
Civilian Harm and Military Legitimacy: Evidence from the Battle of Mosul

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Abstract The legitimacy of armed forces in the eyes of civilians is increasingly recognized as crucial not only for battlefield effectiveness but also for conflict resolution and peace building. However, the concept of “military legitimacy” remains under-theorized and its determinants poorly understood. We argue that perceptions of military legitimacy are shaped by two key dimensions of warfare: just *cause* and just *conduct*. Leveraging naturally occurring variation during one of the deadliest urban battles in recent history—the multinational campaign to defeat the Islamic State in Mosul, Iraq—we evaluate our theory using a mixed-methods design that combines original survey data, satellite imagery, and interviews. Civilians living in neighborhoods where armed forces were less careful to protect civilians view those forces as less legitimate than civilians elsewhere. Surprisingly, these results persist after conditioning on personal experiences of harm, suggesting that perceptions are influenced not only by victimization—consistent with previous studies—but also by beliefs about the morality of armed forces’ conduct and the cause for which they are fighting.

In December 2017, Iraqi Prime Minister Haider al-Abadi declared victory over the Islamic State (IS) after a nine-month battle to recapture control of Mosul. Iraq’s second-largest city had endured more than three years of the insurgent group’s harsh rule. Speaking to a crowd of Iraqi troops, al-Abadi congratulated them, thanked the US-led multinational coalition for its support, and alluded to the painful price of victory paid “by the blood of our martyrs.”¹ The battle, which was described by senior military officials at the time as “the most significant urban combat ... since World War II,”² achieved the objective of expelling IS from its last major stronghold in Iraq, but at an enormous cost: at least 11,000 civilians and 8,200 Iraqi forces were killed,³

1. Chmaytelli and Aboulenein 2017.

2. US Department of Defense 2017a.

3. Ferguson 2018.

138,000 homes suffered more than USD 6 billion worth of damage,⁴ and irreplaceable cultural heritage sites were destroyed.⁵

Although the battle and its aftermath are well documented, most accounts overlook significant temporal and spatial variation in both the extent of damage and, especially, civilian attitudes toward the Iraqi forces that liberated the city. In East Mosul, where Iraq's elite Counter-Terrorism Service (CTS, also known as the Golden Division) led the fighting under orders to minimize collateral damage, their efforts to protect civilians were widely recognized and respected. However, just across the Tigris River in West Mosul, where the Iraqi federal police led the fight relying heavily on artillery and air power, civilians who suffered the worst violence by IS—some used as human shields and summarily executed in the final weeks of the battle⁶—nonetheless questioned the legitimacy of their liberators and of the war itself. What explains these varying perceptions of counterinsurgent forces, and do these differences simply reflect the greater harm caused in West Mosul?

We use an iterative mixed-methods approach to develop a theory of “military legitimacy,” which we define as civilians’ perception of an armed force as wielding violence in a manner that maintains “legal and moral authority” on the battlefield, such that it is deemed subjectively worthy of civilian support.⁷ We argue that civilians assess an armed actor’s military legitimacy by observing its identity, objectives, and actions, as well as the effects those actions have on civilians. These informational inputs then inform civilians’ judgments of whether an armed actor’s cause and conduct are just and, ultimately, whether the actor is militarily legitimate.

We apply and test our theory in the context of the Battle of Mosul, where geographic and other plausibly exogenous features made it necessary for the Iraqi forces and their coalition partners to liberate the city in two distinct phases, first in East Mosul and then in West Mosul. Further factors, unrelated to civilian attitudes, prompted significant shifts in the composition of counterinsurgent ground forces, their rules of engagement, the weapons and tactics they employed, and the overall strategic goals of the two phases—from what military commanders at the time described as a goal of IS “attrition” to one of “annihilation.”⁸ Conceptualizing these changes as a “bundled treatment” of the residents of West Mosul, we measure its effect on civilian perceptions of the Iraqi forces’ military legitimacy.

Our mixed-methods approach leverages both quantitative and qualitative evidence from the Battle of Mosul. We first combine an original household survey of 1,458 residents of Mosul conducted in 2018—approximately eight months after the battle—with data from satellite images to study the effects of the battle and the determinants

4. World Bank 2018, 14.

5. Isakhan and Meskell 2019.

6. El Deeb 2019.

7. Ayres and Thurnher 2018. Previous work has used similar concepts of “combatant legitimacy” (Bassiouni 2007) and “military legalism” (Brooks and Erickson 2022), but we prefer “military legitimacy” because it better encompasses multiple dimensions of warfare: not only the conduct of individual combatants but also higher-level strategic decisions concerning the objectives of war and the means to achieve them.

8. US Department of Defense 2017b.

of military legitimacy. We validate our quantitative results and further explore causal mechanisms with rich qualitative data collected over multiple rounds of careful field research in Mosul before and after the implementation of the 2018 household survey. We use both quantitative and qualitative evidence to validate our research design by showing that the shifts making up our bundled treatment were the likely consequence of plausibly exogenous factors not related to underlying differences in the attitudes or other attributes of civilians in East versus West Mosul.

The results are striking. We present evidence that the shifts in troop composition, rules of engagement, weapons and tactics, and operational and strategic goals contributed to significantly more civilian harm and property destruction in West Mosul than in otherwise similar neighborhoods in East Mosul, as measured by self-reported harm and satellite imagery. We also find strong evidence that the two phases of the battle resulted in markedly different attitudes toward counterinsurgent forces. In West Mosul, respondents are substantially more likely to describe Iraqi forces as at least somewhat likely to kill innocent civilians, which we use as a concrete proxy for our more abstract outcome of interest, “military legitimacy.” Most strikingly, these results persist even after conditioning on respondents’ personal experiences with physical and material harm. Even comparing respondents who were similarly victimized or whose neighborhoods experienced similar levels of collateral damage, those in West Mosul still perceived counterinsurgents as less legitimate than respondents in East Mosul did.

This novel finding suggests that perceptions of military legitimacy are influenced not only by specific incidents of harm caused by combatants but also by beliefs about the morality of armed forces’ conduct and the cause for which they are fighting. Together, our results suggest that conflict-affected civilians are capable of distinguishing between what they perceive as “just” and “unjust” harm, consistent with surveys of Western publics.⁹ Put simply, Moslawis’ perceptions of armed forces appear to be shaped by both *how* and *why* they harmed civilians.

We build on an extensive literature on the determinants of civilian attitudes toward wartime actors.¹⁰ Our work is most similar to that of Dell and Querubin, who compare the military strategies of “overwhelming firepower” and “hearts and minds” during the Vietnam War.¹¹ We extend that scholarship by connecting it to the concept of military legitimacy and by providing a more complete theoretical framework with which to analyze such strategic shifts in combatant behavior. Our findings also complement previous findings on individual-level variables (such as co-ethnicity between perpetrators and victims) that shape civilians’ subjective judgments about harm.¹² We also build on a separate literature on the determinants of legitimacy of government institutions and authorities, including police and courts.¹³

9. Dill and Schubiger 2021.

10. See Petersen 2024 for a comprehensive review of this literature.

11. Dell and Querubin 2018.

12. Condra and Shapiro 2012; Lyall, Blair, and Imai 2013; Lyall, Shiraito, and Imai 2015; Silverman 2019.

13. Peyton, Sierra-Arévalo, and Rand 2019; Sunshine and Tyler 2003.

Although governments and militaries have increasingly recognized the strategic benefit of military legitimacy for battlefield effectiveness and national security, we argue that it also provides important benefits beyond the state. Military legitimacy enhances civilian well-being, promotes respect for human rights and compliance with international law, and improves the prospects for lasting peace. All together, we draw on the Battle of Mosul to develop a theory of military legitimacy with broader implications for the study of war, peace building, and postconflict governance.

Context: The Battle of Mosul

The Battle of Mosul was the apex of the Iraqi state's nine-month fight to liberate Mosul from IS control in 2016 and 2017. This section describes the distinct phases of fighting in East and West Mosul, which we leverage to study the determinants of military legitimacy. Since Mosul is divided by the Tigris River, the battle to retake the city necessarily unfolded in two phases. The key differences between the two phases can be characterized as a bundled treatment with four primary components:

1. Changes in the composition of Iraqi ground forces resulting from heavy casualties sustained by the elite multiethnic and cross-sectarian US-trained CTS in East Mosul, which necessitated greater reliance on the less disciplined and predominately Shia Federal Police in West Mosul, who were less trusted by Mosul's majority Sunni population;¹⁴
2. An important change in the coalition's rules of engagement, Tactical Directive 1, which decentralized authority over use of force, enabling lower-level Iraqi commanders to call in air strikes and artillery faster and with less oversight;¹⁵
3. Heavier use of air strikes, artillery, and other wide-area munitions in West Mosul, as compared with the careful house-to-house urban warfare that was credited with winning the battle for East Mosul; and
4. A shift in the operation's overall objective from "attrition," aimed at degrading IS, to outright "annihilation," by trapping and killing all remaining IS fighters in West Mosul.

Let us look at the phases of fighting and the elements of our bundled treatment in more detail.

Phase 1: East Mosul, October 2016 to January 2017

The battle in East Mosul, which began in October 2016, was led by Iraq's CTS, which sought to clear East Mosul neighborhood by neighborhood and house by house.¹⁶

14. Wasser et al. 2021, 133.

15. Haus 2017.

16. Baudot 2019, 15.

The CTS was widely perceived as the most professional and disciplined of the Iraqi forces. According to one interviewee, “There was no looting in this neighborhood because the Golden Division was here, but I did hear about looting in other neighborhoods.”¹⁷ Relative to other components of Iraqi armed forces, the CTS was also more ethnically diverse and more representative of Mosul’s predominantly Sunni population.¹⁸

During the initial months of the battle, the CTS and other ground forces received minimal air and artillery support, in part due to relatively restrictive rules of engagement and targeting protocols,¹⁹ which were subsequently relaxed by Tactical Directive 1, part of the bundle of changes that occurred in December 2016. Before this change, all coalition targets had to be approved by senior US commanders from a centralized strike cell in Baghdad. Targets were carefully assessed for probable collateral damage, and legal concerns regarding collateral-damage estimates could slow the process further. Furthermore, the CTS forces were told, by commanders who hoped to win over civilians and turn them against IS, to minimize civilian casualties.²⁰ Air strikes were largely limited to precision-guided munitions in this first phase of the battle.²¹

The coalition’s strategy in East Mosul was commended for limiting civilian harm, but at enormous cost to the CTS, who suffered massive casualties that depleted its fighting force by 75 percent.²² An Iraqi commander said of this trade-off between civilian protection and force protection, “Our soldiers have to be very careful. We can’t just bomb a neighborhood and then go clear it, we have to fight from house to house and that is costing us men.”²³

Phase 2: West Mosul, February 2017 to July 2017

After East Mosul was liberated, in January 2017, the coalition took a three-week “operational pause” to rest, bring in reinforcements, and repair equipment. Iraqi forces began their offensive to retake West Mosul in February.

