NBER WORKING PAPER SERIES

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Working Paper 22395
http://www.nber.org/papers/w22395

NATIONAL BUREAU OF ECONOMIC RESEARCH
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July 2016

Katherine Chen, Peter Hickman, Luis Felipe Jaramillo, Nhung Le, Phan Ngoc, and Minh Trinh provided excellent research assistance. We thank Ethan Bueno de Mesquita, Benjamin Crost, Nathan Hendren, Jesse Shapiro, and seminar participants at Berkeley, the Becker Friedman Institute, the Canadian Institute for Advanced Research, Cornell, ITAM, the NBER Political Economy program meeting, Northwestern, NYU, Stanford, and UBC for helpful comments. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 22395
July 2016
JEL No. F35,F51,F52

ABSTRACT

This study uses discontinuities in U.S. strategies employed during the Vietnam War to estimate their causal impacts. It identifies the effects of bombing by exploiting rounding thresholds in an algorithm used to target air strikes. Bombing increased the military and political activities of the communist insurgency, weakened local governance, and reduced non-communist civic engagement. The study also exploits a spatial discontinuity across neighboring military regions, which pursued different counterinsurgency strategies. A strategy emphasizing overwhelming firepower plausibly increased insurgent attacks and worsened attitudes towards the U.S. and South Vietnamese government, relative to a hearts and minds oriented approach.

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1 Introduction

Interventions in weakly institutionalized societies have been central to U.S. foreign policy. These have been amongst the most costly expenditures in the U.S. federal budget and may have important national security consequences. The United States has employed a variety of strategies aimed at defeating insurgents and building states capable of monopolizing violence, ranging from the top-down deployment of overwhelming firepower to bottom-up initiatives to win hearts and minds. This study identifies the causal effects of key interventions employed during the Vietnam War by exploiting two distinct discontinuities in U.S. policy: one varies the intensity of a top-down approach - air strikes - and the other compares a top down military force approach to a more bottom up hearts and minds approach.

The U.S. intervened in Vietnam to prevent the spread of communism, and fostering a state that could provide a bulwark against communism after U.S. withdrawal was central to U.S. objectives. A state monopoly of violence is an equilibrium outcome that relies upon both the capabilities of the state apparatus and citizen compliance. "If it is relatively easy to disperse insurgent forces by purely military action...it is impossible to prevent the return...unless the population cooperates" (Galula, 1964, p. 55). The military force and hearts and minds strategies aimed to incentivize citizens to support a non-communist state.

The military force approach is summed up by the Vietnam era adage: "get the people by the balls and their hearts and minds will follow" (Kodosky, 2007, p. 175). Air strikes were a key component, with the Air Force receiving over half of wartime appropriations and twice as many tons of explosives dropped as during World War II (Thayer, 1975). Leaflets warned citizens of "death from the sky" if they did not cooperate with the South Vietnamese government (Appendix Figures A-1 and A-2). Samuel Huntington (1968) wrote that air strikes could be used to establish social control and then modernization would organically follow, and National Security Adviser Walt Rostow argued that countering Communism required "a ruthless projection to the peasantry that the central government intends to be the wave of the future" (Milne, 2008, p. 88). According to General William DePuy: "The solution in Vietnam is more bombs, more shells, more napalm" (Sheehan, 1988, p. 619).

This contrasts to the approach of building bottom-up support, advocated in Vietnam by the U.S. Marine Corps: "a positive program of civil assistance must be conducted to eliminate the original cause of the resistance movement" (USMC, 1962, p. 72). James Scott (1985, 2009) argues that a top-down, coercion-oriented approach is ill-suited to gaining cooperation, as citizens have many ways to undermine a state they do not genuinely support, even without joining an armed rebellion. Moreover, when states try to impose a simplified order from above, their failure to understand local realities and tendency to disrupt them can lead the scheme to fail (Scott, 1998).

The U.S. utilized quantitative resource allocation metrics to an unprecedented extent in Vietnam, and this study exploits a newly-discovered algorithm component of U.S. bombing strategy that includes discontinuities useful for identifying causal effects. Declassified Air Force histories document that one of the factors used in allocating weekly pre-planned bombing missions was hamlet security (Project CHECO, 1969).[1] A Bayesian algorithm combined data from 169 questions on security, political, and economic characteristics into a single hamlet security rating. The output ranged continuously from 1 to 5 but was rounded to the nearest whole number before being printed from the mainframe computer.

The study identifies the causal impacts of bombing by comparing places just below and above the rounding thresholds, using being below the threshold as an instrument for bombing. Outcome data on security, local governance, civic engagement, and economics are drawn from armed forces administrative records, hamlet level variables compiled by a military-civilian pacification agency, and South Vietnamese public opinion surveys. Hamlets near the thresholds are similar prior to score assignment, but following assignment those that fall just below the cutoffs are significantly more likely to be bombed. There is no evidence that the hamlet-level score was used systematically for other resource allocations, including of ground and naval troops. Placebo checks document that there were no effects during a 1969 pilot, when the score was computed but not disseminated.

Instrumental variables estimates document that the bombing of South Vietnamese population centers backfired, leading more Vietnamese to participate in VC military and political activities. An initial deterioration in security entered the next quarter's security score, increasing the probability of future bombing. Specifically, moving from no strikes during the sample period - a relatively rare event - to the sample average increased the probability that there was a local VC guerrilla squad by 27 percentage points, relative to a sample mean of 0.38. It also increased the probability that the VC Infrastructure - the VC's political branch - was active by 25 percentage points and increased the probability of a VC-initiated attack on local security forces, government officials, or civilians by 9 percentage points. Public opinion surveys and armed forces administrative data show similar patterns. There is limited evidence for spillovers, across nearby areas or within VC administrative divisions, and to the extent they exist they tend to go in the same direction as the main effects.

While U.S. intervention aimed to build a strong state that would provide a bulwark against communism after U.S. withdrawal, bombing instead weakened local government and non-communist civic society. Moving from no to sample mean bombing reduced the probability that the village committee positions were filled by 21 percentage points and reduced the probability that the local government collected taxes by 25 percentage points. The vil-

[1] Other factors included goals in the military region, security of friendly forces, location of combat maneuver battalions, and enemy movements.

lage committee was responsible for providing public goods. Bombing also decreased access to primary school by 16 percentage points and reduced participation in civic organizations by 13 percentage points.

The study also sheds light on how the top-down approach compares to a more bottom-up strategy, by exploiting a spatial regression discontinuity between Military Corps Region I - commanded by the U.S. Marine Corps (USMC) - and Military Corps Region II - commanded by the U.S. Army. The Marines emphasized providing security by embedding soldiers in communities and winning hearts and minds through development programs (USMC, 2009). Their approach was motivated by the view that "in small wars the goal is to gain decisive results with the least application of force...the end aim is the social, economic, and political development of the people" (USMC, 1940). In contrast, the Army relied on overwhelming firepower deployed through search and destroy raids (Long, 2016; Krepinevich, 1986).

Evidence points to the differences in counterinsurgency strategies as a particularly central distinction between the Army and Marines, and comparisons of nearby hamlets on either side of the corps boundary suggest potential pitfalls of the top down approach that are quite consistent with the bombing results. Specifically, regression discontinuity estimates document that public goods provision was higher on the USMC side of the boundary for targeted public goods. Moreover, hamlets just to the USMC side of the boundary were attacked less by the VC and were less likely to have a VC presence. Finally, public opinion data document that citizens in the USMC region reported more positive attitudes towards the U.S. and all levels of South Vietnamese government. Pre-period VC attacks, other pre-characteristics, geography, urbanization, and soldier characteristics - including Armed Forces Qualifying Test scores - are all relatively balanced across the corps region boundary.

Understanding whether heavily top down counterinsurgency strategies are likely to achieve their desired objectives remains policy relevant. The culture of the U.S. Armed Forces has changed only slowly since Vietnam (Long, 2016). Moreover, while targeting has improved significantly, it remains imperfect. Insurgents have responded by embedding more tightly amongst civilians and it is widely accepted that heavy reliance on air power will lead to collateral damage.[2] Additionally, politicians continue to advocate a top-down approach.[3] Our estimates highlight ways in which an intensive focus on top-down strategies could pose challenges to achieving U.S. objectives, particularly when insurgents are embedded amongst civilians as they are in the Middle East today. They do not reveal whether a bottom-up

[2]For example, a dataset from the Bureau of Investigative Journalism suggests that since 2004, civilians have represented 25% of the deaths in U.S. drone strikes of Pakistan.

[3]2016 Republican presidential nominee Donald Trump argued: "I would bomb the [expletive] out of them [ISIS in Iraq]. I would just bomb those suckers...I would blow up every single inch" (Trump in Fort Dodge, 2016). According to 2016 Democratic nominee Hillary Clinton: "It is time to begin a new phase and intensify our efforts [air strikes] to smash the would-be caliphate"(Clinton in New York, 2015).

approach is more effective at achieving U.S. objectives than refraining from intervention, a question that is beyond the scope of this paper.

This study contributes compelling identification to a question that could not ethically be examined using a randomized trial and that is difficult to elucidate through correlations. The most closely related study to the current one is an examination by Kocher et al. (2011) of how bombing in Vietnam impacted an index of VC insurgent activity. The study uses the VC activity index in July and August of 1969 to instrument for bombing in September of 1969 and finds positive impacts on the VC activity index in subsequent months of 1969. We employ an identification strategy in which treatment is orthogonal to initial insurgent activity and other pre-period characteristics and examine a longer period and broader set of outcomes. Miguel and Roland (2011) also examine bombing in Vietnam, focusing on long-run economic impacts. They use distance to the 17th parallel to instrument for district level bombing and do not find persistent economic effects.

This study also relates to a rich literature on intervention, counterinsurgency, and law enforcement in other conflicts. Condra et al. (2010) show that counterinsurgency-generated civilian casualties in Afghanistan, but not Iraq, are associated with increases in insurgent violence over a period of six weeks to six months. Dell (2015) documents that a top-down military force approach to combating the drug trade backfired in Mexico, generating significant increases in violence, and Acemoglu et al. (2015) show that a reliance on top-down military force in Colombia is correlated with a deterioration in security and a weakening of the local state. Dube and Naidu (2015) find that U.S. military bases in Colombia increase paramilitary attacks, potentially undermining domestic institutions. In contrast, Lyall (2009) uses a differences-in-differences strategy across matched pairs of Chechnyan villages to show that shelled villages experienced a substantial reduction in post-treatment insurgent attacks. He argues that exposure to shelling is as if random since artillery fire was often conducted by inebriated soldiers following a policy of random firing intervals.

Consistent with this study's results exploiting the USMC natural experiment, Berman et al. (2011a) document that improved public service provision reduced insurgent violence in Iraq. Using a randomized experiment, Beath et al. (2012) show that participating in the largest development program in Afghanistan improves perceptions of well-being, attitudes towards the government, and levels of security, but only in relatively secure regions. Crost et al. (2014) offer a cautionary note, documenting that insurgents may try to sabotage development programs if they expect such programs will weaken their support, and Nunn and Qian (2014) find that U.S. food aid increases conflict. A qualitative literature has argued that aid is less effective when it is carried out by the same countries that are engaging in military attacks, which may lead citizens to view aid workers with hostility or suspicion (Gill, 2016). Finally, an empirical literature on the CIA documents their involvement in foreign coups and provides evidence that these interventions were commercially motivated (Berger et al., 2013; Dube et al., 2011).

The rest of the study is organized as follows: Section 2 discusses the broader historical background. Section 3 examines the impacts of bombing population centers, first discussing how air strikes were targeted (Section 3.1), then outlining the empirical approach (Section 3.2) and data sources (Section 3.3), and finally presenting the results (Section 3.4). Next, Section 4 compares the top down to bottom up approach by examining the spatial discontinuity between the Army and USMC corps regions. Finally, Section 5 concludes.

2 Historical Background

In 1954, the Geneva Accords temporarily divided Vietnam at the 17th Parallel, until nation-wide elections could be held in 1956. When elections were not held, the Viet Minh established a Communist state led by Ho Chi Minh in the North, and U.S.-backed Ngo Dinh Diem declared leadership of a non-communist state in the South. A communist insurgency began in South Vietnam, led by the Viet Cong (VC). The South Vietnamese central state faced significant difficulties penetrating below the provincial level, and the Viet Cong often made inroads in areas that had received few benefits from belonging to South Vietnam (Appy, 2015). During the 1960s, most tax collection and public goods provision responsibilities were decentralized to the local level, where governance was supposed to be participatory.

In 1965, the U.S. deployed around 200,000 troops to South Vietnam. Troop levels peaked at over half a million in 1968, and the U.S. withdrew in January of 1973. The Department of Defense estimates that the U.S. spent over a trillion USD on the Vietnam War, with spending on Vietnam during the Lyndon Johnson administration exceeding spending on the War on Poverty by a factor of 17 (Appy, 2015).

3 The Top Down Approach: Bombing

3.1 McNamara and the Whiz Kids

The United States utilized an unprecedented number of quantitative metrics during the Vietnam War, spurred by the systems analysis perspective that Secretary of Defense Robert McNamara brought to the Department of Defense (DoD). McNamara pioneered the use of operations research in the private sector during his tenure in the 1950s as President of Ford Motor Company. Upon being named Secretary of Defense by Kennedy in 1961, McNamara surrounded himself with “Whiz Kid” analysts from the Rand Corporation, aiming to bring economics, operations research, game theory, and computing into DoD operations. This produced policies and data that offer unique opportunities for estimating causal impacts.

