective Punishment and Intelligence Extortion during the Kenya Emergency." Working Paper. <http://rexdouglass.com>.

Fair, C. Christine, Patrick M. Kuhn, Neil Malhotra, and Jacob N. Shapiro. 2015. "Natural Disasters and Political Engagement: Evidence from the 2010-11 Pakistani Floods." Accessed on 12/27/15 from: http://www.princeton.edu/~jns/papers/FKMS_2014_Pakistan_Floods_Political_Engagement.pdf.

Von Fintel, Inken and Patrick M. Kuhn. 2014. "Dangerously Informed: Protestant Missions, Information, and Pre-Electoral Violence in Sub-Saharan Africa." Accessed on 12/27/15 from: <https://esoc.princeton.edu/files/dangerously-informed-protestant-missions-information-and-pre-electoral-violence-sub-saharan>.

Matanock, Aila M. and Miguel García-Sánchez. 2013. "Controlling Civilians? Examining Support for the Military in Colombia." Working paper. <http://matanock.berkeley.edu/research/>.

Mikulaschek, Christoph and Jacob N. Shapiro. 2015. "Lessons from America's post-9/11 War." Accessed on 12/27/15 from:

http://www.princeton.edu/~jns/papers/Mikulaschek_Shapiro_2015_Learning_AF_IZ.pdf.

Shaver, Andrew and Jacob N. Shapiro. 2015. "The Effect of Civilian Casualties on Wartime Informing: Evidence from the Iraq War." Accessed on 12/27/15 from:

http://www.princeton.edu/~jns/papers/Shapiro_Shaver_Effect_on_Civilian_Casualties_on_Wartime_Informing.pdf.

Troland, Erin. 2014. "Can Fiscal Transfers Increase Local Revenue Collection? Evidence From The Philippines." Accessed on 12/27/15 from: http://econweb.uscd.edu/~etroland/FF_Draft_Oct14.pdf.

REPORT (Selected)

Jung, Danielle F., Pat Ryan Jacob N. Shapiro, and Jon Wallace. 2014. "Managing a Transnational Insurgency: The Islamic State of Iraq's 'Paper Trail,' 2005-2010." West Point, N.Y.: Combating Terrorism Center. Accessed 12/27/15 from:

http://www.princeton.edu/~jns/publications/JRSW_2014_Managing-a-Transnational-Insurgency-ISI.pdf.

AFOSR Deliverables Submission Survey

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Organization / Institution name

Trustees of Princeton University

Grant/Contract Title

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Terrorism, Governance, and Development

Grant/Contract Number

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FA9550-09-1-0314

Principal Investigator Name

The full name of the principal investigator on the grant or contract.

Jacob N. Shapiro, PhD

Program Manager

The AFOSR Program Manager currently assigned to the award

Benjamin Knott, PhD

Reporting Period Start Date

05/01/2009

Reporting Period End Date

09/29/2015

Abstract

The "Terrorism, Governance, and Development" (TGD) collaborative project produced independent, rigorous, social science research on national security issues. Rebuilding social and economic order in conflict and post-conflict areas will remain critical tasks for the United States and its allies as they seek to defeat violent organizations and prevent the emergence of new non-state threats. Three development-oriented policies dominate efforts to enhance order: (1) providing security assistance to friendly states; (2) encouraging inclusive governance; and (3) improving the population's economic welfare. However, there has been little systematic, independent analysis to measure the impact of these policies. A primary objective of this grant was to develop better theories about the impact of aid programs on terrorist and insurgent violence. To do so, the TGD Team designed and refined a theoretical framework that has been empirically tested with fine-grained, local data from multiple conflicts. TGD researchers implemented a range of design-based inferential approaches to rigorously evaluate newly

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developed models and re-examined existing theories of conflict. Conflicts from the following countries were studied: Afghanistan, Colombia, Egypt, India, Iraq, Kenya, Mexico, Northern Ireland, Pakistan, the Philippines, and Vietnam. The TGD model is now used as a benchmark game-theoretic model by other researchers, and researchers who are not part of TGD are finding results consistent with the model. Forty-four articles were published in academic journals. The project trained a cohort of young scholars, including alumni who now hold Assistant Professor positions at 20 leading universities. TGD Researchers shared findings with government officials and policy experts, and to reach a much broader audience, a book is in progress entitled, "Information in Counterinsurgency" which draws on the TGD team's work to explain how and why development contributes to COIN and CT under certain conditions and not others. The investigators established the Empirical Studies of Conflict (ESOC) project that will continue beyond this grant. Publications, data, and codebooks are available at <http://esoc.princeton.edu>.