With the CTS largely incapacitated by the East Mosul operation, the coalition was forced to rely on the Federal Police, a predominately Shia paramilitary force that was widely recognized as the least professional and least effective of the various Iraqi armed forces involved in the battle. Federal Police interviewed during the battle admitted to having no knowledge of rules of engagement or the laws of war—said one, “I did not receive any instructions on who to shoot and not to shoot.”²⁴ A CTS commander said of the Federal Police, “they are acting with recklessness and

17. Interview 4.

18. Witty 2018.

19. Martini et al. 2022, 190.

20. Baudot 2019, 15.

21. Amnesty International 2017, 11.

22. *Ibid.*

23. Abdul-Ahad 2017.

24. Baudot 2019, 27.

madness,” referring to their heavy use of rockets and artillery in West Mosul.²⁵ There were widespread allegations of looting, property destruction, and sexual violence against civilians by Federal Police.²⁶ According to one of our interviewees, “The Federal Police were looting and stealing a lot from civilians, and they were watching other people stealing and doing nothing.”²⁷

Another important change was in the rules of engagement. In late 2016, just before the end of Phase 1, the coalition issued Tactical Directive 1, which dropped the requirement that all air strikes be approved by a “strike cell” and empowered lower-ranking commanders to call in air strikes faster and more easily than they had been able to in East Mosul.²⁸ This change was partially driven by the coalition’s concern that “the centralization of [target engagement authority] ... limited the effectiveness of airpower and forced it to be employed in a restrained manner” during Phase 1.²⁹ Around the same time, military sources reported that the “noncombatant casualty cutoff value” “was raised slightly” from its previous level of zero,³⁰ meaning that the coalition was willing to risk some nonzero number of civilian casualties without the approval of a senior commander.

As the battle for West Mosul unfolded, journalists and human rights organizations observed a sharp increase in the frequency of air strikes and a corresponding increase in civilian casualties. A Federal Police colonel in West Mosul admitted that Iraqi forces were frequently calling in air strikes against IS snipers on rooftops without knowing whether those buildings contained civilians. “It was impossible to know who was in homes. We had to advance, so when ISIS snipers would attack us, we had to call in airstrikes. Entire families were likely killed.”³¹ Changes in munitions on the ground also contributed to more collateral damage in West Mosul. In East Mosul, ground forces had used relatively precise gun rounds and antitank guided missiles; but in West Mosul, narrower streets forced them to rely on unguided “wide impact area” weapons, including close-range AT-4 rockets, rocket-propelled grenades, mortars, and artillery projectiles.³²

Also changing between Phases 1 and 2 were counterinsurgents’ broader strategic and operational goals. During the operational pause, counterinsurgents weighed their ultimate objective—the liberation of Mosul versus the complete destruction of IS—and chose the latter. In May 2017, amid ongoing fighting in West Mosul, US Secretary of Defense Mattis described this new approach as a shift “from shoving ISIS out of safe locations in an attrition fight to surrounding the enemy strongholds, so we can annihilate ISIS.”³³ Although an earlier proposal had recommended an exit corridor that would have allowed IS fighters to withdraw from Mosul westward into

25. Salim and Morris 2017.

26. Amnesty International 2018; Gaston 2017.

27. Interview 3.

28. George and Szlanko 2017; Hall 2017.

29. Wasser et al. 2021, 83–84.

30. *Ibid.*

31. Baudot 2019, 50.

32. Baudot 2019, 18, 50.

33. US Department of Defense 2017b.

the desert, where they could be surrounded in a “kill box” far from civilians,³⁴ the coalition ultimately decided to trap and kill IS fighters in the Old City of West Mosul. By July 2017, the coalition had achieved its goal of “annihilating” IS, but at the cost of heavy civilian casualties and property destruction in West Mosul.

Quantitative Validation

While journalists and humanitarian actors have detailed the differences in harm between East and West Mosul, this study is the first to systematize and quantify these differences. First, using satellite data and an original survey, we confirm that West Mosul had more collateral damage. Figure 1 visualizes the disparity in battle-related damage between the two sides of the city. West Mosul respondents were eight percentage points more likely than those in East Mosul to report that a member of their household had been killed during the battle (see Table A-7 in the online appendix). Second, we confirm qualitative differences in harm: West Mosul residents were more likely to report looting by Iraqi forces, reflecting a lack of professionalism among ground forces (Table A-7). Analysis of survey data from Lafta, Al-Nuaimi, and Burnham also supports greater reliance on air power and indiscriminate violence in West Mosul, where respondents were more likely to attribute deaths to air strikes (Figure A-4 and Table A-8).³⁵

A Theory of Military Legitimacy

To unpack the consequences of the Battle of Mosul for civilian attitudes, we first offer a definition of our outcome of interest, *military legitimacy*. Focusing on this concept both complements and deepens earlier work on counterinsurgency and harm. We then develop a theory of the determinants of military legitimacy, from which we derive testable hypotheses in the context of the Battle of Mosul.

We define “military legitimacy” as civilians’ perception of an armed force as wielding violence in a manner that maintains “legal and moral authority” on the battlefield such that the military is deemed worthy of civilian support.³⁶ Concepts of legitimacy have long been used to describe states,³⁷ legal authorities and institutions,³⁸ and organizational actors more generally.³⁹ Prominent research has recently examined the consequences and determinants of police legitimacy,⁴⁰ where legitimacy is often linked to “procedural justice”—the perception that authorities

34. Mogelson 2017.

35. Lafta, Al-Nuaimi, and Burnham 2018.

36. Ayres and Thurnher 2018, 224.

37. Weber 1964, 382.

38. Tyler 2006.

39. Suchman 1995.

40. Bolger and Walters 2019; Mazerolle et al. 2013; Sunshine and Tyler 2003.

follow procedures that people see as fair.⁴¹ At its most basic, legitimacy is a condition that inheres “when people are influenced by an authority or institution not by means of the use of power but because they believe that the decisions made and rules enacted by that authority or institution are in some way ‘right’ or ‘proper’ and ought to be followed.”⁴² Legitimacy therefore tends to increase the likelihood of obedience to authorities, which can be observed in behavioral outcomes, including compliance with tax obligations, court decisions, and public health regulations.⁴³



FIGURE 1. *Satellite-assessed damage in Mosul*

In wartime settings, military legitimacy is believed to be important for similar behavioral outcomes of civilian obedience and support, but legitimacy and support are not coterminous. Decisions to support an armed actor may be the result of rational choices rooted in the actors’ exercise of coercive power, but civilian support can also result from emotional or psychological mechanisms.⁴⁴ We propose perceptions of military legitimacy as one such mechanism. Military legitimacy is an attitudinal

41. Tyler 2003.

42. Tyler et al. 2007, 10.

43. Levi, Sacks, and Tyler 2009.

44. Petersen 2017.

precursor to behavioral support, though the relationship is not necessarily automatic or deterministic. Individuals who aid armed actors may believe that they are legitimate, or they may be acting instrumentally, driven by perceived opportunity costs or safety concerns. And legitimacy is not necessarily “zero sum”; civilians living in areas fought over by state and nonstate actors may perceive more than one authority as legitimate.⁴⁵ In these ways, our concept of military legitimacy builds on recent scholarship emphasizing civilians’ agency and sophistication in responding to armed conflict.⁴⁶

Legitimacy matters for reasons beyond its relationship to behavioral support. Our concept of military legitimacy is based not only on *whether* armed forces receive civilian support but also on the degree to which they are perceived as *worthy* of support. While this distinction is subtle, its implications are significant. Much of the policy on counterinsurgency takes an instrumental approach to “winning hearts and minds” from the perspective of combatants, who value civilians as sources of information, material support, and other strategic benefits. In contrast, we take a civilian-centric approach. While military legitimacy does have strategic benefits for armed forces, because it induces voluntary cooperation, it is also intrinsically valuable for civilians, “because it reflects an individual’s own values rather than a reliance on outcomes to regulate behavior.”⁴⁷ From a normative perspective, legitimacy reflects values of individual dignity, consistent with the laws of war. Further, legitimacy is associated with longer-term outcomes, providing a “solid foundation for transitioning from war to peace.”⁴⁸

Our central theoretical contribution is not just to define military legitimacy and defend its conceptual importance but also to hypothesize the process by which civilians assess it. We theorize that, in assessing a military’s legitimacy, civilians rely on three distinct informational inputs, each realized over the course of a conflict (Figure 2).

First, over the course of a conflict—and perhaps even earlier—civilians gradually learn *who* the various armed actors are, including their *identities* and distinct *objectives*. Second, as armed actors engage in conflict, civilians observe and develop beliefs about the types of *actions* that various actors take or might take to achieve their objectives. Third, civilians learn about and experience the *effects* of armed actors’ actions on themselves, their households, and their communities. From these informational inputs, civilians then develop common-sense intuitions about whether an armed actor’s cause and conduct are just. At this stage, civilians may use heuristics to fill in informational gaps, and they may also exhibit biases. For example, research on in-group favoritism predicts that civilians will discount the unjust conduct or cause of a co-ethnic armed actor while judging out-group members more harshly.⁴⁹

45. Morgan 2018, 28.

46. Masullo 2021; Schubiger 2021.

47. Mazerolle et al. 2013.

48. Ayres and Thurnher 2018.

49. Curtice 2023; Lyall, Shiraito, and Imai 2015.

We theorize that military legitimacy depends on tactics and strategies that civilians experience as being fair and situationally appropriate, including by following the international humanitarian law principles of just cause (*jus ad bellum*) and just conduct (*jus in bello*). In doing so, we build on previous findings that civilians distinguish between “just harm” and “unjust harm,” where the former results from just conduct or is necessary to achieve a just cause.⁵⁰ As a result, military legitimacy in most contexts will require that civilians perceive combatants and commanders as exercising “due care”⁵¹ to avoid harming innocent civilians,⁵² and due care will often require militaries to act with restraint. Indeed, the US military itself has adopted a definition of legitimacy as “a condition based on the perception of ... the legality, morality, or rightness of a set of actions ... [that] may be reinforced by restraint in the use of force, the type of forces employed, and the disciplined conduct of the forces involved.”⁵³

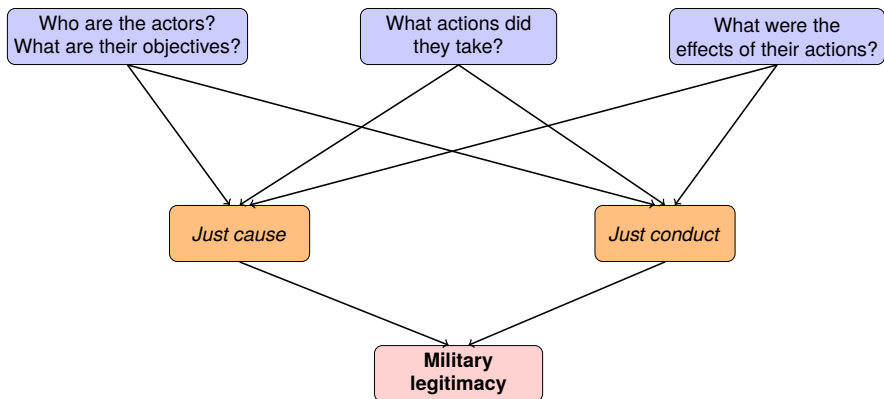


FIGURE 2. *Theory of military legitimacy*

Another way combatants can demonstrate just conduct and thereby enhance their perceived legitimacy is by assuming risk and in some cases visibly putting themselves in harm's way, especially where it is necessary to reduce the risk of harm to civilians. By having “skin in the game,”⁵⁴ combatants align their incentives with those of the civilian community and demonstrate a credible commitment to acting with restraint and exercising due care. This is more easily achieved in ground operations, where the conduct of individual combatants is visible to civilians, than in operations that rely heavily on air strikes or artillery fired from the relative safety

50. Bolinger 2021; Dill and Shue 2012; Draper 2017; Strawser 2023.

51. Walzer 2015, 156.

52. Condra and Wright 2019.

53. Shalikhshvili 1995, II–5.

54. Richardson and Bolton 2018.

of fighter jets or armored vehicles. In short, perceptions of military legitimacy depend not only on *what* civilians experience at the hands of armed actors but also *how* they experience it—whether or not combatants’ conduct is just—and *why* they experience it—whether or not they approve of the cause for which combatants are fighting.