As Defense Secretary (1961-1968), McNamara launched a variety of data systems to monitor the progress of the Vietnam War. Field data were key-punched into mainframe computers in Saigon and Washington and used to determine resource allocation. The resulting electronic data would have likely been destroyed, but data tapes produced by the two IBM 360 mainframe computers in Saigon and Washington were subpoenaed during an IBM lawsuit. Much of this study's outcome data are drawn from these tapes.

The study uses discontinuities in quantitative ratings of hamlet security to identify the causal effects of bombing. In 1967, the U.S. and South Vietnam began the Hamlet Evaluation System (HES) to rate hamlet security. Initially, U.S. district advisers assigned hamlets A-E letter grades based on their subjective perceptions, but two 1968 studies showed that subjective ratings did not always correlate well with actual conditions. In response, the U.S. hired a defense consulting firm to develop an objective metric of hamlet security. In the Revised HES, 169 monthly and quarterly questions about security, politics, and economics were collected by US advisory personnel affiliated with Civil Operations and Revolutionary Development Support (CORDS), a joint civilian-military agency. The majority of these questions were classified into nineteen submodels, and Bayes Rule was used to aggregate responses within each submodel into a continuous score ranging from 1 to 5. The submodel scores were rounded to the nearest whole number - creating discontinuities - and combinatorial logic aggregated the rounded scores into an overall security score.

Specifically, the algorithm starts with a flat prior that each hamlet is equally likely to belong to one of five security classes, ranging from A (very secure) to E (very insecure). The algorithm then updates using Bayes Rule, the question responses, and conditional probability matrices, which give the probabilities that each question would take on different response values if the hamlet was very secure (A), somewhat secure (B), and so forth. The successive application of Bayes Rule yields a posterior probability that a hamlet belongs to each of the five latent security classes for that submodel. An A is assigned 5 points, a B 4 points, a C 3 points, a D 2 points, and an E 1 point. Then the expected value of the posterior distribution is computed, using the points assigned to each latent class. Finally, this expected value is rounded to the nearest whole number to produce a score for that submodel. For example, a hamlet with a numerical score of 4.4999 is rounded down to a 4/B (somewhat secure), whereas a hamlet with a numerical score of 4.5001 is rounded up to a 5/A (very secure).

Combinatorial logic was used to aggregate the rounded submodel scores, two or three at a time, into an overall security score, which was disseminated to military planners. Figure 1 illustrates the logic for combining scores two at a time. It is symmetric, taking an average of the two submodel scores and rounding down. Figure A-3 shows the three-way logic, which combines three scores non-symmetrically. Finally, Figure 2 illustrates how the nineteen submodel scores are combined, using the two and three-way logic, to produce a single hamlet security score.[4] Intermediate scores were also created during this process, covering military, political, and economic topics. While national and provincial trends in these intermediate scores were disseminated, the coding manuals for creating reports document that only the overall score was reported at the hamlet level, and hence we focus on it.

Consider the following simplified example of how the algorithm provides identification. Suppose the security score combined two submodels, whose continuous scores are shown on the x- and y-axes of Figure 1. The thick lines show the thresholds between different output scores, and their location is determined by the rounding of the input scores and the decision logic used to combine the rounded submodel scores. The thresholds create discontinuities, and identification can be achieved by comparing nearby hamlets on either side. For example, a hamlet with continuous submodel scores of 4.7 (rounded to 5/A) and 4.49 (rounded to 4/B) - which would produce a 4/B output score - could be compared to a hamlet with input scores 4.7 (rounded to 5/A) and 4.5 (rounded to 5/A) - whose output score would be a 5/A.

The security score combines 19 submodels, creating a 19 dimensional equivalent of Figure 1. The study computes the location of the A-B, B-C, C-D, and D-E thresholds and calculates the distance - in continuous score space - from each observation to the nearest threshold. To compute the continuous scores, which were never printed or saved from the mainframe's memory, we obtained the question responses from tapes now held at the U.S. National Archives and the conditional probability matrices from uncatalogued documents at Fort McNair.[5] The tapes also contain the rounded scores, and we can reproduce all rounded scores using the algorithm and question responses.

Meeting memos held in an uncatalogued collection at Fort McNair emphasize the arbitrariness of the algorithm's design. Military field officers were sent a survey stating "you have been selected to participate in the design of a Bayesian processor", which elicited the conditional probabilities for one of the submodels. When the surveys were returned, the probabilities had a high variance and often did not sum to one, leading the architect of the design John Penquite to state "I have changed my mind about expertise on the Vietnam situation. There are no experts." Conditional probabilities more than two standard deviations from the mean were dropped, and the remaining responses were averaged to create a conditional probability matrix for each question. When the same question enters multiple submodels, the conditional probabilities can be quite different. Moreover, the consulting firm ran out of time before considering how to aggregate submodels, and hence the combinatorial

[4]The way that submodel scores were combined changed somewhat between 1970 and 1971 to de-emphasize economic submodels, but the conditional probabilities remained the same.

[5]HES is in Record Group (RG) 472. There is also a version online from Record Group 330, but it is missing most months.

logic was put together hastily.

This study documents that the discontinuities have a strong influence on the targeting of air strikes. More than twice as many tons of explosives were dropped during the conflict as during World War II and four times more tons of explosives were dropped on South Vietnam than on North Vietnam, about 500 pounds of ordinance for every man, woman, and child in the country. 10% of air strikes supported ground operations and most of the remainder targeted Viet Cong supply lines and insurgents (Thayer, 1975). Declassified studies by the Defense Office for Systems Analysis reveal that over half of air attacks in South Vietnam did not respond to real-time intelligence. Moreover, declassified documents on the fragging of SVN air sorties highlight that most were pre-planned by the corps commander, according to a pre-allocated quota, and overall hamlet security was a relevant consideration.[6] Bombers could not hit a precise target from high altitude, but they could hit a general area with reasonably high probability. The common F-105 bomber had a circular error probability of 447 feet, meaning that half the bombs dropped fell within this radius of the target.

Bombing was controversial. In a meeting with Johnson, Rostow, and others following the Tet Offensive, McNamara argued: "This [expletive] bombing campaign, it's been worth nothing, it's done nothing, they've dropped more bombs than in all of Europe in all of World War II and it hasn't done a [expletive] thing" (Milne, 2008, p. 5). We go further than McNamara and show evidence that bombing undermined U.S. objectives.

3.2 Empirical Strategy

The study examines how bombing impacts outcomes, immediately and cumulatively during the war. The endogenous variables are immediate bombing in quarter $t+1$ and cumulative bombing averaged across quarters $t+1$ through U.S. withdrawal, both instrumented by whether the hamlet was below the security score threshold when the score was computed at the end of quarter t. Quarters are used because the score was calculated primarily from quarterly data, with just a few inputs updated monthly. The first stage takes the following form, and the second stage regressions are analogous:

$$\begin{aligned} y_{h,t+n} = & \gamma_1 below_{ht} + \sum_{d=1}^{4} \delta_d D_{htd} + \sum_{d=1}^{4} \upsilon_d D_{htd} f_d(dist_{ht}) + \sum_{d=1}^{4} \psi_d D_{htd} f_d(dist_{ht}) below_{ht} \\ & + \alpha_t + \beta X_{ht} + \epsilon_{ht} \end{aligned} \tag{1}$$

where $y_{h,t+n}$ is bombing in hamlet h, in quarter(s) $t+n$, and $below_{ht}$ is an indicator equal

[6] The U.S. military authorized its forces to bomb villages if it had been fired on from them, if there was evidence that villagers were aiding the VC, or if the area had previously been cleared of civilians.

to 1 if the hamlet is below the threshold in quarter t. $f_d(dist_{ht})$ is an RD polynomial in distance to the nearest score threshold, estimated separately on either side of each threshold (A-B, B-C, C-D, D-E). D_{htd} is a set of indicators equal to 1 if threshold d is the nearest threshold, X_{ht} includes indicators for all question responses that enter the quarter t security score, and α_t is a quarter-year fixed effect.

Baseline estimates use the Imbens and Kalyanaraman (2011) bandwidth and local linear regression (the Calonico et al. (2014) bandwidth is nearly identical). Each hamlet appears in the sample once, with period t denoting the first time that the hamlet is near the threshold, where near is defined by the optimal bandwidth. This is more compelling than exploiting all times near the threshold, because whether a hamlet is near in $t+1$ could be endogenous to whether it is below in t.[7] Standard errors are clustered by village and would be nearly identical if clustered by district.

Identification requires: 1) all factors besides security score assignment change smoothly at the rounding thresholds, 2) the security score is strongly correlated with bombing, and 3) the security score only impacts outcomes through the allocation of air power. These assumptions will be examined in Section 3.4. There is a strong first stage relationship between cumulative bombing and the quarter t security score because bombing in $t+1$ worsens security, reducing the $t+1$ score and making bombing more likely at $t+2$, and so forth.

The above specification will estimate a local average treatment effect of the impact of bombing on places that were targeted because they were below the threshold. Compliers plausibly include places for which hard intelligence was limited, and hence planners relied on the score to assess the likelihood that the village supported the VC. The estimates inform contexts where air strikes are conducted with relatively limited intelligence, a situation likely to obtain when the air war is accelerated without a concurrent increase in intelligence gathering capabilities.

The study focuses on causally identifying reduced form impacts. Due to data limitations, we cannot estimate structural parameters that would shed light on such questions as how varying levels of civilian versus insurgent casualties translate into changes in VC activity.[8] While the reduced form estimates cannot quantify optimal strategies, they provide compelling causal evidence about big picture questions that remain highly controversial, in part because exogenous variation is rare and randomized control trials of bombing are unfeasible.

[7] Results are robust to using share of times near the threshold that the hamlet is below it as the instrument for cumulative bombing. If we focus only on places near the threshold the first quarter that the score was used, estimates are qualitatively similar but the first stage is weaker since the sample is much smaller.

[8] There are no estimates of civilian casualties and measures of VC casualties are unreliable.

3.3 Data

This study utilizes archival data, drawn from the U.S. National Archives. Our preferred data on bombing are from the Hamlet Evaluation System (HES), a joint data collection effort between U.S. district advisers and South Vietnamese officials. District advisers were part of a personnel structure that advised the South Vietnamese government and military. Some district advisers were civilians and others were military officers. Data were collected between July of 1969 and 1973, with the same questions asked in nearly all of South Vietnam's hamlets. HES records whether air or artillery fire struck near a populated area during the past month, and we use this to compute the share of months during the quarter with a strike. Since we do not find impacts of the security score on ground troop activity - using HES as well as detailed administrative data - we expect any impacts to be driven primarily by air strikes. However, even if results are driven by both air and artillery fire, the study's broader arguments about the impacts of top-down military force would remain unchanged. We also examine Air Force data providing the coordinates and amounts of ordinance dropped over South Vietnam.[9] Unfortunately, the system was migrated during our sample period, leading to fragmentary information.[10] It is also difficult to infer whether the ordinance struck a populated area, as the data record the approximate coordinate where the ordinance was dropped, not what it hit, and we only know the coordinate of the hamlet centroid.

We combine three diverse sources of outcome data to elucidate robust insights about impacts: HES, armed forces administrative data, and public opinion surveys. HES contains answers to questions about monthly and quarterly security, as well as economic, governance, and civic society outcomes. Some questions have multiple categorical values, and we code them into binary indicators that preserve as much variation as possible (see the data appendix for more details). For example, a coding of no VC attacks as 0 and sporadic/frequent VC attacks as 1 preserves significantly more information than a coding of no/sporadic VC attacks as 0 and frequent attacks as 1, since frequent attacks are rare.[11] Section 3.4 also reports estimates from latent class analysis that uses the categorical responses.

While there have been critiques of HES, overall the evidence points to the source as being reasonable, if potentially noisy. To our knowledge, there are not any critiques suggesting differential measurement error by whether the hamlet was bombed, which would be necessary for measurement error to bias results. A well-known critique of HES comes from a memoir by David Donovan (1985), who observed its collection during his tour of duty in Vietnam.

[9] The systems are entitled "Combat Air Activities" (RG 218, 529) and "Sorties Flown in Southeast Asia" (RG 218).

[10] Some months appear in both systems but record different incidents. Some months are marked as incomplete in both systems.

[11] An alternative would be to estimate a multinomial logit, but this does not converge well since there is often little variation in some of the categories.

He argued that U.S. district advisers - who were responsible for data collection - delegated collection to subordinates or collected information hastily since they were overworked. He also claims that advisers feigned progress by inflating responses over time. While it was plausibly common to rely on subordinates, or to be hasty, it is not obvious that Donovan's experiences generalize. For example, HES scores tend to deteriorate, not improve, across our sample period. A rigorous academic critique of Vietnam era data by Gregory Daddis (2011, p. 40) argues that the main failing, particularly in the case of HES, stemmed "not from a lack of effort" by those collecting the data, but rather from an over-reliance on summary statistics without a careful interpretation of what the data implied about policy effectiveness.[12]

Second, we examine administrative data from the U.S. and South Vietnamese armed forces on operations, attacks, and casualties. Specifically, data on ground troops are from the "Situation Report Army" (RG 218). Data on enemy initiated attacks from 1964-1969 come from the "Vietnam Database" (RG 330), and data on naval incidents are from the "Naval Surveillance Activities File (RG 218). Finally, data on South Vietnamese territorial defense units are from the "Territorial Forces Evaluation System" (RG 330) and the "Territorial Forces Activity Reporting System" (RG 330). The collection of these data was independent of HES. VC casualties should be taken with a grain of salt, as they were based on thin information and potentially exaggerated, but attacks, friendly (South Vietnamese and U.S.) operations, and friendly casualties are well-measured.