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Archival Publications (published) during reporting period:

2015-16:

Berman, Eli and Aila M. Matanock. 2015. "The Empiricists' Insurgency." *Annual Review of Political Science* 18: 443-464.

Calderon, Gabriela, Gustavo Robles, Alberto Diaz-Cayeros, and Beatriz Magaloni. 2015. "The Beheading of Criminal Organizations and the Dynamics of Violence in Mexico." *Journal of Conflict Resolution*, doi: 10.1177/0022002715587053, advanced publication online June 1, 2015.

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Heger, Lindsay, Danielle Jung and Wendy Wong. 2012. "Organizing for Resistance: How Group Structure Impacts the Character of Violence." *Terrorism and Political Violence* 24(5): 743-768.

Johnston, Patrick B. 2012. "Does Decapitation Work? Assessing the Effectiveness of Leadership Targeting in Counterinsurgency Campaigns." *International Security* 36(4): 47-79.

Shapiro, Jacob N. 2012. "Terrorist Decision-Making: Insights from Economics and Political Science." *Perspectives on Terrorism* 6: 5-20.

2011:

Berman, Eli, Michael Callen, Joseph H. Felter, Jacob N. Shapiro. 2011. "Do Working Men Rebel? Unemployment and Insurgency in Afghanistan, Iraq, and the Philippines." Journal of Conflict Resolution 55(4): 496-528.

Berman, Eli, Joseph H. Felter, and Jacob N. Shapiro. 2011. "Can Hearts and Minds be Bought? The Economics of Counterinsurgency in Iraq." Journal of Political Economy 119(4): 766-819.

Cederman, Lars-Erik, Kristian Skrede Gleditsch and Nils B. Weidmann. 2011. "Horizontal Inequalities and Ethnonationalist Civil War: A Global Comparison." American Political Science Review 105(03): 478-495.

Weidmann, Nils B. 2011. "Violence 'from above' or 'from below'? The Role of Ethnicity in Bosnia's Civil War. Journal of Politics 73(04): 1178-1190.

Changes in research objectives (if any):

Not applicable

Change in AFOSR Program Manager, if any:

Prior Program Managers:

Dr. Terence Lyons

Dr. Joseph Lyons

Extensions granted or milestones slipped, if any:

The project was awarded six years of funding, including an extension year.

AFOSR LRIR Number

LRIR Title

Reporting Period

Laboratory Task Manager

Program Officer

Research Objectives

Technical Summary

Funding Summary by Cost Category (by FY, \$K)

	Starting FY	FY+1	FY+2
Salary			
Equipment/Facilities			
Supplies			
Total			

Report Document

Report Document - Text Analysis

Report Document - Text Analysis

Appendix Documents

2. Thank You

E-mail user

Dec 31, 2015 17:21:11 Success: Email Sent to: kseith@princeton.edu

Response ID: 5637

Survey Submitted:	Dec 31, 2015 5:21 PM
IP Address:	128.112.149.44
Language:	English (en-US)
User Agent:	Mozilla/5.0 (Windows NT 6.1; Trident/7.0; rv:11.0) like Gecko
Http Referrer:	http://afosr.reports.sgizmo.com/s3/
Page Path:	1 : (SKU: 1) 2 : Thank You (SKU: 2)
SessionID:	1451598234_5685a19a9752c2.26479422

Response Location

Country:	United States
Region:	NJ
City:	Princeton
Postal Code:	08540
Long & Lat:	Lat: 40.375598907471, Long:-74.659698486328