Applying this theory, we generate two predictions for patterns of military legitimacy following the Battle of Mosul. First, because of the differences in the identities and objectives of counterinsurgent forces in East and West Mosul, the differences in their strategies and tactics, and the much greater collateral damage in West versus East Mosul, we hypothesize:

H1: Relative to respondents in East Mosul, respondents in West Mosul should view counterinsurgent forces as less legitimate.

This is a necessary observable implication of our theory of military legitimacy. However, because collateral damage was much worse in West Mosul than in East Mosul, it is not on its own sufficient to support our theory that military legitimacy is also determined by civilian perceptions of just conduct and just cause. To address this limitation, our second hypothesis helps rule out the possibility that military legitimacy is determined solely by the amount of conflict-related harm that civilians experience. If just conduct and just cause indeed play a role, we would also expect:

H2: Relative to respondents in East Mosul, respondents in West Mosul should view counterinsurgent forces as less legitimate, holding fixed a respondent’s personal exposure to conflict-related harm.

To be sure, tests of H1 and H2 still are not sufficient to confirm all aspects of our theory. Ideally, our design and data would support individual tests of the causal pathways outlined in Figure 2—for example, how the identity of actors informs just cause, or how an actor’s actions affect just conduct. Although limitations in our survey data and the bundled nature of our treatment do not support such granular testing, we can nonetheless use our two hypotheses to confirm the core logic of our theory and help rule out that military legitimacy is driven by exposure to harm alone. In the “Further Evidence” section we supplement our main analysis with qualitative interviews and some additional quantitative tests in order to probe the inner workings of our theory.

Our theory has an important scope condition. For the theory to apply, civilians must be able to evaluate the three informational inputs depicted in Figure 2. Thus, it is likely to be most applicable in high-intensity urban, civil conflict where civilians can directly observe the identities and behaviors of combatants. Still, we believe it may be generalizable beyond the context of counterinsurgency, and may also help explain civilian perceptions of military legitimacy (or lack thereof) in more conventional battles away from urban centers and air wars where combatants are less visible to civilians.

Research Design: Comparing the Two Phases in the Battle of Mosul

To learn from the Battle of Mosul and its aftermath, we combine quantitative analysis of survey and satellite data with qualitative interviews in an iterative, mixed-methods approach.⁵⁵ Our quantitative research design is straightforward: to assess the relationship between counterinsurgent strategy and perceived military legitimacy, we compare the self-reported perceptions and lived experiences of civilians who were living in East and West Mosul during the battle against IS. Here we detail our data sources and research design.

Quantitative and Qualitative Data

Our study is based on an original household survey of a random sample of 1,458 residents of East and West Mosul (see Figure 3 for locations), along with qualitative data from field research in Mosul and other areas of northern Iraq. The survey was conducted by a gender-balanced team of Iraqi enumerators in March 2018, approximately eight months after Mosul was recaptured from IS by Iraqi forces. Further details on survey methodology and fieldwork, including ethical considerations, are given in section B of the online appendix.

We supplement our original survey data with observational, spatial data. The United Nations Satellite Centre (UNITAR–UNOSAT) acquired and cleaned satellite imagery of Mosul in August 2017, at the conclusion of the battle. A total of 19,888 battle-affected structures were identified within the city. By matching the coordinates of damaged buildings to a respondent's location, we can detect whether there was any significant structural damage to the residential unit associated with the geographic coordinates.

We complement our quantitative data sources with qualitative semi-structured interviews and in-person observation of Mosul's urban geography. The design of the survey was informed by in-depth interviews conducted in recently liberated neighborhoods in the outskirts of East Mosul over the course of several research trips in 2017, while West Mosul was still occupied by IS, and in 2018, after IS's defeat, when it was possible to conduct interviews in both East and West Mosul.⁵⁶ In August 2023, after quantitative analysis of the 2018 survey data and spatial analysis of the satellite data raised new questions about the determinants of military legitimacy that could not be adequately addressed with quantitative data alone, we returned to Mosul as a team to conduct follow-up interviews.⁵⁷ This second round of field research provided further evidence for the assumptions of our design and the underlying mechanisms of our theory. Excerpts of key quotes from these interviews and photos of the neighborhoods are provided in section A of the appendix.

55. Seawright 2016.

56. These interviews were approved by Yale University's Institutional Review Board on 14 December 2017 (protocol no. 1506016040).

57. The Human Subjects Committee of Duke University's Institutional Review Board approved this follow-up study on 3 August 2023 (protocol no. 2023-0560).

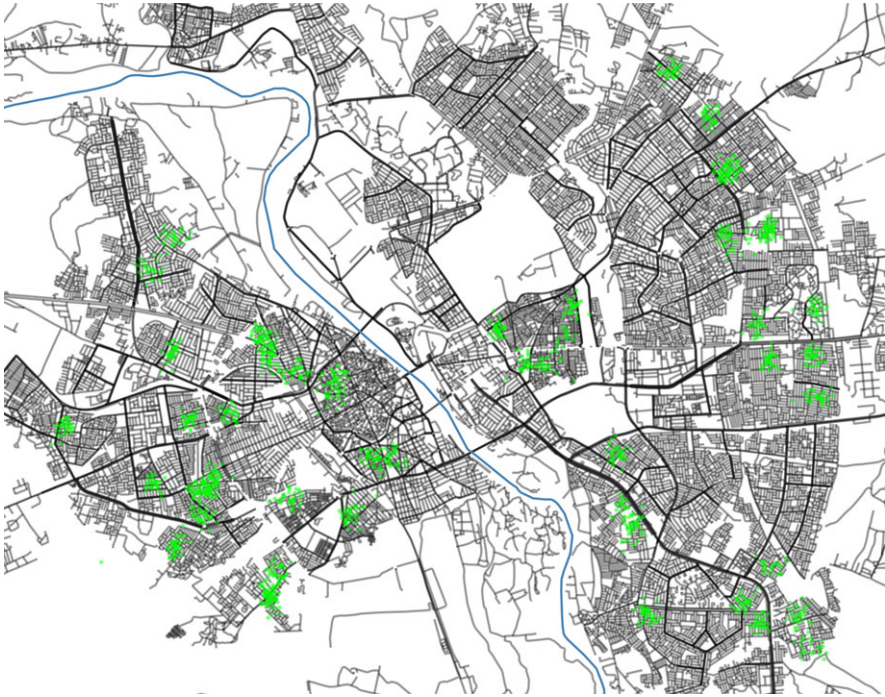


FIGURE 3. Approximate survey locations in Mosul, Iraq

Empirical Strategy

We test H1 (predicting differences between East and West Moslawis' perceptions of the military legitimacy of counterinsurgent forces) with a simple regression:

$$\text{MILITARY LEGITIMACY}_{ij} = \alpha + \beta \text{WEST}_j + \mathbf{X}'_i \Gamma + \mathbf{N}'_j \Pi + \varepsilon_{ij} \quad (1)$$

The dependent variable is constructed from a series of Likert-scale survey questions asking respondents to separately assess how likely each of the three primary components of the Iraqi armed forces (the Iraqi Army, Federal Police, and CTS) are to kill innocent civilians in a hypothetical conflict.⁵⁸ We average the three responses to obtain a proxy for each respondent's overall assessment of the Iraqi security forces.⁵⁹ The choice to average across the Iraqi armed forces reflects findings from our qualitative interviews. Although Iraqi civilians are generally well informed regarding distinctions between various units of the Iraqi security forces, they were not always able

58. "In your opinion, how likely are the following actors [CTS, Iraqi Army, Federal Police] to kill innocent civilians?" The four available responses ranged from "very likely" to "very unlikely."

59. Respondents were asked the same question about the US military and the Iranian-backed Popular Mobilization Force. We excluded these groups from our main analysis because they are not broadly perceived as part of the Iraqi military, but Table A-13 gives the results.

to distinguish between them amid the chaos of the battle, and they tend to view them as representative of an overall Iraqi security and defense apparatus.⁶⁰ The survey questions were carefully worded to elicit forward-looking and subjective views of how likely the various armed actors were to kill innocent civilians in the future, rather than merely reflecting the amount of killing respondents witnessed in the Battle of Mosul itself.

We consider this measure to be a plausible proxy for military legitimacy, capturing Ayres and Thurnher's description of legitimacy as the "actual and perceived righteousness of [combatants'] conduct."⁶¹ Our measure is similar to Condra and Wright's survey question, which gauges the "perceived level of effort that the government and insurgents exert to avoid civilian casualties."⁶² Admittedly, it captures only one facet of military legitimacy (efforts to avoid harming civilians), and scholars of legitimacy in other contexts have used different questions to measure other observable indicators of legitimacy, including trust and obedience. However, we believe that our question was the best and most concrete way to operationalize military legitimacy in a postbattle survey of civilians, and our qualitative data provide additional evidence on alternative dimensions of military legitimacy from civilians' own words.

Our treatment variable, $WEST_j$, indicates that the respondent was living in West Mosul during the battle;⁶³ X_i is a vector of individual-level demographic characteristics; and N_j is a vector of neighborhood-level geographic characteristics.⁶⁴ Our empirical strategy thus boils down to a comparison of survey responses among observably similar respondents living in East and West Mosul.

For this design to yield credible estimates of the effects of the bundled treatment on perceived military legitimacy, we must make two assumptions: that exposure to the bundled treatment is exogenous; and that we are able to control for all systematic differences between East and West Mosul. In other words, after controlling for individual- and neighborhood-level observable characteristics, we have individuals living on the two sides of Mosul that are similar along the key dimensions that could shape perceived military legitimacy *except for* what they experienced during the Battle of Mosul. Three key pieces of evidence support this. First, East and West Mosul are balanced on most observables, and all covariates are only marginally jointly significant (Tables 1 and A-4). Second, evidence strongly suggests that the

60. Individual assessments of military legitimacy were highly correlated across the Iraqi Army, Iraqi Federal Police, and CTS (Figure A-5).

61. Ayres and Thurnher 2018.

62. Condra and Wright 2019.

63. Because our survey was conducted approximately eight months after the liberation of Mosul, we cannot assume that a respondent's survey residence was the same as where they lived at the time of the battle. Consequently, we remove from the sample all respondents who said no to a survey question on whether they were living in Mosul during any part of the battle. Those who reported that they had moved since the battle were asked to identify the neighborhood they were living in then. We code the treatment variable as well as neighborhood-level controls according to where they reported living during the battle.