Finally, public opinion data on citizen attitudes towards local government, national government, and the war are available for a sample of hamlets through the Pacification Attitudes and Analysis Survey (PAAS), a joint U.S.-South Vietnamese effort that was collected by Vietnamese enumerators. PAAS was launched in March of 1970 and was conducted monthly until December of 1972, overlapping closely with the period in which the security score was used to target bombing, though unfortunately not all months have been preserved.[13] Each month, surveys were conducted in 6 randomly selected hamlets per province. 15 respondents were randomly selected per hamlet, with stratification on demographic characteristics. The number of months in which a given question was included in the questionnaire - and whether the question was asked in all or only a subset of hamlets - varies. Sample sizes for some interesting questions - such as those about anti-Americanism - are sufficiently small that few observations are left when we limit to hamlets near the security score discontinuities.

[12]In a description of HES, CORDS director Robert Komer (1970) similarly concludes: "Vietnam has been the most extensively commented on but least solidly analyzed conflict in living memory...[HES's] full exploitation may have to be left to the academic community."

[13]Tapes containing information for May, 1970 through February, 1971 and for August and September of 1971 were not preserved.

3.4 Results

We begin by examining graphically the first stage relationship between being below the security score threshold and the share of months in the quarter with air or artillery strikes near inhabited areas. Discontinuity fixed effects are partialled out so barely A's are compared to barely B's and so forth, but other controls are excluded in order to transparently display the raw data. Figure 3, panel (a) uses a local linear polynomial to plot strikes in quarter $t+1$ against the distance to the nearest threshold in quarter t. Dashed lines show 95% confidence intervals. A negative distance signifies that the hamlet is below the threshold. Strikes increase discontinuously just below the threshold. When the controls from equation (1) are included, estimates become more precise but do not change in magnitude.

Panel (b) repeats this exercise for the cumulative specification, plotting the distance to the threshold in quarter t against average strikes in quarters $t+1$ through U.S. withdrawal. Again, strikes change discontinuously at the threshold. The cumulative first stage is strong because bombing reduces security, which in turn lowers the score and makes future bombing more likely. Appendix Figure A-4, panels (a) and (b), document that these estimates are highly robust to the choice of bandwidth and RD polynomial.[14]

Panel (c) examines how the score relates to bombing in the quarters before and after it was computed, by plotting quarter-by-quarter RD estimates from equation (1). There is no pre-period impact of being below the threshold. The sample can be extended further back, but sample size declines substantially. The effect persists following the score's dissemination.

Panel (d) shows the McCrary plot, which tests for selective sorting around the threshold. Given that the continuous scores were never printed or saved and required the world's most powerful super-computer to calculate, it would have been difficult to manipulate scores around the threshold, and indeed there is no discontinuity in the density of observations.[15]

During 1969 the system was in pilot, and the security score was computed but not disseminated. Panels (e) and (f) document that there are no impacts of security scores in 1969 on bombing in the following quarter or cumulatively until U.S. withdrawal.

Next, we examine whether hamlets barely above the threshold are a valid control group for those barely below. Since the data used to compute the score were not received until the close of the quarter, there should be no contemporaneous impact. Figure 4, panel (a) documents that contemporaneous strikes change smoothly at the threshold. Strikes during quarter $t-1$ (panel b) and on average during the pre-period (panel c) also change smoothly.

Table 1 examines pre-period balance for the study's outcomes. The pre-period charac-

[14] The quadratic RD polynomial specification becomes extremely noisy when the polynomial is estimated separately on each side of the four score discontinuities. Hence, for the quadratic specification, we estimate a single RD polynomial, separately above and below the thresholds.

[15] Moreover, the conditional probabilities were classified and were not known by those in the field who collected the data (Komer, 1970).

teristics are used as the dependent variable in equation (1). Columns (1) and (2) consider quarter $t-1$ and columns (3) and (4) the entire pre-period. The coefficients on *below* are typically small and statistically insignificant, with the few statistically significant differences plausibly due to sampling error.

To further check for balance, we predict bombing in $t+1$ using the variables that enter the period t security score but not the score itself. Figure 4, panel (d) documents that predicted bombing changes continuously, as we would expect if the characteristics that enter the score change smoothly. Panel (e) documents a similar pattern for predicted cumulative bombing. Data on VC attacks on troops are available for an extended pre-period. Panel (f) plots the quarter by quarter relationship from equation (1) between being below the threshold and VC attacks for 1964-1969, documenting that they are balanced throughout the pre-period.

Table 2 reports the first stage estimates using the RD specification from equation (1). Being below the score threshold in quarter t increases the share of months in quarter $t+1$ with bombing or artillery fire that hit near inhabited areas by 5.4 percentage points, relative to a sample average probability of 28 percent (column 1). The F-statistic, equal to 14.9, indicates a strong first stage relationship. Columns (2) and (3) document that there is no discontinuity using period t and $t-1$ bombing, respectively, and column (4) shows that there are no significant impacts using scores from 1969, when the score was not disseminated.

Column (5) reports the first-stage for the cumulative specification. Being below the threshold in quarter t increases the share of months with bombing or artillery fire that hit inhabited areas in quarters $t+1$ through U.S. withdrawal by 4.4 percentage points, relative to a sample average probability of 26 percent. The first stage F-statistic is 11.5. Column (6) shows that cumulative pre-period bombing is balanced, and column (7) documents that there is no impact of being above the threshold in 1969 on cumulative bombing afterwards.

These patterns can be validated with the Air Force ordinance data, which while incomplete for our period, provide corroborating information. RD estimates document that being below the threshold increases the tons of ordinance dropped within 5 kilometers of the hamlet by 22 percentage points, though the effect is noisily estimated and would not provide a strong first stage. 21% of hamlet-months have ordinance dropped within 5 kilometers.[16]

To be a valid instrument the score should not directly affect other resource allocations. Table 3 examines this assumption, focusing on immediate impacts. Military planners respond to information about the enemy that is as recent as possible, so it is unlikely that the score would have no immediate effect on allocations but would affect them in the longer run. This scenario would more likely result if changes in security caused by bombing drew the attention

[16]These data also contain information on the type of target, which in theory could provide additional information not available from HES but in practice is typically missing: for 71% of strikes in our sample the target is missing, 9% list it as "confirmed enemy", 3.9% list it as "bunkers", 3% list it as "any [enemy] personnel", and 2.8% list it as "structures."

of other actors, which would not violate the exclusion restriction.

Column (1) documents that there is no discontinuity at the quarter t threshold in whether friendly (U.S. or South Vietnamese) ground troops operated near populated areas in $t+1$. These data are drawn from HES and are used to maximize comparability. Columns (2) and (3) use armed forces administrative data to document that the score likewise does not immediately impact U.S. battalion operations or U.S. initiated attacks.[17] The coefficients are small and precisely estimated. Even if there were effects, however, the paper's broader arguments would remain valid since troops mostly engaged in a top-down military strategy. Moreover, there is no discontinuity in U.S.-initiated naval attacks (column 4), in the presence of South Vietnamese Regional or Popular Forces, which were regional self-defense forces (columns 5 and 6), or in the presence or share of households participating in the People's Self-Defense Forces, which were local self defense units (columns 7 and 8).[18] Finally, there is no effect on the presence of South Vietnamese development aid teams (the Rural Development Cadre). An extensive qualitative search revealed that the only allocation beyond air power to directly use the overall hamlet security score was the Accelerated Pacification Campaign, which aimed to drive VC out of D and E hamlets following the Tet Offensive. It began in 1968 and had concluded before the start of our sample period.

Next, the study examines the impacts of bombing. The main text reports IV estimates, and Appendix Table A-1 documents that OLS estimates are similar.[19] To address multiple hypothesis testing concerns - and also to show that effects are not driven by the coding of categorical questions into binary outcomes - outcomes from HES are divided into six groups: security, local government administration, education provision, health care provision, non-insurgent civic society, and economic. For each group of variables the study computes an index created using latent class analysis (LCA) that combines information from all available questions in that group.[20] Based on the observed question responses, latent class analysis estimates the posterior probability that each hamlet belongs to one of two latent groups associated with "high" and "low" values for each category: i.e. good and bad security.

We focus in the main text on the direct impacts of bombing, but it could also affect other locations. For example, nearby places might be less likely to support the VC if seeing a neighbor get bombed leads residents to update their beliefs about the costs of supporting

[17]Battalion operations exclude small scale operations. Data on small operation movements are unavailable, but U.S. initiated attacks include all attacks made by the U.S., regardless of the size of the attacking unit.

[18]Data on U.S. initiated attacks are available through the first quarter of 1972. Data on the allocation of naval personnel are only available at the district level.

[19]This could be the case because on average biases in the OLS cancel each other out - i.e. an upward omitted variables bias cancels a downward attenuation bias - or the OLS could be a biased estimate of an average treatment effect that is different from the local average treatment effect estimated by the IV.

[20]We include questions that are available for the entire sample period. Results are similar if we include questions that were only asked during part of the sample period.

the insurgents. Additionally, VC recruiters might go to the bombed areas instead of targeting nearby places. On the other hand, if nearby bombing creates grievances or disillusionment - or impacts the economy - it could increase VC support. Appendix Tables A-2 through A-9 examine spillovers using two measures of neighbors: contiguous areas and hamlets in the same VC administrative district.[21] Spillovers would likely occur in nearby places, since media markets were nearly non-existent (radio and television were state-owned), and VC recruitment networks were highly local. The spillovers analysis examines the average LCAs and average measures of VC activity in the nearby areas. Both immediate and cumulative bombing are examined, using *below* as an instrument. There is limited evidence of spillovers, and to the extent they exist they tend to go in the same direction as the direct effects. In Tables A-2 through A-9, there are only two statistically significant coefficients that go in the opposite direction. Both are significant at the 10% level and may be due to sampling error.

To identify the direct impacts of bombing, we first consider security outcomes, starting with data from HES and then examining military administrative data and public opinion surveys. Table 4, Column 1 reports the immediate effect of bombing on the security LCA, using whether the hamlet was below the threshold as the instrument. Moving from no strikes to the sample mean of 0.28 strikes per month decreases the posterior probability of being in the good security class by 19 percentage points (-0.67×0.28), relative to an overall sample mean of 0.65, and the effect is statistically significant at the 1% level. Appendix Figure A-5 shows the reduced form RD relationship for this - as well as the other - immediate LCAs.

The other columns examine cumulative effects until U.S. withdrawal. Estimates using the immediate specification tend to be qualitatively similar but noisier.[22] The point estimate of -0.64 (s.e. 0.25) in column (2) suggests that moving from no cumulative strikes - which is rare - to the sample average of 0.26 strikes per month decreases the posterior probability of being in the high security class by 17 percentage points. Appendix Figure A-6 shows the reduced form RD relationship for this - as well as the other - cumulative LCAs in the raw data. Placebo checks reported in Appendix Table A-10 document that bombing in period t does not impact the security posterior probability in $t-1$, nor does cumulative bombing affect the average pre-period posterior probability.

Columns 3 through 11 of Table 4 examine outcomes that enter the LCA index.[23] Moving from no bombing to the sample mean increases the average probability of an armed VC presence in a hamlet-month by 15 percentage points, relative to a sample mean probability

[21] The appendix uses a radius of 10 kilometers. Results are similar when other radii are utilized.

[22] Outcomes measured monthly are more likely to respond immediately than outcomes measured quarterly.

[23] Appendix Table A-11 reports estimates for the other outcomes that enter the security LCA. The effects are qualitatively similar, but the outcomes reported in Table A-11 tend to have significantly less variation than the outcomes in the main text. Hence more power is required to detect effects, and impacts tend not to be statistically significant.

of 0.19, and the estimate is statistically significant at the 5% level (column 3). Figure 5, panel (a) plots the reduced form relationship between distance to the threshold and VC armed presence in the raw data, revealing a clear discontinuity. Column 4 documents that moving from no bombing to the sample mean increases the average probability that there is an active VC village guerrilla squad during a given quarter by 27 percentage points. The guerrilla squad consists entirely of locals. Bombing also increases the probability that a VC main squad, which may operate throughout the region, is active (column 5) and increases the probability that there is a VC base nearby (column 6). Finally, bombing increases attacks on local security forces, government officials, and civilians by 9 percentage points, relative to a sample mean of 16 percent of hamlet-months witnessing an attack (column 7).

In addition to its military branch, the VC also maintained a political branch - called the VC Infrastructure - tasked with propaganda, recruitment, and extortion (taxation). Column 8 documents that moving from no bombing to sample mean bombing increases the probability that there is an active VC Infrastructure by 25 percentage points, and this effect is statistically significant at the 5% level. Figure 5, panel (b) plots the reduced form relationship between distance to the threshold and VC Infrastructure presence in the raw data. Bombing also increases the share of households estimated to have engaged in VC Infrastructure activities by around 4 percentage points (column 9). There is not a statistically significant effect on whether a VC propaganda drive was held, although the coefficient is large and positive (column 10). Finally, bombing increases the probability that the VC extorted residents by 23 percentage points, relative to a sample mean of 0.27 (column 11).

Appendix Figure A-4 documents that the estimated impacts on the security LCA are highly robust to the choice of bandwidth and RD polynomial.[24] Moreover, Appendix Figure A-7 (A-8) plots quarter x quarter reduced form (IV) estimates. There is no impact of being below the threshold (bombing) before score assignment, whereas being below the threshold (bombing) reduces the security LCA after score assignment. The impacts after score assignment are all negative, as expected, though some are noisily estimated.

35% of observations are near the A-B threshold, 46% near the B-C threshold, 16% near the C-D threshold, and only 3% near the D-E threshold. Figure A-9 plots the raw data by threshold, documenting jumps in bombing at the A-B, B-C, and D-E thresholds, and Figure A-10 shows that the discontinuities in the security posterior probability closely match this pattern. There is not enough power to run IV estimates by threshold, but Figure A-11 shows coefficient plots for the reduced form for the outcomes in Table 4. Impacts are concentrated around the A-B, B-C, and D-E thresholds, though some estimates are noisy.

A potential concern with the above results is that CORDS advisers may have reported

[24] The other outcomes in Table 4 are similarly robust but are not shown to avoid displaying a very large number of coefficients.

less VC activity to show that bombing was working, or more VC activity to justify that bombing was needed, though there was not an explicit incentive to do so, and the hamlet level data were entirely for internal use.[25] Administrative data on troop operations and friendly casualties provide an alternative, well-measured source of information on security. Table 5, Columns 1 through 6 consider immediate effects on troops, and columns 7 through 12 examine cumulative impacts. Consistent with ground troops not directly using the score to allocate resources, there are no contemporaneous effects, but troops might well respond over time to a deterioration in security. Column 7 documents, using data from HES, that moving from no bombing to sample mean bombing over the course of the war increases the monthly probability that friendly troops operated nearby by 17 percentage points. Administrative data from the U.S. military present a consistent picture. U.S. battalion operations are more likely over the course of the war near more bombed areas (column 8), as are U.S. initiated attacks (column 9). Figure 5, panel (c) plots the reduced form relationship between distance to the threshold and U.S. initiated attacks. There is no impact on US deaths (column 10), which with a mean of 0.06 are relatively rare, whereas bombing increases South Vietnamese and VC deaths (columns 11 and 12). VC deaths are measured with considerable error and should be interpreted cautiously, whereas South Vietnamese deaths are well-measured. Figure A-4, panel (d) shows that impacts on U.S. battalion operations are robust to the choice of bandwidth and RD polynomial (as are other outcomes, available upon request). Figures A-12 through A-15 show reduced form impacts by discontinuity, which match the first stage impacts well.

These estimates are complimented by Figure 6, which examines citizens' perceptions of security. The data are drawn from public opinion surveys collected by South Vietnamese enumerators and provide an alternative source to corroborate the effects documented above. The surveys were conducted in six randomly selected hamlets in each province x month and not all months have been preserved. Hence, these data are available for a much smaller sample, and due to lower power the first stage is weaker, though the coefficients do not differ significantly. To avoid a weak first stage, Figure 6 instead plots the reduced form. Perceived VC terrorism in the hamlet is higher below the threshold (panel a); the probability of citizens reporting VC recruitment is higher, though the effect is noisy (panel b); citizens' assessment of the effectiveness of local officials at ensuring security is worse (panel c); and citizens rate the police as less effective in preventing VC activity (panel d).

Bombing also affects governance outcomes beyond security. The local government was often the face of the state, and strengthening local governments was an explicit U.S. objective

[25] HES continued to be collected by the South Vietnamese for a year following U.S. withdrawal. The study cannot reject that the impacts of cumulative bombing on the average LCA posteriors prior to U.S. withdrawal are the same as those on the average LCA posteriors in the year following U.S. withdrawal. This suggests that effects are unlikely to be driven purely by reporting incentives of the U.S. district advisers.

in winning the political war. Column 1 of Table 6 examines the contemporaneous effect of bombing on a local government administration LCA, which incorporates the government's ability to tax, staff its positions, and interface with citizens. The point estimate is small and statistically insignificant, which is not surprising since this outcome may change slowly and the component questions are measured quarterly. Column 2 documents that a cumulative increase in bombing from zero to the sample mean decreases the posterior probability of being in the high administration latent class by 8 percentage points. The appendix examines placebo and robustness checks and documents impacts by quarter and discontinuity.[26]

Columns 3 through 5 examine outcomes in the administration LCA.[27] Moving from no bombing to sample mean cumulative bombing decreases the probability that all village committee positions are filled by 21 percentage points, relative to a sample average of 0.84 (column 3). The village committee administered public goods provision, and Figure 5, panel (d) plots the reduced form relationship for this outcome. Moreover, bombing reduces the probability that the local government systematically collects taxes by 25 percentage points, relative to a sample mean of 0.70 (column 4). Finally, the village chief is less likely to visit all neighborhoods in the village at least once a month in more bombed areas (column 5).

Both education and health care were provided primarily by local governments. Column 6 documents that there is not an immediate effect of bombing on the posterior probability of being in the high education provision latent class, which incorporates questions about the accessibility of primary and secondary education and challenges faced by schools. In contrast, moving from no bombing to sample mean bombing over the course of the war reduces the probability of being in the high latent class by 12 percentage points, relative to a sample mean of 0.66 (column 7). Columns 8 and 9 document that cumulative bombing reduces access to primary and secondary school, respectively. See also Figure 5, panel (e). Next, columns 10 and 11 consider the impact of immediate and cumulative bombing on the health care provision LCA. If anything, the impact is positive, but it is not statistically significant. This could potentially be explained by bombing increasing health care demand. Column 12 examines the probability that public works were under construction during the quarter. While the estimate is negative and substantial in magnitude, it is not significant. The appendix shows placebo and robustness checks and impacts by quarter and discontinuity.[28]

Increasing non-communist civic engagement was another aim of nation building in South

[26] Table A-10 documents that bombing does not impact the administration posterior probability in $t-1$, nor does cumulative bombing affect the average pre-period posterior probability. Figure A-4, panel (e) shows that impacts are robust to the choice of bandwidth and RD polynomial, though the quadratic polynomial is noisy for narrower bandwidths. Figures A-7 and A-8, panel (b), plot the reduced form and IV impacts by quarter. Figures A-16 and A-19 show reduced form impacts by discontinuity.

[27] Additional outcomes entering the LCA are presented in Table A-12. The other outcomes do not have as much variation, and thus we are less powered to detect effects.

[28] See Table A-10, Figures A-4-A-8, and Figures A-17-A-19.

Vietnam, but the study shows that bombing had the opposite effect. Column 1 of Table 7 documents that there is an immediate negative impact of bombing on civic society, which is significant at the 10% level. Column 2 estimates that moving from no bombing to sample mean cumulative bombing reduces the probability of being in the high civic society latent class by 14 percentage points, relative to a sample mean of 0.69, and this effect is significant at the 5% level. Columns 3 to 9 report cumulative estimates for all outcomes used in the latent class index. Moving from no to sample average bombing reduces the share of individuals participating in civic organizations by 13 percentage points, relative to a sample mean of 0.29 (column 3). Figure 5, panel (f) plots this reduced form relationship. The impacts on participation in the People's Self Defense Force and economic training programs are negative but not statistically significant (columns 4 and 5). Locally organized self-development projects are less likely to be underway in more bombed hamlets (column 7). There is not a statistically significant impact on the presence of youth organizations (column 8) or whether the local council meets frequently with citizens (column 9). The appendix documents placebo and robustness checks and examines impacts by quarter and discontinuity.[29]

South Vietnam was primarily a rural subsistence economy, with little capital to be destroyed, but bombing could nevertheless affect economic outcomes. Impacts go in the expected direction but are imprecise, plausibly because the outcomes are noisily measured. Column 1, Table 8 reports the immediate effect of bombing on the probability of being in the high economic latent class, and the estimate is statistically insignificant. Column 2 considers the cumulative specification. The point estimate is negative and fairly large but not quite statistically distinct from zero. Columns 3 to 8 report cumulative estimates for all outcomes used in the LCA. Bombing decreases the availability of manufactures (column 4), reduces the likelihood that there is a surplus of goods (column 5), and reduces the share of households with access to a vehicle (column 7). The point estimate for the availability of non-rice foodstuffs (column 3) is negative but statistically insignificant, and the impacts on whether plots are left fallow due to security concerns (column 6) and the share of households requiring assistance to subsist (column 8) are positive but insignificant. Table 8 also examines quarterly population growth. Hamlet population was declining in this period, though the secondary literature notes that Vietnamese often remained near their hamlets even when they were destroyed (Appy, 2015, p. 167). The coefficient on bombing is negative and large, but statistically insignificant (column 9). The appendix documents similar patterns for different bandwidths, RD polynomials, and estimates by quarter and discontinuity.[30]

Bombing could impact insurgent activity through grievances/disillusionment and eco-

[29]See Table A-10 and Figures A-4-A-8, A-20, and A-21.

[30]See Table A-10 and Figures A-22 and A-23.

nomic opportunity costs, amongst other potential explanations.[31] The economic effects appear weaker and more delayed than the security effects, suggesting that grievances may be more central, but it is difficult to rule out opportunity costs with the available data. The best information on VC motivations, while imperfect, comes from interviews that RAND conducted with 2,400 VC defectors and POWs between 1964 and 1968. Summary statistics are reported in a RAND study that compares VC volunteers to draftees (Denton, 1968). Volunteers were significantly more likely than forced draftees to have grievances against the government and also to face economic hardship, including unemployment, suggesting that both political and economic factors motivated citizens to join the VC.[32]

We have also examined long-run effects on outcomes today, using a specification analogous to that used to measure cumulative effects during the war.[33] We combine data from the Vietnamese Household Living Standards Survey (2002-2012), The Vietnamese Enterprise Census (2011), and the Provincial Competitiveness Index (2010-2012), which surveys firms on their perceptions of provincial government officials. Table A-13 reports small and statistically insignificant impacts on log equivalent household consumption. The estimates suggest that moving from no bombing to sample mean bombing over the course of the war increases equivalent household consumption by a little more than three percentage points, but the results are not statistically different from zero. Assessing the reasons why bombing does not exert persistent economic effects is beyond this study's scope, but columns 2 through 4 - which examine data from the 2011 Enterprise Census - provide some hints. Moving from no to sample mean bombing increases the share of employment in the state sector by 14 percentage points, decreases employment in the private sector, and does not have a statistically significant impact on foreign sector employment. During the first decades of Communism, the state sector was the main economic game in town and plausibly played a role in recovery from the war.[34] Columns (5) through (8) do not find impacts on firms' perceptions of various types of favoritism towards state-owned enterprises, suggesting that any historical favoritism may have been eroded more recently. Other perceptions of provincial officials (available upon request) also do not show impacts. Perceptions of village officials are not available, but given that local governments were replaced by the Communist Party, we would not necessarily expect effects on local government to persist. Column (9) documents that there is not a difference in private land titles in the 2000s in more bombed places.[35]

[31]See i.e. Berman et al. (2011b); Miguel et al. (2004). Blattman and Miguel (2010) provides a review.

[32]Common grievances included being falsely accused by the government and the killing or rape of a family member by ARVN forces.

[33]Results are similar whether being below the threshold is used to instrument bombing until U.S. withdrawal or bombing for the entire period of data availability.

[34]While some data on state enterprises during this period are available in provincial yearbooks and declassified Communist Party documents, they are at too high a level of aggregation to be useful for empirics.

[35]We obtained declassified Communist Party documents on collectivization in the 70s and 80s, but the

Finally, column (10) estimates a positive coefficient of bombing on the number of days household survey respondents were ill during the past year, but the estimate is not statistically significant.[36]

4 Top Down Versus Bottom Up

4.1 Counterinsurgency in South Vietnam

This section examines a second natural experiment, which directly compares the military force strategy to a more bottom-up counterinsurgency (COIN) approach. A qualitative literature highlights major differences in how the U.S. Army and U.S. Marine Corps (USMC) approach counterinsurgency (Long, 2016; Krepinevich, 1986). The Army has traditionally emphasized overwhelming firepower and large-scale operations, a by-product of its formative years during the U.S. Civil War. In contrast, following the Spanish-American War the USMC developed as a de facto imperial police force with operations in the Caribbean. USMC units worked closely with local police to maintain order, developing an organizational culture that prioritized small units, limited firepower, and close collaboration with locals and civilians.[37]

US Army leadership in Vietnam emphasized overwhelming firepower, deployed through search and destroy raids that aimed to neutralize the VC. For example, an official Army publication on search and destroy argued: "Units in Vietnam emphasized pacification by stressing civic action efforts. In our opinion, this was a mistake...we always stressed the military...The only way to overcome VC control is by brute force...one has to lower the boom occasionally and battalion commanders have authority to use heavy firepower in populated areas (Ewell and Hunt, 1974, p. 160). U.S. Army Chief of Staff William Westmoreland described his COIN strategy in one word: "firepower" (Krepinevich, 1986, p. 197). Development aid could be undertaken by USAID later, once peace was solidified (Daddis, 2011). This approach was reflected in the Army's preferred metrics: the enemy body count, battalion (large-scale) days of operation, ammunition expended, and the ratio of U.S. to enemy deaths (Sheehan, 1988, p. 287-288; Krepinevich, 1986, p. 196-205).[38]

In contrast, the Marines designated Civic Action - development aid - and Combined Action - small units embedded in communities that worked closely with local security forces - as pillars of their mission.[39] The 1962 USMC Manual states: "a positive program of civil assis-

data are too aggregated to be useful for empirical analysis.