The survey necessarily omits Moslawis from either side of the river who left Mosul and did not return before our survey in March 2018. Previous research on displacement dynamics in Iraq (Revkin 2021) raises the possibility that displacement is correlated with attitudes toward combatants, which could introduce sampling bias. Although we cannot definitively rule out this possibility, to the extent that displacement is negatively correlated with perceptions of the Iraqi military's legitimacy, this would likely bias our estimates toward zero.

64. Table A-3 details the coding of all survey variables.

shift in strategy and tactics between East and West Mosul was driven by plausibly exogenous factors (section C.1 of the appendix). Third, Oster’s bounds,⁶⁵ reported in Table 3, and Cinelli and Hazlett sensitivity analysis,⁶⁶ presented in Table A-5, suggest that confounding from unobservables would need to be far larger than from our carefully chosen set of observable covariates before it would induce meaningful bias. Although the ever-present potential for omitted-variable bias cautions against a narrowly causal interpretation of our quantitative findings, we nonetheless interpret them—particularly in combination with our findings from qualitative interviews—as suggestive of the determinants of military legitimacy.

TABLE 1. *Balance on covariates*

	Treated (West Mosul)
EDUCATION (SECONDARY OR ABOVE)	-0.018 (0.035)
AGE	0.001 (0.001)
INCOME COVERS EXPENSES	-0.105*** (0.031)
PRIMARILY IDENTIFIES AS MUSLIM	-0.002 (0.039)
VOTED IN 2014 ELECTION	0.017 (0.040)
PREFERS MORE SHARIA LAW	-0.065* (0.034)
ATTENDS MOST OR ALL FRIDAY PRAYERS	-0.007 (0.034)
FELT DISCRIMINATED AGAINST BY IRAQI GOVERNMENT FOR BEING SUNNI	-0.006 (0.061)
EXPERIENCED ANY HARM DURING IS RULE	0.008 (0.048)
PAID IS ZAKAT	-0.022 (0.049)
Observations	978
F-statistic	2.532

Notes: HC1 robust, neighborhood-clustered standard errors; * $p < .10$; ** $p < .05$; *** $p < .01$.

We turn now to a test of H2—that respondents from West Mosul will systematically view the Iraqi military as less legitimate than respondents from East Mosul *even after controlling* for personal exposure to conflict-related harm. The most straightforward test of H2 would be a regression similar to Equation (1) where we simply control on the right-hand side for respondents’ individual experiences of harm.⁶⁷ However, because controlling for post-treatment variables like actual harm

65. Oster 2019.

66. Cinelli and Hazlett 2019.

67. In Table A-9 we present results from this simple approach, regressing our outcome on controls for harm concurrently with the treatment.

from the battle can induce bias, we instead use a two-step regression method, proposed by Acharya, Blackwell, and Sen,⁶⁸ where we first “demediate” our dependent variable (military legitimacy) by residualizing the effect of actual harm, and then estimate the effect of our treatment variable on our demediated version of military legitimacy.⁶⁹

Under certain assumptions,⁷⁰ this approach estimates the average controlled direct effect (ACDE) of the treatment (whether a respondent resided in East or West Mosul) on the outcome (our survey measure of military legitimacy), which effectively holds constant whether a respondent directly experienced collateral damage during the Battle of Mosul—measured either by self-reports of damage to their home or injury or death to members of their household, or by satellite measurements of damaged buildings nearby.⁷¹ This approach does not elucidate the precise pathways by which our treatment affects military legitimacy, but it does allow us to rule out a scenario in which military legitimacy is determined *exclusively* through a mechanism of collateral damage.⁷²

Results

Main Results

We begin the results with our tests of H1, which predicts that respondents from West Mosul will perceive Iraqi armed forces as less legitimate than those from East Mosul. Table 2 provides a “naïve” test of this hypothesis by simply comparing respondents on the two sides of the river through a standard difference-in-means *t*-test. In West Mosul, civilians perceive Iraqi forces as more likely to kill innocent civilians in a hypothetical future scenario, and thus less legitimate.

68. Acharya, Blackwell, and Sen 2016.

69. Specifically, we start with a regression of military legitimacy on the treatment variable, a variable for collateral damage, a matrix W'_{ij} of pretreatment confounders (including neighborhood characteristics like residential density and individual characteristics like pre-battle household income), and a matrix Z'_i of “intermediate” confounders (variables, like individual religiosity and attitudes toward IS and the current Iraqi government, which, *theoretically* at least, may have been affected by the battle while also themselves affecting current perceptions of military legitimacy). We then demediate the outcome, subtracting the values predicted from the first stage, and regress the demediated outcome on the treatment and the pretreatment confounders to estimate the average controlled direct effect.

70. Specifically, we assume sequential unconfoundedness (that is, we assume no omitted variables for the effect of treatment on our outcome, conditional on pretreatment covariates, and we assume no omitted variables for the effect of collateral damage on our outcome, conditional on the treatment and pretreatment and intermediate covariates). We probe the robustness of this assumption in Figure A-3.

71. To capture personal exposure to conflict-related harm, we use self-reported survey measures: “Was the house or apartment that you were living in during the battle seriously damaged?”; “Was a member of your household injured?”; and “Was a member of your household killed?” We also create an indicator for detected harm using satellite-detected building damage in the respondent’s location.

72. In Table A-10 we present results on the marginal effects of both the treatment and conflict-related harm in regressions where we include interactions between the two. Although these regressions suffer from the same bias that motivates our reliance on a two-step regression approach to estimating the ACDE, they are nonetheless suggestive of the interactive relationship between a military’s behavior and the concrete effects of its actions in determining military legitimacy.

Table 3 reports results from our primary estimation strategy in Equation (1), where we average each respondent’s responses across the three primary components of the Iraqi armed forces to assess their military legitimacy as a whole. Still using the likelihood of killing civilians as our proxy for legitimacy, we find that respondents from West Mosul perceived Iraqi security forces as *less legitimate* relative to respondents from East Mosul, consistent with H1 (Table 3). On average, and after controlling for individual- and neighborhood-level characteristics, respondents from West Mosul gave Likert-scale responses that were approximately 0.17 points lower than respondents from East Mosul. Interestingly, the primary margin of response is whether respondents describe Iraqi forces as anything more than “very unlikely” to kill innocent civilians—something that happens almost 12 percent more frequently among respondents from West Mosul.

TABLE 2. *Difference in means of military legitimacy*

	East Mosul	West Mosul	Difference in means (East Mosul–West Mosul)
COUNTER-TERRORISM SERVICE	3.773 (0.591)	3.601 (0.694)	–0.171***
POLICE	3.716 (0.674)	3.474 (0.826)	–0.242***
ARMY	3.769 (0.569)	3.544 (0.751)	–0.225***
AVERAGE ACROSS ACTORS	3.753 (0.562)	3.540 (0.693)	–0.212***
Observations	440	547	987

Notes: Standard deviations in parentheses; * $p < .10$; ** $p < .05$; *** $p < .01$.

TABLE 3. *Effect of the bundled treatment on military legitimacy*

	Perceived military legitimacy			
	(1)	(2)	(3)	(4)
Treated (West Mosul)	–0.212*** (0.061)	–0.187*** (0.060)	–0.185*** (0.058)	–0.168*** (0.049)
<i>Summary Statistics</i>				
Observations	984	981	963	959
Unconditional mean	3.635	3.636	3.637	3.636
Oster’s δ		19.094	29.086	19.976
<i>Parameters</i>				
Basic demographic controls		✓	✓	✓
Additional individual controls			✓	✓
Neighborhood controls				✓

Notes: HC1 robust, neighborhood-clustered standard errors in parentheses. Demographic controls are gender, education level, age, pre-IS household income, and primary identity. Additional individual-level controls are reported harm during IS rule (pre-battle), experienced various grievances with the Iraqi government (pre-IS), voted in the 2014 parliamentary elections, and paid taxes to IS. Neighborhood controls are residential-unit density, population density, and street density; * $p < .10$; ** $p < .05$; *** $p < .01$.

TABLE 4. *Controlled direct effect of the bundled treatment on military legitimacy*

	Perceived military legitimacy			
	(1)	(2)	(3)	(4)
Treated (West Mosul)	−0.172*** (0.046)	−0.166*** (0.046)	−0.148*** (0.046)	−0.152*** (0.046)
<i>Summary Statistics</i>				
Observations	951	951	951	951
Unconditional mean	3.633	3.633	3.633	3.633
<i>Parameters</i>				
Basic demographic controls	✓	✓	✓	✓
Additional individual controls	✓	✓	✓	✓
Neighborhood controls	✓	✓	✓	✓
Intermediate controls	✓	✓	✓	✓
Reported house damage	✓			✓
Reported HH death or injury		✓		✓
Detected house damage			✓	✓

Note: Demographics controls are gender, education level, age, and pre-IS household income. Additional individual level controls are reported harm during IS rule (pre-battle), experienced various grievances with the Iraqi government (pre-IS), voted in the 2014 parliamentary elections, and paid taxes to IS. Neighborhood controls are residential unit density, population density, and street density. Intermediate controls are primary identity, support for *sharia* law, attendance at Friday prayer, preferences for IS governance, evaluation of IS corruption, fairness of IS taxation, and evaluation of Iraqi government corruption. * $p < .10$; ** $p < .05$; *** $p < .01$; standard errors from Acharya, Blackwell, and Sen’s consistent variance estimator errors in parentheses.

Table 4 presents the results for H2. Specifically, Table 4 presents two-stage regression estimates of the ACDE of the treatment after controlling for the effect of personal exposure to conflict-related harm, which we measure using both survey and satellite data. Column (1) controls for self-reported household damage, column (2) controls for self-reported death or injury to a household member, column (3) controls for satellite-detected building damage within 10 meters of the respondent’s home, and column (4) controls for all three variables simultaneously.

The uniformly negative and relatively sizeable estimated coefficients—extremely similar in magnitude to the estimates in Table 3, where we do not condition on household exposure to harm—provide support for H2: that civilian attitudes are not driven by exposure to physical and material harm alone. Indeed, not even the scale of neighborhood-level harm can by itself explain the lower perceptions of military legitimacy in West Mosul. These ACDE estimates are robust to controlling for satellite-detected harm within a variety of distances (10 to 500 meters) from the respondent’s home (Table A-14). We interpret these results as suggesting that civilian attitudes toward armed forces are influenced by their perceptions of *why* and *how* an actor fights, including the casualty-permissiveness of their tactics and the efforts they take to prevent civilian harm.

Further Evidence

Here we leverage qualitative data collected from semi-structured interviews with residents of Mosul, and additional quantitative results, to shed more light on the effects of the Battle of Mosul and our theory of military legitimacy. Due to constraints in our survey data and the nature of the battle itself, our primary quantitative results are limited in two key ways. First, whereas our theory predicts the individual importance of various informational inputs, the Battle of Mosul bundled these inputs into a single source of variation. And second, whereas our theory predicts the individual importance of both just cause and just conduct, our survey data do not support separate tests of each concept, and our outcome variable (whether Iraqi forces are perceived as likely to kill innocent civilians in the future) reflects just conduct more than it does just cause. The following qualitative and quantitative evidence helps address both shortcomings.

First, the qualitative interview evidence helps to establish the individual importance of each of our theorized informational inputs, including the identity and apparent objectives of the armed actors, how they conducted themselves, and the effects of their actions on civilians. For example, several interviewees highlighted differences in the professionalism and attitudes of the CTS relative to the Iraqi police and army. And echoing findings that community-oriented policing can improve police legitimacy in domestic law enforcement⁷³ and on the role of intergroup ethnic bias during wartime,⁷⁴ interview subjects specifically cited the Golden Division's ethnic diversity (and the Iraqi police's lack thereof) as shaping their experiences of the battle.⁷⁵ Interviewees also emphasized aspects of counterinsurgents' conduct, especially the excessive and indiscriminate air strikes and wide-impact-area munitions relied on in the west, versus the care counterinsurgents took to avoid civilian casualties in the east.⁷⁶

Our quantitative data are also at least suggestive of many of these same dynamics. For example, we theorize that force composition is one determinant, and indeed, Moslawis on *either side* of the river tend to view the CTS as more legitimate than the Iraqi Army and the Iraqi Federal Police as less legitimate than either (Table 2).⁷⁷ In addition, survey respondents (from either side of Mosul) who witnessed looting by Iraqi forces tend to view those same forces as less legitimate than respondents who saw no looting (Table A-11). While perhaps not causal, this suggests at least an association between a military's professionalism and civilians' perceptions of its legitimacy. Similarly, respondents tend to perceive the Iraqi forces as less legitimate

73. Peyton, Sierra-Arévalo, and Rand 2019.

74. Lyall, Shiraito, and Imai 2015.

75. Interviewee 3 said, "The Golden Brigade was better [than the Federal Police because they] were very mixed in terms of ethnicity." Interviewee 6 expressed trust in the CTS because "they knew how we were living, they knew this was our land, and they knew our people."

76. Interviews 1, 2, and 8.

77. Unfortunately, we would need additional data—for example, data on individual or neighborhood-level variation in exposure to the different components of the Iraqi armed forces—to precisely decompose the effect of force composition on perceived military legitimacy.

when they live in a neighborhood with high satellite-detected collateral damage (Table A-12), suggesting the importance of both military conduct and the effects of that conduct.

Finally, our qualitative interviews suggest that just cause is an important determinant of military legitimacy, in addition to just conduct. Our respondents overwhelmingly viewed the coalition's objectives in East Mosul, which they understood to be the liberation of the city with minimal collateral damage, as more justified than the "annihilation" objective used in West Mosul.⁷⁸ As one interviewee said, "there is no such thing as a harmless war,"⁷⁹ but some types of harm were perceived as morally worse than others, consistent with findings from Afghanistan.⁸⁰ Respondents clearly differentiated between intentional and unintentional harms, between harms caused in pursuit of more and less just objectives, and between harms that were more or less necessary to achieve those objectives. For example, several interviewees said that much of the harm in West Mosul could have been avoided if the coalition had allowed IS to retreat into the desert rather than trapping them in the Old City, and that the defeat of IS "was not worth" the destruction it caused.⁸¹ These findings suggest that civilians evaluate both the actions combatants take and the overall purpose for which they were fighting.

Discussion and Conclusion

Our mixed-methods study yields strong evidence that the coalition's changes in composition of ground forces, rules of engagement, weapons and tactics, and broader strategic and operational goals (particularly from "attrition" to "annihilation") was associated with lower perceived military legitimacy in West versus East Mosul. This effect persists even after conditioning on personal exposure to harm, suggesting that civilians' attitudes to combatants are driven not just by the physical and material harms caused by war, but also by their perceptions of *how* armed forces conduct themselves, including the extent to which they exercise due care to minimize civilian harm, and *why* armed forces fight (that is, whether military objectives are just or unjust).

Military policymakers widely recognize the importance of military legitimacy for battlefield effectiveness and national security,⁸² but we argue that it is also intrinsically valuable for other outcomes, including respect for human rights and international law,

78. Excerpts from interviews 3, 4, 7, and 8 support these distinctions between avoidable and unavoidable harm.

79. Interview 2.

80. Dill and Shue 2012.

81. Interviews 4, 7, and 8. One Iraqi military commander expressed the same regret in 2018: "Looking back ... we should have let ISIS escape" (quoted in Fache 2018).

82. For example, the US Department of Defense's latest guidance on implementation of its Civilian Harm Mitigation and Response Action Plan, the US military's first-ever comprehensive strategy for reducing civilian harm, argues that "the protection of civilians ... supports US national security interests ... [by] enhancing the effectiveness and *legitimacy* of military operations" (US Department of Defense 2023, emphasis added).

conflict resolution, peace building, and laying the foundations for effective postwar civilian governance.⁸³ Related scholarship on “police legitimacy” suggests that misconduct by state security forces, including excessive violence against civilians, can undermine the legitimacy of other state institutions, potentially eroding trust in democracy itself.⁸⁴ Our findings also have important implications for militaries that provide training and funding for partners and proxies that may be perceived as locally illegitimate (such as US support for Israel’s operations in Gaza and the UAE’s support for the Rapid Support Forces in Sudan). Our finding that perceptions of military legitimacy depend not only on personal experiences with direct harm but also on *how* and *why* the harm was caused speak to a growing literature on “cumulative”⁸⁵ and “reverberating effects”⁸⁶ of conflict that often go unaccounted-for in measures of civilian harm, including moral injuries and indirect harm to surrounding economies, the environment, infrastructure, and cultural heritage objects.⁸⁷

Future research can extend and refine this theory, and test additional implications. We hope that other scholars will take up our invitation to study the microfoundations of military legitimacy in contexts beyond Iraq and across different types of insurgencies and conventional wars. An important next step in this research agenda is to bridge insights from micro-level case studies with macro-level patterns to build generalizable knowledge.⁸⁸ Although our research design does not allow us to fully disaggregate the components of our bundled treatment, future research should explore the individual effects of changes in personnel, tactics, technology, type of harm, identity of perpetrators (co-ethnicity, local or foreign), and timing (earlier or later in the battle) on civilian attitudes and behaviors, as well as interactions between these attributes. Survey experiments are one possible tool for doing so.

We also insist on the importance of studying critically important cases like the Battle of Mosul that are worthy of “mere description” in and of themselves,⁸⁹ regardless of our ability to precisely identify causal effects. The Battle of Mosul is already having a profound effect on military doctrine, education, and training, as evidenced by numerous “lessons learned” documents and course materials,⁹⁰ with implications for the complex urban warfare that is unfolding in Gaza and Ukraine at the time of writing.⁹¹

Data Availability Statement

Replication files for this research note may be found at <<https://doi.org/10.7910/DVN/IWTHDK>>.

83. Dandeker and Gow 1999; Gelpi 2003.

84. Cruz 2015; Urbina and Sgorlon 2024.

85. Lubell and Cohen 2020.

86. Waxman 2000.

87. Hathaway, Khan, and Revkin, *forthcoming*.

88. Balcells and Justino 2014.

89. Gerring 2012.

90. Arnold and Fiore 2019.

91. Sanger and Baker 2023; Spencer 2023; South 2022.

Supplementary Material

Supplementary material for this research note is available at <<https://doi.org/10.1017/S0020818325000098>>.

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Key Words

Civil war; conflict; counterinsurgency; civilian harm; international humanitarian law; civil-military relations; Iraq; legitimacy

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A Ethics and Implementation of Field Research in Mosul

Research in conflict-affected areas presents a number of potentially serious risks to participants, and researchers have a professional and moral responsibility to do no harm Wood (2006). Conflict-affected populations are particularly vulnerable for several reasons including possible recent exposure to violence, the risk of retraumatization, and unequal power dynamics between international researchers and local participants (Cronin-Furman and Lake, 2018). In order to minimize these risks, the study underwent a rigorous process of obtaining ethics approval from Anonymous University’s Institutional Review Board (IRB)⁸⁹ and followed best practices for participant and researcher safety including a detailed informed consent process, frequent reminders of respondents’ right to end the survey at any time, and strong data security protocols (Koehler et al., 2020). As an additional precaution, Figure 3 above plots respondents’ sampling coordinates after adding random error terms of up to 100 meters in order to further protect the anonymity of respondents.

This study began with in-depth interviews with residents of Mosul conducted over the course of more than two years of field research starting in 2016. Anonymous University’s Institutional Review Board (IRB) approved these interviews on June 24, 2015 (Portocol #Anonymous). One of the authors conducted all interviews in standard Arabic with occasional help from local research assistants in interpreting the Iraqi dialect. Table A-1 summarizes key demographic attributes of a subset of 30 interviews with residents of Mosul that informed the design of the survey questionnaire and our analysis of the quantitative data. All interviewees are identified by a number to protect their anonymity. As an additional precaution to ensure anonymity, we specify the month and year but not the day on which the interview was conducted. Interviews were conducted in Mosul as well as in other towns, cities, and IDP camps to which Moslawis fled during the battle.

Between 2018 and 2022, one of the authors spent more than two years in Iraq based in Erbil and Baghdad conducting academic research,⁹⁰ and working as a researcher and advisor for humanitarian organizations. This work included several more visits to Mosul and continuous engagement with Iraqi colleagues and interlocutors from Mosul.

The research team returned to Mosul in August 2023 to conduct follow-up interviews and observations of street and building density in seven of the same neighborhoods included in the 2018 survey: four randomly selected neighborhoods from the list of previously surveyed neighborhoods on the west side of the river (Farouk, Shiah, Amil, and Hay Al Mansur) and three on the east (Jazara, Mazari, Karamah), resulting in eight interviews. These interviews

⁸⁹The Human Subjects Committee of Anonymous University’s Institutional Review Board (IRB) approved this study on December 14, 2017 (Protocol #Anonymous).

⁹⁰For several related follow-on studies that were covered by subsequent IRB protocols approved by anonymous universities.

were approved by Anonymous University’s Institutional Review Board (IRB) on July 22, 2023 (Portocol #Anonymous). We randomly selected these locations from the list of 47 neighborhoods that comprised the sampling frame in the 2018 survey. Figure A-1 shows the approximate areas the team visited and Table A-2 details the demographics of interviewees.

Since the 2018 survey was conducted anonymously for the safety of respondents, we did not attempt to re-interview any of our original respondents, opting to interview a convenience sample of eight individuals we encountered while walking through the neighborhoods. We used a screening question to identify potential interviewees who were living in Mosul during the battle of Mosul, our inclusion criterion.