[36]Other measures of health (available upon request) are also not statistically different.

[37]The USMC also had an amphibious sub-culture that operated as an advanced landing team for the Navy, but technological advancements following World War II made this function largely obsolete.

[38]The favored metrics of the Air Force, sorties flown and bomb tonnage dropped, also focused on attrition.

[39]The nascent U.S. Army Special Forces pursued an approach that resembled that of the USMC.

tance must be conducted to eliminate the original cause of the resistance movement" (USMC, 1962, p. 72). "Marine units built schools, roads, marketplaces, and hospitals...provided regular medical care...and provided training and equipment to local and regional militias" (USMC, 2009). Moreover, "one of the most important duties to be performed by the commander...is to gain the cooperation and assistance of local police" (USMC, 1962, p.16). Combined Action units eschewed heavy firepower, as it was likely to harm populations they were protecting (Long, 2016). Working closely with local authorities to provide security and basic public goods may have convinced some citizens "that they will be well rewarded and well protected when they serve as local agents in the regime's political network," which Roger Myerson (2011) has argued is fundamental to counterinsurgency. The USMC's favored metrics focused on measuring the above inputs to pacification (USMC, 1970, p. 15-17).[40]

Military historian Austin Long qualitatively examines a 1967 natural experiment in which the Army replaced the Third Marine Division, which was diverted to deal with urgent threats along the DMZ. Long documents that the USMC emphasized small-unit operations in conjunction with locals, whereas the Army emphasized overwhelming firepower. For example, the Army expended significantly more rounds of ammunition than the USMC after assuming control of the districts, even on days with no enemy contact. The latter occurred because of harassment and interdiction (H & I), which did not have a specific target but rather fired at a general area that could contain the enemy but also civilians. 88% of Army rounds were used for H & I in the districts Long examines. Moreover, refugees were produced five times faster after the Army arrived than when the USMC controlled the districts. Long presents a variety of anecdotal evidence that US Army and USMC organizational cultures have persisted since Vietnam, despite efforts by General David Petraeus to move the Army towards a COIN strategy that more closely resembles that of the USMC in Vietnam.

The USMC commanded Corps I, the northernmost of the four military regions in South Vietnam, whereas the Army commanded neighboring Corps II. Lyndon Johnson deployed the Marines - who serve as international first responders - to Vietnam in 1965 to protect a key airbase in Da Nang, located in Corps I. Later that year the USMC expanded into the rest of northern South Vietnam. The Marines were given command of Corps I upon arrival and retained it until March of 1970, when the Army assumed command, and the USMC withdrew from Vietnam in April of 1971. Army soldiers operated in Corps I, under USMC command, and administrative data document that the Marines were concentrated almost exclusively in Corps I.[41] The Third Division was stationed along the DMZ and engaged

[40]When the CIA developed the original, subjective Hamlet Evaluation System in 1967, they used the USMC Matrix metric as a template.

[41]99.7% of armed incidents involving the USMC occurred in Corps I, 99.8% of attacks on U.S. Marines were in Corps I, and 99.8% of deaths of U.S. Marines were in Corps I. Appendix Figures A-24 to A-26 plot USMC initiated attacks, enemy attacks on the USMC, and USMC casualties, respectively.

primarily in conventional warfare, whereas the First Division conducted counterinsurgency in the remainder of Corps I.

This study uses an RD to compare across the corps boundary (see Figure 7). If all other factors change smoothly at the boundary, the RD will isolate the causal impact of the USMC relative to the Army, though there could be other mechanisms beyond COIN strategies that lead to different outcomes. While we cannot rule out other channels, evidence points to the differences discussed above as particularly central, painting a picture about the potential pitfalls of the top down approach that is quite consistent with the results on bombing.

Differences in personnel recruitment and rotation are the most plausible alternative channels that differentiate the Army and Marines, but the differences appear relatively modest compared to differences in COIN. Notably, average Army and Marines scores on the Armed Forces Qualifying Test (AFQT) - which was taken by all soldiers - were not different, nor were the shares of soldiers drawn from the lowest AFQT score groups (Dawson, 1995). High school completion rates for Army soldiers were slightly higher. The Army also had a higher share of soldiers from the Selective Service, but rates varied from year to year, and the USMC relied extensively on the draft from 1968 until withdrawal. Table A-14 compares a wide range of demographic characteristics of Army and USMC casualties.[42] USMC casualties were modestly more likely to be from the Northeast, whereas US Army casualties were modestly more likely to be from the South, but there are no differences in racial composition.

Both the USMC and Army pursued an individual rotation policy, in which enlisted men were rotated in and out of combat units on a 12 (Army) or 13 (USMC) month schedule. During a tour of duty, Army officers spent six months each in combat and staff positions, whereas USMC officers could be assigned for the entire year to combat, which may have boosted morale or provided more relevant experience (Gabriel and Savage, 1979).[43] It is possible that differences in officer rotation or other officer characteristics could contribute to differences across the boundary, though impacts are statistically identical across quarters and thus unlikely to be driven entirely by officers in months 7 through 12 of their rotation or by particular individuals stationed near the boundary.

4.2 Empirical Design

To compare the impacts of the USMC to those of the Army, the study uses a spatial regression discontinuity across the Corps Region I-II boundary:

$$y_{hs} = \alpha_0 + \alpha_1 USMC_{hs} + f(lat_{hs}, lon_{hs}) + \beta G_{hs} + \alpha_s + \epsilon_{hs} \tag{2}$$

[42] This information cannot be released for individuals who are still living.

[43] Due to rotation policies, however, officers would not spend the entire time with the same soldiers, and often not in command of the same unit.

where $USMC_{hs}$ is a dummy equal to 1 if hamlet h, along segment s, is in Corps I and $f(lat_{hs}, lon_{hs})$ is an RD polynomial in latitude and longitude. G_{hs} is a vector of geographic controls, and α_s is a boundary segment fixed effect that splits the boundary into two segments. Standard errors are clustered by village. The baseline utilizes a local linear specification and a bandwidth of 25 kilometers. Results are robust to alternative specifications.[44]

The identifying assumptions for a spatial RD are the same as those for the RD in security score space, and Table 9 examines whether pre-characteristics change smoothly at the corps region boundary. Column 1 considers VC attacks, averaged from 1964 through when the Marines established operations in southern Corps I in May, 1965. VC attacks are balanced during the pre-period. The dependent variable in Column 2 is a dummy for whether the hamlet is urban. The estimate is small and statistically insignificant, suggesting no difference in urbanization across the boundary. Columns 3 and 4 consider elevation and slope, respectively, documenting that there are no statistically significant differences.

Next, geo-referenced 1929 maps are used to compute whether there are various landmarks located near the hamlet: factories (column 5), markets (column 6), military posts (column 7), telegraphs (column 8), and train or tram stations (column 9). While the landmarks tend to be rare, the limited data from the French colonial period are highly aggregated, and these maps provide a rare source of hamlet level information. Overall, colonial landmarks are balanced, though military posts are different at the 10% level. Columns 10 and 11 examine the density of all roads and paved colonial-built roads near the hamlet, taken from the 1929 maps. Total roads are higher on the Marines side, but paved roads are not. Data on outcomes like schooling or health care are not available, and these were not widely accessible.

4.3 Results

We compare outcomes across the Army-USMC boundary, using the spatial RD described by equation (2) and data drawn from HES, military administrative records, and public opinion surveys. Outcomes are averaged for the period prior to USMC withdrawal in April 1971.

We first examine whether public goods targeted by the Marines were higher on their side of the boundary, using data from HES. These data were collected by a SVN-US joint agency that was not directly affiliated with the USMC or Army. Columns 1 and 2 of Table 10 document that the posterior probability of being in the high education latent class is 24 percentage points higher on the USMC side of the boundary and the probability of being in the high health care provision latent class is 56 percentage points higher. Results for specific outcomes, available upon request, document that primary school completion is 39 percentage

[44] Table A-15 examines robustness to using a quadratic RD polynomial, and Table A-16 examines a wider 50 kilometer bandwidth. Results are broadly similar. While the education LCA is still positive and fairly large in magnitude, it is no longer statistically significant.

points higher, medical services are 19 percentage points more likely to be available, and public works are 28 percentage points more likely to be under construction on the USMC side.

Columns 3 through 9 examine differences across the boundary in security. The posterior probability of being in the high security latent class is 10 percentage points higher on the Marines' side of the boundary, relative to a sample mean of 0.35, but the estimate is not statistically significant (column 3). Security impacts are concentrated in VC military but not political activity. The village is less likely to have an armed VC presence (column 4), and VC initiated attacks on hamlets are lower (column 5). However, there is not a statistically significant difference in the presence of the VC Infrastructure (column 6). Related outcomes such as VC bases, propaganda, and extortion (not reported) show a similar pattern.

Columns 7 through 9 consider military administrative data. VC attacks on troops are significantly lower on the USMC side of the boundary. This could reflect lower VC presence but may also result from the fact that search and destroy - pejoratively known as "dangling the bait" - often found the amorphous Viet Cong by sending troops into areas where they would attack. The impacts on friendly (U.S. and South Vietnamese) and enemy troop deaths are negative but not statistically significant (columns 8 and 9). Appendix Figure A-27 shows RD figures for key outcomes. The x and y axes plot the running variables - latitude and longitude - whereas shading is used to denote the outcomes. Predicted values are shown in the background and the raw data values are displayed using points in the foreground. Discontinuities in outcomes at the corps boundary are clearly visible.

Columns 10 through 12 consider the administration, civic society, and economic posterior probabilities, and do not find statistically significant impacts. We've also examined whether bombing differs across the boundary. As expected given that security enters the algorithm targeting air strikes, bombing was 11 percentage points lower on the USMC side of the boundary, but the difference is not statistically significant (s.e. = .10).[45] Nonetheless, bombing could magnify initial security differences, though effects are similar when we limit the sample to 1969, before the security score was used to target bombing.[46]

It could also be that spillovers from Corps I impact nearby Corps II hamlets, leading the boundary region to be atypical. Table A-17 shows that results are broadly similar when we compare only hamlets 10-25 km from the boundary, suggesting that areas very near the boundary are not unusual.

A potential interpretation of the results thus far is that while less aggression reduced violence, instead of winning hearts and minds it may have simply led the Vietnamese to perceive

[45]CAP targeted public goods also enter the security score algorithm, but are among the less influential questions and alone cannot explain much of the potential difference in air strikes.

[46]It is also possible that the USMC strategy could have reduced or magnified the impacts of bombing. We do not estimate the impacts of bombing separately for Corps I because the significantly smaller sample in this region weakens the first stage, but the reduced form impacts are broadly similar for Corps I and II.

non-communists as weak. Public opinion surveys, while potentially subject to experimenter demand effects, can help shed light on whether hearts and minds were influenced. Table 11 examines attitudes towards Americans and the South Vietnamese government. Since there are only 13 sampled hamlets within 25 km of the corps boundary, it uses OLS to compare places within 100 km.

Respondents in Corps I were 16 percentage points more likely to state that they liked Americans and significantly less likely to respond that they hated Americans (columns 1 - 2).[47] Moreover, respondents were 39 percentage points more likely to state that there was no hostility towards the U.S. in their community, 11 percentage points more likely to state that there is harmony between Americans and Vietnamese, and 38 percentage points more likely to state that the American presence was beneficial (columns 3 - 5).

Citizens in Corps I were also more likely to respond that they were fully confident in the effectiveness of the South Vietnamese government (column 6). They were more likely to rate the South Vietnamese Army (ARVN) as effective (column 7), to rate the Popular and Regional Forces (PF and RF) - regional security forces - as effective (columns 8 and 9), and to rate the police as effective in countering the VC and maintaining order (columns 10 and 11). Finally, they also rated local officials as more effective in ensuring security (column 12). Table A-18 show that results are broadly similar when the sample is limited to hamlets further than 25 km from the boundary. These results are consistent with the hypothesis that hearts and minds were won - or lost less - by the bottom up approach, relative to a more exclusive focus on overwhelming force.

5 Conclusion

Interventions in weakly institutionalized societies have been central to U.S. foreign policy over the past half-century. This study identifies the causal impacts of bombing South Vietnamese population centers by exploiting discontinuities in an algorithm used to target air strikes. Bombing increased Viet Cong military and political activity, weakened local government administration, and lowered non-communist civic engagement. Consistent with this, evidence suggests that the Army's reliance on overwhelming firepower led to worse outcomes than the USMC's more hearts and minds oriented approach.

This study illustrates that the top down force strategy can backfire when targets are embedded amongst civilian populations. Studying how weakly institutionalized states can obtain a monopoly on violence remains a fundamental area for ongoing research.