Table A-1: Pre-Survey Interviews with Residents of Mosul: 2017

#	Approximate Age	Gender	Occupation	Interview Date	Interview Location
1	40s	Male	School administrator	4/2017	Mosul
2	40s	Female	School administrator	4/2017	Mosul
3	40s	Male	School administrator	4/2017	Mosul
4	50s	Male	Teacher	4/2017	Mosul
5	20s	Male	Teacher	4/2017	Mosul
6	30s	Male	Teacher	4/2017	Mosul
7	40s	Female	Teacher	4/2017	Mosul
8	30s	Female	Teacher	4/2017	Mosul
9	40s	Female	Housewife	4/2017	Mosul
10	60s	Male	Butcher	4/2017	Mosul
11	30s	Male	Factory worker	4/2017	Mosul
12	20s	Female	Student	4/2017	Mosul
13	30s	Male	Municipal worker	4/2017	Mosul
14	60s	Male	Doctor	4/2017	Mosul
15	30s	Male	Hospital administrator	4/2017	Mosul
16	30s	Male	Accountant	4/2017	Mosul
17	40s	Male	Journalist	4/2017	Mosul
18	20s	Female	Store clerk	4/2017	Mosul
19	40s	Male	Butcher	4/2017	Mosul
20	50s	Male	Tailor	4/2017	Mosul
21	30s	Male	Car dealer	4/2017	Mosul
22	30s	Male	Store clerk	4/2017	Mosul
23	30s	Male	Store clerk	4/2017	Mosul
24	30s	Male	Food services	4/2017	Mosul
25	20s	Male	Food services	4/2017	Mosul
26	30s	Male	Truck driver	4/2017	Mosul
27	50s	Female	Housewife	12/2017	IDP camp, Makhmour
28	30s	Female	Housewife	12/2017	IDP camp, Makhmour
29	30s	Female	Housewife	12/2017	IDP camp, Makhmour
30	40s	Male	Retired military	12/2017	IDP camp, Makhmour

Figure A-1: Approximate Neighborhood Locations of August 2023 Fieldwork



Table A-2: Interviews with Residents of Mosul: August 2023

#	Approximate Age	Gender	Occupation	Interview Date	Interview Location
1	60s	Female	Shop Owner	8/2023	West Mosul
2	50s	Male	Shop Owner	8/2023	West Mosul
3	60s	Male	Shop Owner	8/2023	West Mosul
4	30s	Male	Shop Owner	8/2023	West Mosul
5	60s	Male	Retired Military	8/2023	West Mosul
6	30s	Male	Shop Owner	8/2023	West Mosul
7	60s	Male	Shop Owner	8/2023	East Mosul
8	50s	Male	Retired Military	8/2023	East Mosul

A.1 Abridged Quotes from Qualitative Interviews

This section provides abridged excerpts from our final round of interviews conducted in August 2023 to provide more context for the brief quotations included in the article. We do not provide full transcripts because of the risk that we might unintentionally disclose identifying information, among other ethical and security concerns noted in the Final Report of the Working Group on Qualitative Transparency Deliberations (Jacobs et al., 2021: 179).

Interview 1

“This area [West Mosul] was IS’s last stronghold because it has narrow alleys and the houses are close together and there were basements where they could hide from the airplanes, and the tanks could not enter. That’s why there was so much destruction here, because it was so confusing to the army. They didn’t know who was IS or civilians and that’s why they were bombing everywhere ...”

Interview 2

“They were randomly bombing, there were no IS fighters here... We did not expect the bombings because there were no IS headquarters or fighters near our house. I kept thinking: Why was our house bombed if they [the Coalition] had informants on the ground? ... There were no IS fighters nearby. ... They claimed they were professionals, they had drones, they said they knew where the [IS] headquarters were, where the fighters were, where the civilians were. But they didn’t know anything.”

Interview 3

“The Federal Police were the ones who were harming us and bombing us. But the Golden Division were the ones who were helping us ... My husband has Parkinsons disease and he fell while we were trying to flee. A Golden Division soldier picked us up with his own car and took us all the way to the hospital ... The Golden Division was much better [than the Federal Police] ... they [the CTS] very mixed in terms of ethnicity. The Federal Police were mostly Shia Muslims. The Federal Police were looting and stealing a lot from civilians and they were watching other people stealing and doing nothing ... They [the Coalition] were capable of minimizing the damage but they did not. They destroyed the whole minaret [referring to a historic mosque] for just a few IS fighters.”

Interview 4

“They [the CTS] ... caused very little damage because they used snipers and ... some of the same techniques as IS, moving through holes between houses, which allowed them to liberate neighborhoods from the ground not using airstrikes ... There was no looting in this neighborhood because the Golden Division was here, but I did hear about looting in other neighborhoods ... The streets were wider in the east side, so IS could not easily fight back and resist. It was easier for the Iraqi forces to liberate the east first because it was so open. But in West Mosul, the narrow streets and alleys are not wide enough for tanks and Humvees to enter ... The Army made a big mistake by leading them to their own rather than leading them toward the desert. They led them to Old City [in West Mosul] and everyone complains about this. They could have led them to the desert with much less damage.”

Interview 5

“The east was open, which made it easy to liberate because the roads were wide enough for tanks and Humvees. In the west, the streets were very narrow and even if they [the Iraqi forces and vehicles] could enter through streets, IS was throwing grenades from the rooftops so it was not easy for them to move.”

Interview 6

“I believe the targeting was random. They didn’t know who was IS and who was a civilian because IS was hiding among civilians ... The Golden Division was better trained and more effective. Both forces were professional [Golden Division and Federal Police] but there are always bad apples in every force, and there were more bad apples in the Federal Police ... Because the Iraqi forces were from Iraq, they were more careful with civilians than the U.S. If I were called up to fight to liberate Syria or Jordan, I would be less passionate and less careful with civilians than if I were fighting to defend my own people in my own country [Iraq]. The Federal Police were mostly Shia from the south of Iraq. The people of Mosul did not know them and did not trust them. The Golden Division, on the other hand, knew how we were living, they knew that this was our land, and they knew our people.”

Interview 7

“They were getting information from informants on the ground so they could track targets that were moving, but I don’t understand why they destroyed hospitals ... The Golden Division were very good...The Old City [in West Mosul] is like Old Italy with very narrow streets. It would have been very difficult to start the battle in the west because all of the houses are connected to each other from the Old City all the way to the stadium and hospital. The streets are very tight and there would have been many casualties. That’s why they started in the east, because they had better visuals and wider streets and could more effectively start the fight ... No it wasn’t worth it [the defeat of IS was not worth the collateral damage it caused]. They destroyed the infrastructure, the schools, the hospitals, government institutions, and services just to kill a few thousand IS fighters ... It was not worth all of this damage. Most importantly, you cannot replace a human soul. There were way too many casualties and many more in the west than in the east. Too many houses collapsed on civilians, and there are still bones in the rubble.”

Interview 8

“I served in the military [previously, before 2003] and I think the airstrikes were too much ... It was kind of wild, frankly. IS fighters were concentrated on that side of the city [West Mosul]. The American air strikes were too wild. They said they wanted to save the civilians, but they caused too many casualties. All that force was not needed ... they used too much force, of which only 10 percent was needed to defeat IS and the remainder was all excessive ... Of course it would have been better to let IS escape into the desert.”

B Household Survey Methodology & Implementation

B.1 Random Sampling Procedure

The random sample was drawn from 47 primary sampling units (PSUs) based on census blocks that were randomly selected from a list of all 209 census blocks in Mosul. These blocks have names corresponding to different neighborhoods. Enumerators conducted 30 interviews within each PSU.⁹¹ Within each PSU, the sampling team randomly selected streets,

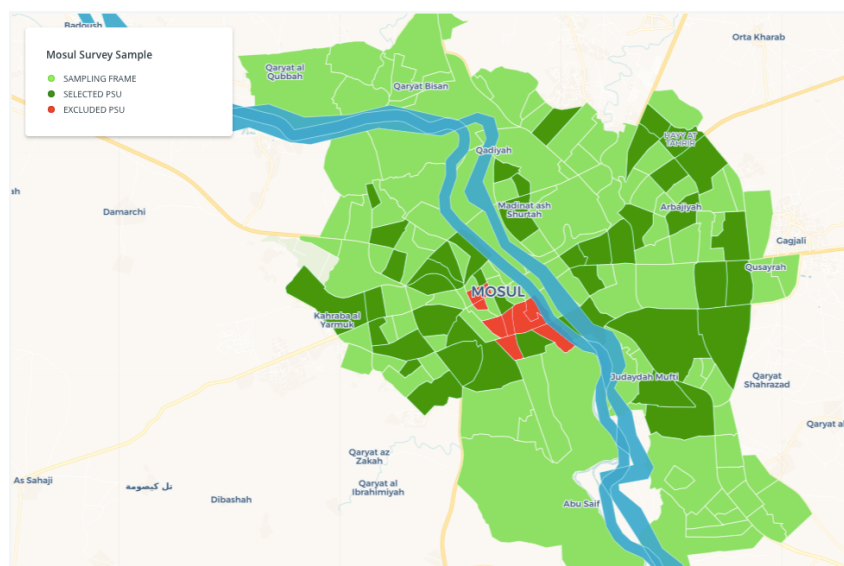
⁹¹It was not feasible to implement truly random sampling using probability proportional to size due to conflict-related changes in demography that make accurate estimates of the true populations of the PSUs

within which enumerators selected households using a random-walk procedure. Enumerators counted the number of houses on each street and divided by seven to determine the interval of houses skipped between interviews. The tablets were programmed with a Kish grid (Kish, 1949) that randomly selected a respondent from the pool of adult household members.

B.2 Map of the Sampling Frame

Figure A-2 shows the sampling frame of 209 Primary Sampling Units (PSUs) in light green and the 47 randomly selected PSUs in dark green. Eight PSUs in West Mosul were excluded from the sampling frame (marked in red) because these areas experienced severe collateral damage during the recent military operation and were largely uninhabited. To the extent these neighborhoods experienced the highest “doseage” of our bundled treatment, we anticipate that excluding these neighborhoods biases our estimates towards zero.

Figure A-2: Map of the Sampling Frame



B.3 Enumerator Training and Gender Protocol

We worked with a respected Iraqi survey firm, the Independent Institute for Administration and Civil Society Studies (IIACSS), to train a team of 10 Iraqi enumerators from Mosul who

impossible. For this reason, we assigned a consistent number of interviews to each PSU.

then conducted the door-to-door survey with tablets. One author conducted the training in Arabic and supervised translation of the questionnaire and eventual data in both directions (English to Arabic and Arabic to English). Given that many Iraqis have religious and cultural preferences for gender segregation, the team included male and female enumerators in order to accommodate any respondents who requested to be interviewed by someone of the same gender. Enumerators walked door-to-door individually, if a female or male respondent requested to be interviewed by an enumerator of the same gender, the opposite-gender enumerator called a colleague to conduct the interview.

B.4 Response Rate and Quality Control

As noted in the article, Mosul’s current population is almost entirely Sunni Arab due to massive out-migration by other religious and ethnic groups who were persecuted by IS. Through the filter questions that were designed to limit the sample to Sunni Arab Iraqis who were living in Mosul in June 2014, only 4 people were excluded for not being Iraqi, 4 were excluded for not being Sunni Arab, and 9 were excluded because they were not living in Mosul in June 2014. The refusal rate was 15%. After piloting the survey, the research team agreed that the survey should take at least 25 minutes to complete, to ensure that all questions were read thoroughly and slowly. Six surveys were dropped from the final dataset because they were completed in less than 25 minutes.

B.5 Wording of Survey Instruments

Table [A-3](#) presents the survey instrument wording for all control variables included in the analysis. The replication package contains a codebook for all variables.

Table A-3: Codebook of Control Variables

Variable	Survey Question	Outcome Space
Pre-IS household income	Which of these statements comes closest to describing your household income immediately before Daesh captured Mosul?	Our household income... (1) does not cover our expenses and we face significant difficulties in meeting our needs (2) does not cover our expenses and we face some difficulties in meeting our needs (3) cover our expenses without notable difficulties (4) cover our expenses well and we are able to save
Reported harm during IS rule (pre-battle)	Did your household, as a whole, experience house damage, house confiscation, household injury, or household death during the time that Daesh was in control of Mosul?	(0) No (1) Yes
Experienced various grievances with the Iraqi government (pre-IS)	4 variables: During the years 2006- 2014... (1) Did you ever feel disrespected or insulted by an Iraqi police officer? (2) Were you ever arrested? (3) Did you ever feel that you were discriminated against ... for being Sunni? (4) Did you ever participate in a demonstration or protest directed at the Iraqi government?	(0) No (1) Yes
Paid taxes to IS	3 variables: During the first six months of Daesh rule, did Daesh collect any of the following types of taxes and fees from this household? (1) electricity fees (2) water fees (3) zakat	(0) No (1) Yes

Voted in the 2014 parliamentary elections	Did you vote in the last parliamentary election in 2014?	(0) No (1) Yes
Support for Sharia law	Do you believe that Iraqi state law should be reformed to include more Sharia, less Sharia, or stay the same as it is now?	(1) More Sharia (2) Stay the same (3) Less Sharia
Attendance at Friday prayer	How often do you attend Friday prayer?	(1) Never (2) Rarely (3) Sometimes (4) Most of the time (5) Always
Preferences for IS governance	During the first six months of Daesh rule, did you believe that Daesh was doing a better job of governing Mosul than the Iraqi government did previously?	(0) No (1) Yes
Evaluation of IS corruption	During the first six months of Daesh rule, to what extent did you think that Daesh was corrupt?	(1) Not at all corrupt (2) Somewhat corrupt (3) Very corrupt
Fairness of IS taxation	How much do you agree or disagree with the following statement? "The taxes and fees collected by Daesh were fair in exchange for the services that Daesh was providing."	(1) Strongly Disagree (2) Somewhat Disagree (3) Somewhat Agree (4) Strongly Agree
Evaluation of Iraqi government corruption	In general, to what extent do you think that the current Iraqi government is corrupt?	(1) Not at all corrupt (2) Somewhat corrupt (3) Very corrupt

C Design & Identification

C.1 Requirements for Causal Inference

Our empirical strategy rests on two assumptions: (1) exposure to the bundled treatment is exogenous and (2) that we are able to control for all systematic differences between East and West Mosul. We address potential violations of these two assumptions below.

To begin, it would threaten our identification if the East-to-West sequencing of operations was in fact correlated with civilian attitudes on either side of Mosul. In fact, our extensive field research and a review of secondary sources both strongly suggest that the sequencing of operations was primarily driven by plausibly exogenous factors. We are aware of no evidence that Iraqi or coalition military planners viewed East Mosul as a more favorable starting location due to any differences in civilian attitudes there.

The decision was primarily a consequence of the pre-battle location of armed forces. In preparation for the Battle of Mosul, the Iraqi Armed Forces worked in tandem with the Kurdish Peshmerga and the Popular Mobilization Forces (PMF), predominately Shia paramilitary force, to encircle the city. The PMF established control from the southwest, the Peshmerga from the north, and the Iraqi Armed Forces from the southeast. Rather than liberate the city simultaneously, a key decision was made to let the Iraqi Armed Forces liberate Mosul alone in two phases starting in the East Mosul. The decision was based on two considerations, both unrelated to civilian attitudes. First, the positioning of Kurdish Peshmerga forces north of Mosul allowed Iraqi forces to leverage existing Kurdish defenses and avoided the potential for friendly fire (Wasser et al., 2021). Second, Turkey explicitly requested for the Iraqi Armed Forces to liberate the city without assistance from the PMF and Peshmerga (Spencer and Geroux, 2021). Turkey was adamant, convinced that liberation of West Mosul by any other actor would lead to Shia or Kurdish control of the politically important district of Telafar, which borders Mosul and Turkey (Anadolu Agency, 2016; Stansfield, 2016).

And what drove the various strategic and tactical shifts comprising bundled treatment itself? Here, too, the evidence supports a variety of plausibly exogenous factors. We have already discussed how changes in the composition of ground forces—from the elite multi-ethnic CTS in East Mosul to lesser-trained and predominately Shia Federal Police in West Mosul—were necessitated by the CTS’s severe losses (Amnesty International, 2017). In addition, the shift from house-to-house ground fighting with support from relatively precise munitions to greater reliance on unguided “wide-impact-area” explosives was influenced by the urban terrain of West Mosul, particularly its denser buildings and narrower streets in comparison with East Mosul (Baudot, 2019: 18, 48), which one of our interviewees described as “like Old Italy.”⁹²

⁹²The Appendix includes photographs of West and East Mosul street views taken during our field research.

Additionally, Tactical Directive 1 and other changes comprising the shift from “attrition” to “annihilation” were partially reactive to IS’s evolving strategy⁹³ and influenced by lessons learned by Iraqi and Coalition commanders during the first phase of the battle (Awadi and Haus, 2017; Wasser et al., 2021: 83-84). Altogether, we do not find evidence that commanders were making decisions on the basis of any differences between East and West Mosul that are not captured in our controls.

Regarding our second assumption, we cannot definitively rule out the possibility of omitted variable bias, but we can test for balance across observable characteristics. Indeed, Table 1 above shows balance between East and West Mosul across several key individual covariates, and Table A-4 shows balance across an even more extensive list of individual- and neighborhood-level covariates. With the exception of self-reported slightly higher pre-IS household economic security in East Mosul, high preferences for Sharia law in East Mosul, and greater urban density in West Mosul—which we believe was itself one of the exogenous factors driving certain aspects of the bundled treatment—Tables 1 and A-4 show that our covariates are well balanced across East and West with no other statistically significant differences, and all covariates are only jointly marginally significant. Especially notable is that respondents in East and West Mosul report nearly identical levels of grievances with the Iraqi government prior to IS occupation in 2014; this suggests that differences in respondents’ present attitudes toward Iraqi and Coalition armed forces are not merely reflecting pre-existing attitudes toward the Iraqi government that are unrelated to the battle of Mosul itself.

Overall, the balance in observables across East and West Mosul gives us confidence that our estimates are unlikely to be biased by unobservable or omitted variables and lends credibility to our identifying assumption (Altonji, Elder and Taber, 2005). In addition, to formally benchmark the degree our results may be influenced by omitted variables bias, in the below section we conduct sensitivity analysis. Results suggest that our analysis is reasonably robust to the possibility of omitted-variable bias.

Table A-4 shows that East Mosul had a higher density of population and residential units.

⁹³By the time the battle moved to West Mosul, IS’s posture was much more defensive and desperate. After losing East Mosul, IS entrenched itself in the dense Old City of West Mosul, using civilians as human shields and summarily executing those who tried to flee (El Deeb, 2019).

Table A-4: Balance on Covariates

	East Mosul	West Mosul	Difference-in-Means (East Mosul - West Mosul)
Education: None	0.151 (0.359)	0.173 (0.379)	0.022
Education: Elementary	0.393 (0.489)	0.418 (0.494)	0.025
Education: Primary	0.164 (0.371)	0.130 (0.336)	-0.035
Education: Secondary	0.149 (0.357)	0.157 (0.364)	0.008
Education: Mid-level Diploma	0.048 (0.215)	0.047 (0.213)	-0.001
Education: Bachelor	0.092 (0.289)	0.073 (0.260)	-0.019
Education: Masters	0.002 (0.047)	0.002 (0.043)	-0.000
Age	36.311 (13.906)	37.712 (14.432)	1.401
Income: Significant Difficulties	0.257 (0.437)	0.377 (0.485)	0.120***
Income: Some Difficulties	0.191 (0.393)	0.192 (0.394)	0.001
Income: No Difficulties	0.338 (0.473)	0.234 (0.424)	-0.104***
Income: Can Save	0.215 (0.411)	0.197 (0.398)	-0.017
Primary Identity: Iraqi	0.481 (0.500)	0.495 (0.500)	0.013
Primary Identity: Muslim	0.394 (0.489)	0.398 (0.490)	0.004
Voted In 2014 Elections	0.686 (0.465)	0.700 (0.459)	0.014
Prefers More Sharia Law	0.607 (0.489)	0.541 (0.499)	-0.066*
Prefers Less Sharia Law	0.062 (0.242)	0.046 (0.209)	-0.017
Friday Prayer Attendance	2.607 (1.649)	2.475 (1.665)	-0.132
Experienced Harm During IS Rule	0.381 (0.486)	0.400 (0.490)	0.020
Paid IS Electricity Fees	0.353 (0.478)	0.416 (0.493)	0.063*
Paid IS Water Fees	0.428 (0.495)	0.451 (0.498)	0.022
Paid IS Zakat	0.349 (0.477)	0.330 (0.471)	-0.019
Insulted by Iraqi Police	0.235 (0.425)	0.267 (0.443)	0.032
Arrested	0.068 (0.252)	0.053 (0.224)	-0.015
Sunni Based Discrimination	0.123 (0.329)	0.124 (0.330)	0.001
Protest Participation	0.035 (0.184)	0.020 (0.140)	-0.015
Population Density	0.014 (0.010)	0.018 (0.008)	0.004***
Road Density	0.024 (0.005)	0.024 (0.005)	-0.000
Residential Unit Density	0.001 (0.001)	0.002 (0.001)	0.001***
Observations	603	668	1271

Note: * p <.10, ** p <.05, *** p <.01.

C.2 Sensitivity Analysis

Our identification strategy relies on the strong assumption of conditional independence. The exposure to the bundled treatment, as defined by the two phases of the battle, is assumed

to be as-if random after conditioning on a rich set of observable. Omitted-variable bias is possible. Unobserved factors could drive selection into treatment and bias estimates. To alleviate this concern we conduct sensitive analysis. As an initial approach, presented in the manuscript, we calculate Osters bounds. In addition, we below conduct two additional approaches. Across all tests, results are reasonably robust to the concern of omitted variable bias.

In Table A-5, we present sensitivity analysis from Cinelli and Hazlett (2019). This has become the recent standard for bench-marking omitted variable bias. Table A-5 reports our estimated treatment effects and standard error from Table 3 Column (4), and then reports a number of diagnostics. The Partial R^2 of the treatment with the outcome, $R_{Y \sim D|\mathbf{X}}^2$, indicates that a confounding variable (or set of variables), orthogonal to our matrix of controls, that explains 100% of the residual variance of the outcome, would need to explain at least 1.4% of the residual variance of the treatment to fully account for the observed estimated effect. The robustness values $RV_{q=1}$ reports that an unobserved confounders (orthogonal to the covariates) would have to explain more than 11.2% of the residual variance of both the treatment and the outcome (a partial r^2 of .112) to bring the point estimate to 0 (a bias of 100% of the original estimate). A similar, yet more difficult test, $RV_{q=1, \alpha=0.05}$, estimates that an unobserved confounder would have to a partial r^2 of .052 to bring the estimate to a range where it is no longer “statistically different” from zero.