[47] The omitted category, and modal response, is "neither likes nor hates Americans."

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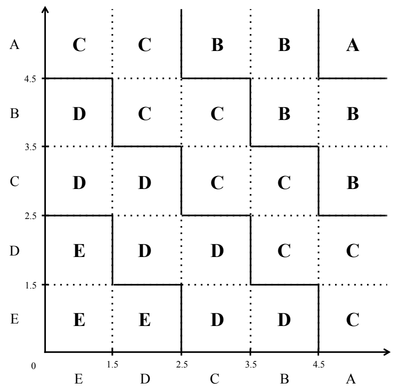
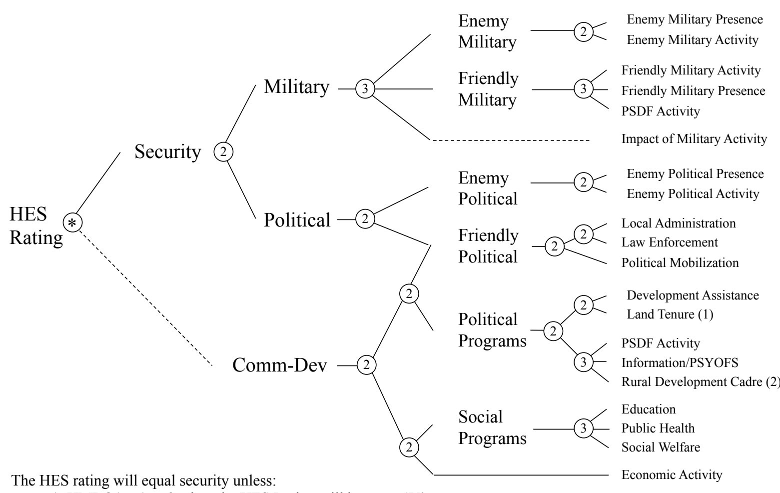
Figure 1: Decision Logic (2-Way)



Notes: This figure shows the aggregation logic for combining 2 submodel scores at a time.

Figure 2: Model Aggregation



The HES rating will equal security unless:

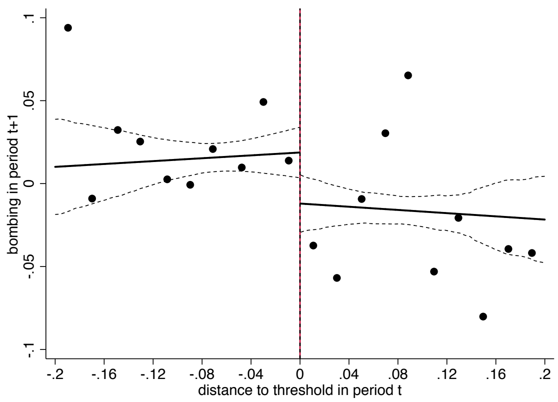
1. HMBO1 = 1 or 2 when the HES Rating will be set to 'V'
2. Community Development (Comm-Dev) is three letter grades higher or lower than security whereupon it will be raised or lowered by one letter grade as applicable. If security is Not-evaluated (N) , the HES Rating will = 'N'

(1) If Land Tenure = 'N', use Development Assistance only.
(2) If RD Cadre = 'N', use a two way decision table rather than the three way table.

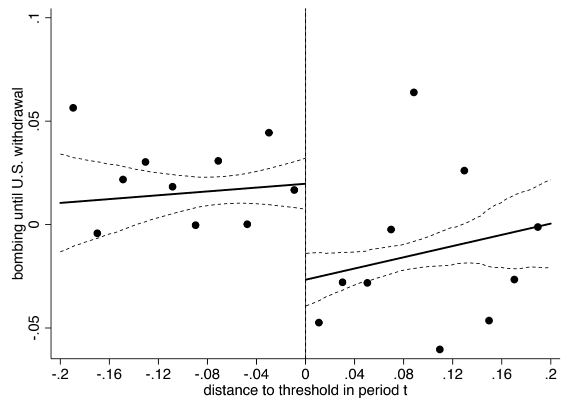
Notes: This figure illustrates how the nineteen submodel scores are combined two or three at a time to create a single hamlet security score. "N" indicates a missing value and "V" indicates Viet Cong controlled. Scores of "N" or "V" are rare.

Figure 3: First Stage

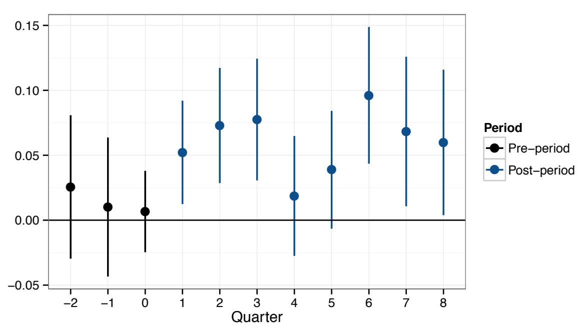
(a) Immediate First Stage



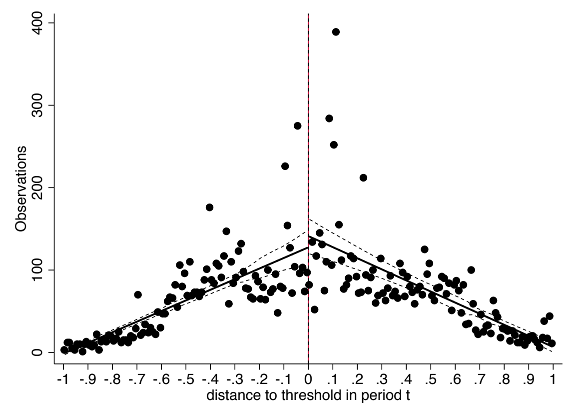
(b) Cumulative First Stage



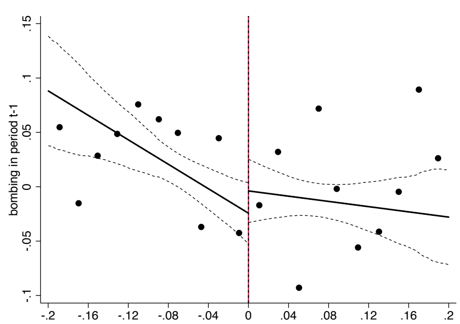
(c) Impacts by Quarter



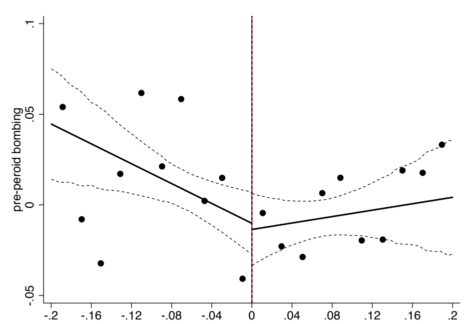
(d) McCrary Test



(e) 1969 ($t+1$)



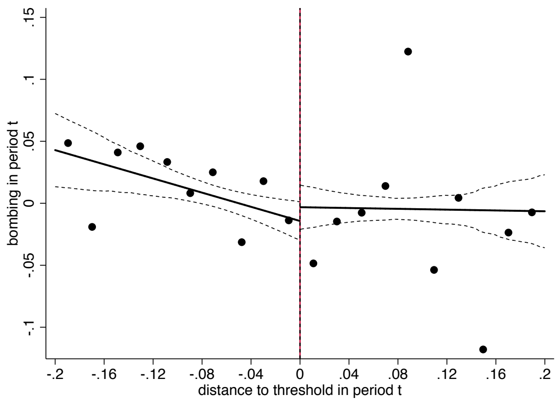
(f) 1969 (Cum)



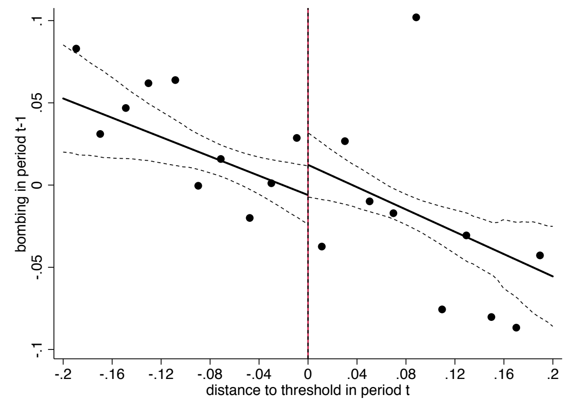
Notes: In panels (a), (b), (d), (e), and (f), each point plots an average value within a bin. Discontinuity fixed effects have been partialled out. The solid line plots a local linear regression and dashed lines show 95% confidence intervals. In panel (c), each point plots a coefficient from a separate regression.

Figure 4: Placebos

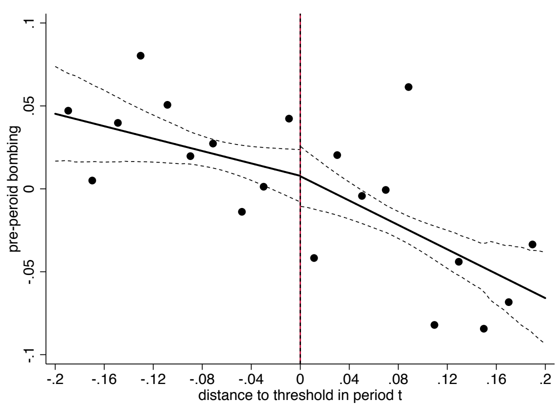
(a) Contemporaneous Bombing



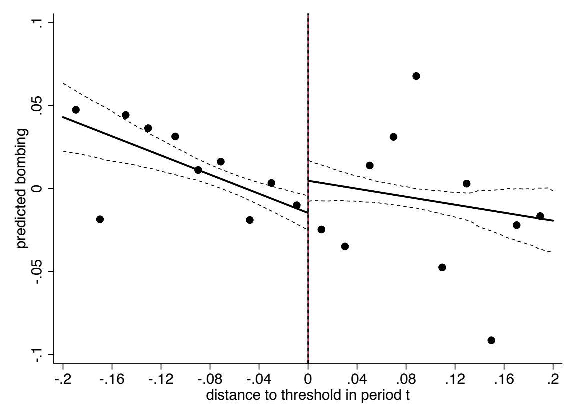
(b) $t-1$ Bombing



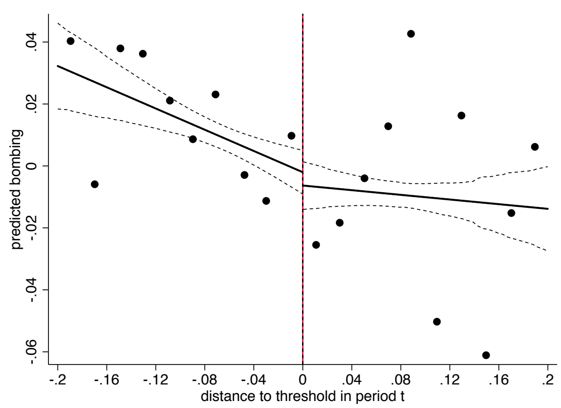
(c) All Prior Quarters Bombing



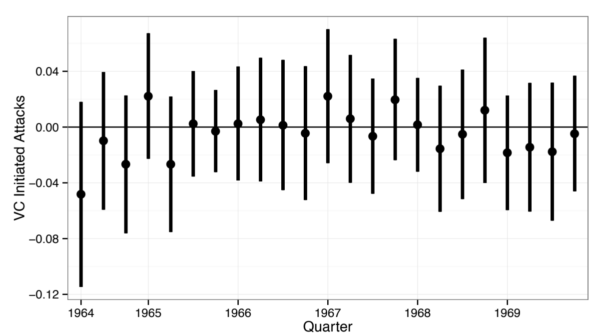
(d) Predicted Bombing $(t+1)$



(e) Predicted Bombing (Cum)

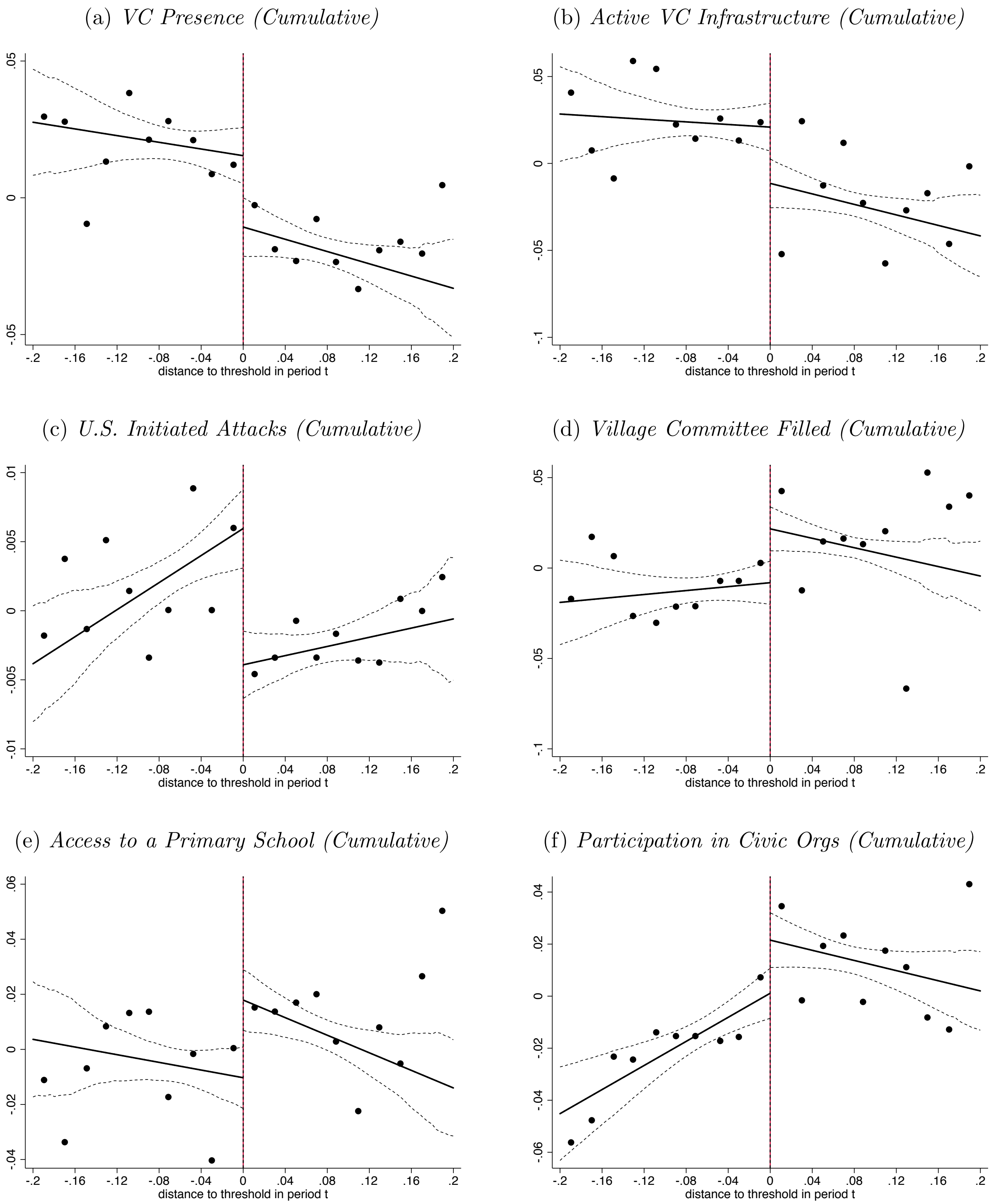


(f) 1964-1969 VC-Initiated Attacks



Notes: In panels (a) through (e), each point plots an average value within a bin. Discontinuity fixed effects have been partialled out. The solid line plots a local linear regression and dashed lines show 95% confidence intervals. In panel (f), each point plots a coefficient from a separate regression.

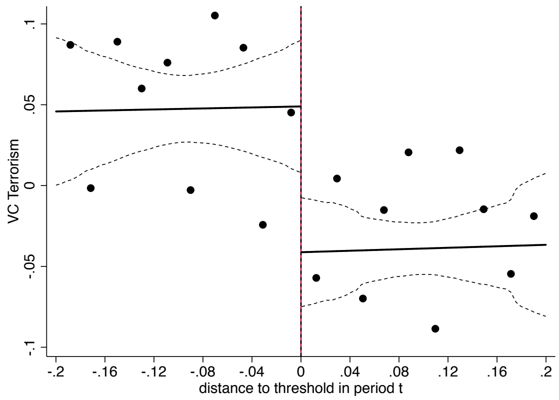
Figure 5: Reduced Forms



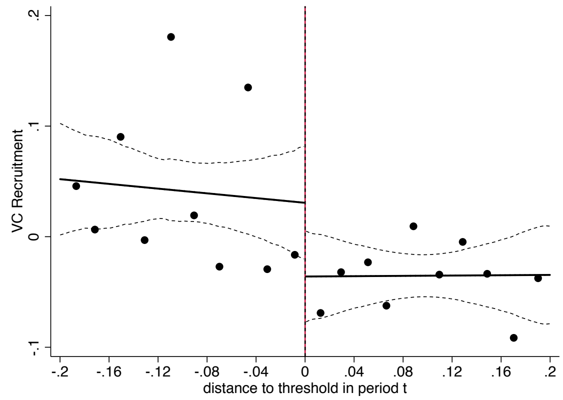
Notes: Each point plots an average value within a bin. Discontinuity fixed effects have been partialled out. The solid line plots a local linear regression and dashed lines show 95% confidence intervals.

Figure 6: Public Opinion Data

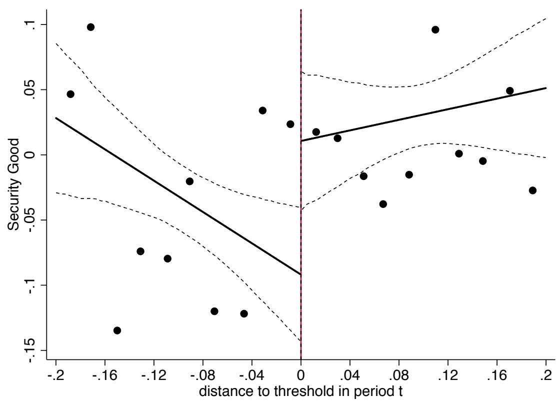
(a) *VC Terrorism (Cumulative)*



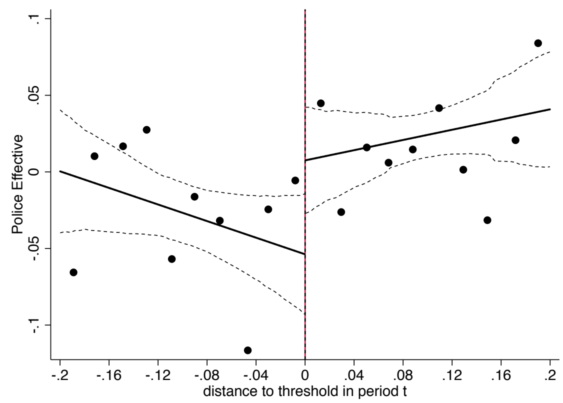
(b) *VC Recruitment (Cumulative)*



(c) *Local Officials Ensure Security (Cum)*

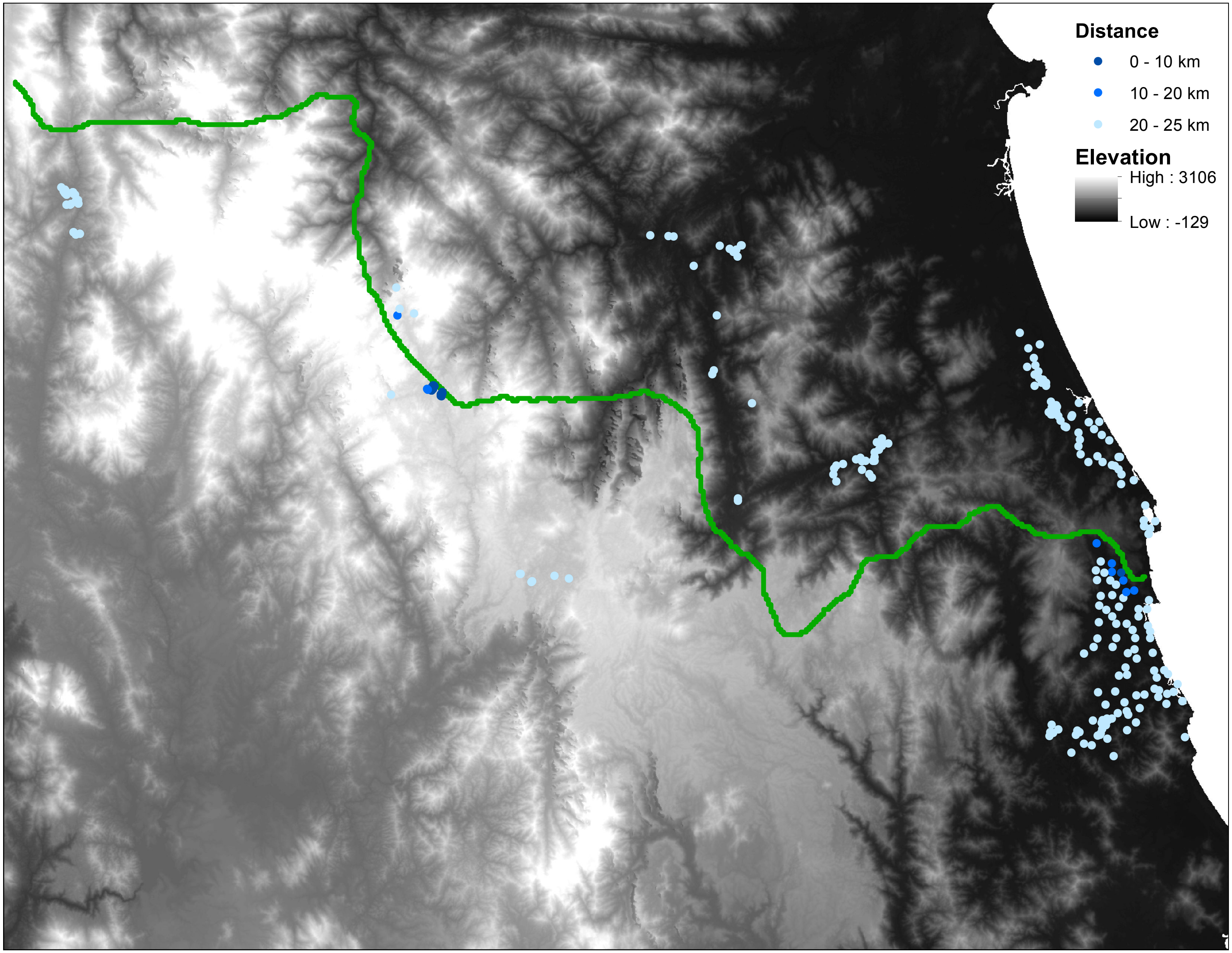


(d) *Police Effective Against VC (Cumulative)*



Notes: Each point plots an average value within a bin. Discontinuity fixed effects have been partialled out. The solid line plots a local linear regression and dashed lines show 95% confidence intervals.

Figure 7: Corps Region Boundary



Notes: This map plots hamlets near the Corps I-II boundary. See the legend for more details.

Table 1: Balance Checks

	$t-1$		Full Pre-Period	
	RD Coeff	SE	RD Coeff	SE
	(1)	(2)	(3)	(4)
Bombing	-0.001	(0.018)	0.020	(0.016)
Security				
Enemy Forces Present	-0.017	(0.018)	-0.008	(0.014)
Village Guerrilla Squad	0.026	(0.021)	0.015	(0.019)
VC Main Force Squad	-0.019	(0.022)	-0.021	(0.019)
VC Base Nearby	0.022	(0.018)	0.012	(0.017)
VC Attack	0.007	(0.015)	0.005	(0.012)
Active VC Infrastructure	-0.013	(0.018)	-0.022	(0.017)
% Households Participate VC	-0.003	(0.005)	-0.005	(0.006)
VC Propaganda	-0.019	(0.014)	-0.018	(0.014)
VC Taxation	-0.024	(0.020)	-0.019	(0.019)
Troops				
Friendly Forces Nearby	-0.02	(0.024)	-0.004	(0.019)
US Operations	0.006	(0.005)	0.005	(0.003)
US Initiated Attacks	0.007	(0.006)	0.009	(0.005)
US Deaths	0.036	(0.060)	0.036	(0.094)
SVN Deaths	0.326	(0.191)	0.141	(0.057)
VC Deaths	2.000	(1.950)	0.320	(2.027)
Governance				
Administration LCA	0.005	(0.008)	0.012	(0.009)
Local Government Taxes	-0.007	(0.021)	0.016	(0.021)
Village Committee Filled	-0.001	(0.020)	0.026	(0.019)
Local Chief Visits Hamlet	0.01	(0.012)	0.012	(0.012)
Education LCA	0.007	(0.015)	0.000	(0.015)
Primary School Access	0.004	(0.012)	0.013	(0.012)
Secondary School Access	-0.005	(0.019)	0.004	(0.018)
Health LCA	0.01	(0.015)	0.013	(0.015)
Public Works Under Construction	0.005	(0.027)	0.040	(0.022)
Civic Society				
Civic Society LCA	0.009	(0.018)	0.020	(0.018)
HH Participation in Civic Orgs	-0.008	(0.011)	0.006	(0.010)
HH Participation in PSDF	0.005	(0.012)	0.002	(0.011)
HH Participation in Econ Training	-0.017	(0.009)	0.003	(0.007)
HH Participation in Devo Projects	-0.012	(0.013)	-0.004	(0.010)
Self Devo Projects Underway	-0.021	(0.024)	-0.030	(0.019)
Youth Organization Exists	0.014	(0.022)	0.014	(0.021)
Council Meets Regularly with Citizens	0.01	(0.018)	0.004	(0.017)
Economic				
Economic LCA	-0.031	(0.016)	-0.024	(0.016)
Non-Rice Food Available	-0.055	(0.019)	-0.038	(0.019)
Manufactures Available	-0.036	(0.016)	-0.018	(0.016)
Surplus Goods Produced	-0.023	(0.020)	-0.011	(0.020)
Fields Fallow Due to Insecurity	0.029	(0.019)	0.017	(0.019)
HH With Motorized Vehicle	-0.005	(0.005)	-0.004	(0.006)
HH Require Assistance to Subsist	0.003	(0.007)	0.007	(0.007)
Hamlet Population Growth	0.003	(0.012)	0.006	(0.010)
Urban	-0.015	(0.012)	-0.018	(0.012)

Notes: Columns (1) and (3) report the coefficients on *below* in RD regressions. Columns (2) and (4) report robust standard errors clustered by village.

Table 2: First Stage

	Dependent Variable is Share Months Bomb/Artillery:						
	$t+1$	t	$t-1$	$t+1$	Post	Pre	Post
	70-72	70-72	70-72	69	70-72	70-72	69
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Below	0.054	0.011	-0.001	-0.016	0.044	0.020	-0.002
	(0.014)	(0.011)	(0.018)	(0.019)	(0.013)	(0.016)	(0.017)
Obs	12,188	12,259	11,382	4,510	12,206	11,427	4,527
Clusters	2261	2277	2196	1435	2265	2201	1439
Mean	0.28	0.31	0.33	0.39	0.26	0.36	0.30

Notes: The dependent variable is the share of months that friendly air or artillery fire struck in or near a populated area. *Below* is an indicator equal to one if the security score is below the threshold in quarter t. The regression also includes a linear RD polynomial - estimated separately on either side of the threshold for each discontinuity - as well as discontinuity fixed effects, quarter-year fixed effects, and controls for the characteristics that enter the period t security score. Robust standard errors clustered by village are in parentheses.

Table 3: Other Resource Allocations

	Dependent variable is:								
	Immediate ($t+1$)								
	Friendly Forces	US Ops	US Attacks	Naval Attacks	Regional Forces	Popular Forces	PSDF Present	% HH PSDF	RD Cadre Present
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Below	0.016	0.004	0.005	-0.000	0.026	0.012	0.013	0.004	0.012
	(0.018)	(0.005)	(0.005)	(0.006)	(0.021)	(0.013)	(0.011)	(0.010)	(0.019)
Obs	12,188	12,181	12,181	11,535	10,432	10,432	11,796	11,839	11,610
Clusters	2261	2261	2261	2221	2162	2162	2180	2196	2179
Mean	0.53	0.02	0.02	0.01	0.35	0.10	0.86	0.46	0.53

Notes: *Below* is an indicator equal to one if the score is below the threshold in quarter t. The regression includes a linear RD polynomial - estimated separately on either side of the threshold for each discontinuity - as well as discontinuity fixed effects, quarter-year fixed effects, and controls for the characteristics that enter the period t security score. Robust standard errors clustered by village are in parentheses.

Table 4: Security

	Dependent variable is:										
	Security Posterior Prob		Armed	Vilg	VC	VC	VC	Reg VC	% HH	VC	VC
	$t+1$	Cum	VC Present	Guer Squad	Main Squad	Base Nearby	Attack Hamlet	Infra Activity	Part VC Infr	Prop Drive	Extorts Pop
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Bombing ($t+1$)	-0.673										
	(0.246)										
Bombing (Cum)		-0.642	0.571	1.030	0.640	1.139	0.328	0.978	0.159	0.278	0.893
		(0.246)	(0.222)	(0.435)	(0.387)	(0.429)	(0.183)	(0.384)	(0.095)	(0.179)	(0.417)
Obs	12,188	12,206	12,189	11,923	11,924	11,925	12,149	11,921	11,914	12,139	11,904
Clusters	2261	2265	2263	2204	2204	2205	2262	2198	2200	2260	2195
F stat	14.43	12.12	11.89	10.03	10.18	10.04	11.45	10.41	11.76	11.44	10.43
Mean	0.65	0.68	0.19	0.38	0.39	0.22	0.16	0.25	0.03	0.09	0.27

Notes: *Bombing* measures the share of months that friendly air or artillery fire was directed in or near a populated area. Bombing is instrumented by whether the hamlet was below the security score threshold. The regression also includes a linear RD polynomial - estimated separately on either side of the threshold for each discontinuity - as well as discontinuity fixed effects, quarter-year fixed effects, and controls for the characteristics that enter the security score. Robust standard errors clustered by village are in parentheses.

Table 5: Armed Forces Administrative Data

	Dependent variable is:											
	Immediate						Cumulative					
	Friendly Forces	US Ops	US Attacks	US	SVN	VC	Friendly Forces	US Ops	US Attacks	US	SVN	VC
				Troop Deaths						Troop Deaths		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Bombing ($t+1$)	0.294	0.068	0.088	-0.204	-1.263	-4.742						
	(0.326)	(0.094)	(0.096)	(0.806)	(2.976)	(18.764)						
Bombing (Cum)							0.635	0.110	0.113	-0.048	24.547	171.569
							(0.312)	(0.063)	(0.063)	(0.209)	(12.863)	(78.879)
Obs	12,188	12,181	12,181	12,181	12,181	12,181	12,206	12,199	12,199	12,199	12,199	12,199
Clusters	2261	2261	2261	2261	2261	2261	2265	2265	2265	2265	2265	2265
F stat	14.43	14.47	14.47	14.47	14.47	14.47	12.12	12.05	12.05	12.05	12.05	12.05
Mean	0.52	0.02	0.02	0.14	1.84	4.80	0.43	0.01	0.02	0.06	2.41	8.74

Notes: *Bombing* measures the share of months that friendly air or artillery fire was directed in or near a populated area. Bombing is instrumented by whether the hamlet was below the security score threshold. The regression also includes a linear RD polynomial - estimated separately on either side of the threshold for each discontinuity - as well as discontinuity fixed effects, quarter-year fixed effects, and controls for the characteristics that enter the security score. Robust standard errors clustered by village are in parentheses.

Table 6: Governance

	Dependent variable is:											
	Administration Posterior Prob		Vilg Comm	Vilg Gov	Chief Visits	Education Posterior Prob		Primary School	Sec School	Health Posterior Prob		Pub Works
	$t+1$	Cum	Filled	Taxes	Hamlet	$t+1$	Cum	Access	Access	$t+1$	Cum	Cons.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Bombing ($t+1$)	-0.091					-0.090				0.277		
	(0.110)					(0.183)				(0.175)		
Bombing (Cum)		-0.305	-0.798	-0.944	-0.560		-0.447	-0.623	-0.752		0.417	-0.523
		(0.144)	(0.380)	(0.443)	(0.241)		(0.283)	(0.307)	(0.455)		(0.286)	(0.492)
Obs	12,188	12,206	11,815	11,878	11,928	12,188	12,206	11,928	11,906	12,188	12,206	11,904
Clusters	2261	2265	2188	2189	2202	2261	2265	2204	2192	2261	2265	2191
F stat	14.43	12.12	10.33	10.62	11.44	14.43	12.12	11.61	9.76	14.43	12.12	10.34
Mean	0.97	0.96	0.84	0.70	0.93	0.59	0.66	0.88	0.37	0.72	0.76	0.51

Notes: *Bombing* measures the share of months that friendly air or artillery fire was directed in or near a populated area. Bombing is instrumented by whether the hamlet was below the security score threshold. The regression also includes a linear RD polynomial - estimated separately on either side of the threshold for each discontinuity - as well as discontinuity fixed effects, quarter-year fixed effects, and controls for the characteristics that enter the security score. Robust standard errors clustered by village are in parentheses.

Table 7: Non-Insurgent Civic Society

	Dependent variable is:								
	Civic Society Posterior Prob.		% HH with a Member Active in				Self Dev Proj	Youth Org	Council Meets
			Civic	PSDF	Econ	Dev			
	$t+1$	Cum	Org	Units	Train	Proj	Underway	Exists	Regularly
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Bombing ($t+1$)	-0.331								
	(0.186)								
Bombing (Cum)		-0.523	-0.504	-0.260	-0.225	-0.563	-0.471	0.166	-0.128
		(0.248)	(0.266)	(0.238)	(0.230)	(0.357)	(0.245)	(0.359)	(0.421)
Obs	12,188	12,206	11,927	11,914	11,967	11,298	11,863	11,855	11,761
Clusters	2261	2265	2202	2201	2209	2168	2186	2189	2143
F stat	14.43	12.12	11.28	11.61	10.35	8.53	11.03	11.25	11.16
Mean	0.61	0.69	0.29	0.52	0.20	0.37	0.89	0.76	0.58

Notes: *Bombing* measures the share of months that friendly air or artillery fire was directed in or near a populated area. Bombing is instrumented by whether the hamlet was below the security score threshold. The regression also includes a linear RD polynomial - estimated separately on either side of the threshold for each discontinuity - as well as discontinuity fixed effects, quarter-year fixed effects, and controls for the characteristics that enter the security score. Robust standard errors clustered by village are in parentheses.

Table 8: Economic Outcomes

	Dependent variable is:								
	Economic Posterior Prob $t+1$	Economic Posterior Prob Cum	Non-Rice Food Avail	Manuf. Goods Avail	Surplus Goods Prod	No Farm Security Bad	% HH Own Vehic	% HH Require Assist	Ham Pop Growth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Bombing ($t+1$)	0.029								
	(0.148)								
Bombing (Cum)		-0.452	-0.336	-0.839	-0.775	0.636	-0.302	0.074	-0.063
		(0.287)	(0.379)	(0.460)	(0.487)	(0.418)	(0.154)	(0.158)	(0.212)
Obs	12,188	12,206	11,882	11,882	11,894	10,976	11,935	11,848	11,966
Clusters	2261	2265	2187	2187	2190	2072	2204	2197	2209
F stat	14.43	12.12	9.66	9.66	9.90	10.18	11.84	11.74	10.38
Mean	0.67	0.68	0.71	0.61	0.43	0.28	0.26	0.07	-0.02

Notes: *Bombing* measures the share of months that friendly air or artillery fire was directed in or near a populated area. Bombing is instrumented by whether the hamlet was below the security score threshold. The regression also includes a linear RD polynomial - estimated separately on either side of the threshold for each discontinuity - as well as discontinuity fixed effects, quarter-year fixed effects, and controls for the characteristics that enter the security score. Robust standard errors clustered by village are in parentheses.

Table 9: Army and Marines: Balance Checks

	Dependent variable is:										
	VC Attack	Urban	Elev.	Slope	Factory	Market	Military Post	Telegraph	Tram or Train	Total Road (Km)	Colonial Road (Km)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Marines	0.020	0.031	-78.042	-1.552	0.003	-0.032	0.300	-0.017	0.038	2.253	-0.109
	(0.047)	(0.037)	(107.561)	(1.497)	(0.010)	(0.040)	(0.160)	(0.037)	(0.047)	(0.816)	(0.710)
Obs	302	289	302	302	302	302	302	302	302	302	302
Clusters	64	63	64	64	64	64	64	64	64	64	64
Mean	0.35	0.04	302.24	3.32	0.01	0.03	0.05	0.02	0.05	1.63	0.64

Notes: Marines is an indicator equal to one if the observation is in Corps Region I. Regressions also include a linear RD polynomial in latitude and longitude and a boundary segment fixed effect. Robust standard errors clustered by village are in parentheses.

Table 10: Army and Marines: Public Goods and Security

	Dependent variable is:											
	Educ	Health Posterior Probability	Secur	Armed VC Present	VC Init Attack	Active VC Infr.	VC Attacks Troops	Friendly Troop Deaths	VC Troop Deaths	Admin	Civic Soc Posterior Probability	Econ
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Marines	0.243	0.562	0.095	-0.560	-0.482	-0.018	-0.191	-0.628	-1.935	0.147	0.130	-0.242
	(0.096)	(0.198)	(0.110)	(0.075)	(0.061)	(0.036)	(0.071)	(0.405)	(2.807)	(0.138)	(0.153)	(0.270)
Obs	302	302	302	300	300	286	302	302	302	302	302	302
Clusters	64	64	64	63	64	63	64	64	64	64	64	64
Mean	0.25	0.36	0.35	0.32	0.33	0.87	0.18	0.68	4.06	0.87	0.35	0.39

Notes: Marines is an indicator equal to one if the observation is in Corps Region I. Regressions also include a linear RD polynomial in latitude and longitude, as well as geographic controls and a boundary segment fixed effect. Robust standard errors clustered by village are in parentheses.

Table 11: Army and Marines: Attitudes Towards Americans and South Vietnam

	Dependent variable is:											
	Respondent Likes Americans	Respondent Hates Americans	No Hostility Am.	American Vietnam Harmony	American Presence Beneficial	Fully Conf in GVN	ARVN	PF Effective	RF	Police Effective VC	Police Effective Order	Local Officials Effective
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Marines	0.158	-0.086	0.392	0.111	0.383	0.139	0.110	0.288	0.287	0.179	0.175	0.190
	(0.082)	(0.023)	(0.110)	(0.058)	(0.079)	(0.041)	(0.060)	(0.066)	(0.158)	(0.051)	(0.039)	(0.055)
Obs	117	117	115	116	117	250	181	179	85	408	344	288
Clusters	66	66	65	66	66	112	102	109	54	178	156	145
Mean	0.24	0.04	0.48	0.18	0.51	0.43	0.79	0.35	0.55	0.77	0.28	0.56

Notes: Marines is an indicator equal to one if the observation is in Corps Region I. Regressions also include geographic controls. Robust standard errors clustered by village are in parentheses.