Table A-5: Minimal Reporting on Sensitivity to Unobserved Confounders

Outcome: <i>Percieved Military LEgitimacy</i>						
Treatment:	Est.	S.E.	t-value	$R_{Y \sim D \mathbf{X}}^2$	$RV_{q=1}$	$RV_{q=1, \alpha=0.05}$
<i>treated</i>	-0.168	0.047	-3.606	1.4%	11.2%	5.2%
df = 929	<i>Bound (1x gov_grievances_sunni) : $R_{Y \sim Z \mathbf{X}, D}^2 = 0.9\%$, $R_{D \sim Z \mathbf{X}}^2 = 0\%$</i>					

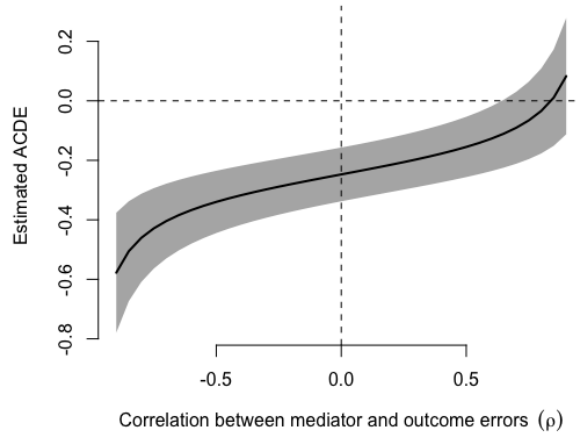
In Table A-6 we then benchmark this effect to a known, measured confounder in our control matrix. Pre-treatment grievances with the Iraqi government – proxied with an variable indicating a respondent was discriminated against because on their Sunni identity – as a plausible confounder between our treatment indicator and military legitimacy. A confounder that has the same strength as pre-treatment grievances can explain at most 0.9% of the residual variation of the outcome and treatment. This is well below the robustness value, showing that our estimates are robust to omitted variable bias. If an omitted variable was 1, 5, our 10 times as strong as government grievances our estimated coefficient would be -.167, -.0166, and -.0164 respectively, remaining negative and statistically significant.

Table A-6: Adjusted Treatment Estimates To Unobserved Confounding

Bound	Label	R2dz.x	R2yz.dx	Adjusted Estimate	Adjusted Se	Adjusted T	Adjusted Lower CI	Adjusted Upper CI
1x	gov_grievances	0e+00	0.0091	-0.1677	0.0464	-3.6119	-0.2588	-0.0766
5x	gov_grievances	0e+00	0.0454	-0.1660	0.0456	-3.6429	-0.2554	-0.0766
10x	gov_grievances	1e-04	0.0908	-0.1639	0.0445	-3.6852	-0.2512	-0.0766

An additional assessment of sensitivity is warranted unique to the results presented in Table 4. Sequential g-estimation requires the assumption of sequential unconfoundedness, there should be no unmeasured covariates which effect the mediator (harm) and the outcome (military legitimacy). We probe this assumption in Figure A-3, using the approach from Acharya, Blackwell and Sen (2016). A substantial positive, residual correlation is required for there to be a non-significant ACDE. Harm and perceptions of military legitimacy are likely to negatively correlated indicating that the ACDE may be larger than the original estimate.

Figure A-3: Sensitivity Analysis of the ACDE



C.3 Design Validation: Comparing Battle Experiences

In Table A-7 we confirm that respondents in West Mosul experienced higher levels of harm and less professionalism by the Iraqi Armed Forces.

Table A-7: Validation Test: The Effect of the Treatment on Experiences of Harm

	Reported House Damage	Reported Death of Injury	Detected House Damage	Reported Looting
	(1)	(2)	(3)	(4)
Treated (West Mosul)	0.137*** (0.047)	0.077** (0.034)	0.148** (0.056)	0.128*** (0.030)
Observations	975	975	975	975
Unconditional Mean	.731	.305	.118	.247
PARAMETERS				
Basic Demographic Controls	✓	✓	✓	✓
Additional Individual Controls	✓	✓	✓	✓
Neighborhood Controls	✓	✓	✓	✓

Note: * p <.10, ** p <.05, *** p <.01. HCl robust, neighborhood-clustered standard errors. Demographic controls are: gender, education level, age, pre-IS household income, and primary identity. Additional individual-level controls are: reported harm during IS rule (pre-battle), experienced various grievances with the Iraqi government (pre-IS), voted in the 2014 parliamentary elections, and paid taxes to IS. Neighborhood controls are: residential unit density, population density, and street density.

C.4 Additional Survey Evidence on Variation of Harm and Tactics

Table A-8: Causes of Battle-Related Death

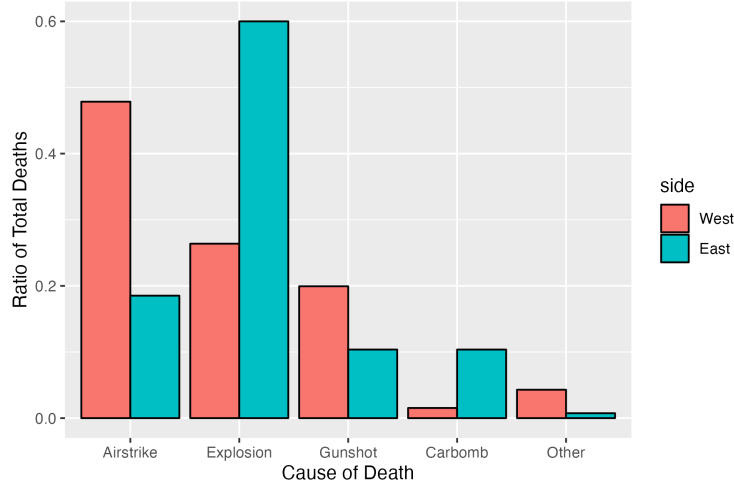
	East Mosul	West Mosul	Difference-in-Means (East Mosul - West Mosul)
Death from Conflict: Any	0.028 (0.166)	0.124 (0.329)	0.095***
Death from Conflict: Airstrike	0.005 (0.072)	0.059 (0.236)	0.054***
Death from Conflict: Explosion	0.017 (0.129)	0.033 (0.178)	0.016***
Death from Conflict: Gunshot	0.003 (0.054)	0.025 (0.155)	0.022***
Death from Conflict: Carbomb	0.003 (0.054)	0.002 (0.044)	-0.001
Death from Conflict: Other	0.000 (0.014)	0.005 (0.073)	0.005***
Observations	4781	2637	7418

Note: * p <.10, ** p <.05, *** p <.01.

Table A-8 conducts a difference in means test of Lafta, Al-Nuaimi and Burnham (2018)'s household survey outcomes covering 7,559 residents of Mosul after the conclusion of the battle. Lafta, Al-Nuaimi and Burnham (2018) ask respondents if they experienced any

death or injury in their household due to the conflict and the cause of the death or injury. Consistent with our analysis, West Mosul residents experiences a higher level of civilian harm in comparison to East Mosul. To explore, variation in the sources of harm, Figure A-4 subsets the data to the households who reported death in the household (326 individuals died in West Mosul compared to 135 in East Mosul) and then plots the percentage of deaths attributed to a given source. Figure A-4 shows that a larger proportion of deaths in West Mosul (compared to East Mosul) were due airstrikes or gunshots, while a higher proportion of deaths in East Mosul were attribute to explosions.

Figure A-4: Death Causes



D Robustness & Additional Results

D.1 Directly Controlling for Harm

Our theory predicts that the shift in tactics, strategy, and goals during the Battle of Mosul should have a negative effect on military legitimacy. This effect should persist even after conditioning on experiences of harm. To estimate this direct effect of our treatment, our preferred specification de-mediates harm through sequential-g estimation. As an alternative approach, we estimate Equation 2 in Table A-9, a reduced form regression which simply includes the mediator, reported and detected civilian harm, as a control variable. While this estimation strategy may be susceptible to intermediate variable bias, results from this approach are generally consistent with our preferred specification (Table 4).

$$\text{Military Legitimacy}_{ij} = \alpha + \beta \text{West}_j + \theta \text{Collateral Damage}_{ij} + \mathbf{X}_i' \Gamma + \mathbf{N}_j' \Pi + \epsilon_{ij}. \quad (2)$$

Table A-9: Military Legitimacy Between East & West Mosul Directly Controlling for Harm

	Perceived Military Legitimacy		
	(1)	(2)	(3)
Treated (West Mosul)	-0.167*** (0.048)	-0.147*** (0.046)	-0.154*** (0.047)
Reported HH Injury or Death	-0.019 (0.052)		-0.016 (0.052)
Detected House Damage		-0.137*** (0.044)	-0.143*** (0.048)
Reported House Damage			0.070 (0.057)
Observations	959	959	959
Unconditional Mean	3.636	3.636	3.636
Oster's δ	12.072	12.348	12.446
PARAMETERS			
Basic Demographic Controls	✓	✓	✓
Additional Individual Controls	✓	✓	✓
Neighborhood Controls	✓	✓	✓

Note: *** p<0.01, ** p<0.05, * p<0.1; HC1 robust, neighborhood-clustered standard errors. Demographic controls are: gender, education level, age, pre-IS household income, and primary identity. Additional individual-level controls are: reported harm during IS rule (pre-battle), experienced various grievances with the Iraqi government (pre-IS), voted in the 2014 parliamentary elections, and paid taxes to IS. Neighborhood controls are: residential unit density, population density, and street density.

D.2 Interactions & Marginal Effects

An *additional* implication of our theory is that harm may have differential effects on military legitimacy, depending on the context in which harms occurs. This extension predicts that the marginal effect of being harmed should be greater in West Mosul than in East Mosul. To probe this extension, we estimate the following equation, and present results in Table A-10.

$$\text{Military Legitimacy}_{ij} = \alpha + \beta \text{West}_j + \beta \text{Collateral Damage}_{ij} + \theta \text{West} \times \text{Collateral Damage}_{ij} + \mathbf{X}'_i \Gamma + \mathbf{N}'_j \Pi + \epsilon_{ij}. \quad (3)$$

To be clear, our identification does not claim to identify the direct effects of harm. Because harm is potentially endogenous, these results should be interpreted with caution. Regardless, the fully interacted model provides evidence for our primary argument and suggestive support for the extension. The marginal effect of the treatment is negative, regardless whether a respondent was harmed or not. Additionally, the marginal effect of harm is negative for individuals who experienced the battle in West Mosul compared to those exposed to the battle for the East.

Table A-10: Interactive Effects of the Treatment and Harm

	Perceived Military Legitimacy		
	(1)	(2)	(3)
Treated (West Mosul)	-0.008 (0.087)	-0.118* (0.058)	-0.138*** (0.046)
Reported House Damage	0.168*** (0.055)		
Treated (West Mosul) X Reported House Damage	-0.233** (0.089)		
Reported HH Injury or Death		0.086 (0.062)	
Treated (West Mosul) X Reported HH Injury or Death		-0.172* (0.092)	
Detected House Damage			-0.092 (0.166)
Treated (West Mosul) X Detected House Damage			-0.093 (0.164)
Observations	959	959	959
Unconditional Mean	3.636	3.636	3.636
PARAMETERS			
Basic Demographic Controls	✓	✓	✓
Additional Individual Controls	✓	✓	✓
Neighborhood Controls	✓	✓	✓

Note: *** p<0.01, ** p<0.05, * p<0.1; HC1 robust, neighborhood-clustered standard errors. Demographics controls are: gender, education level, age, pre-IS household income, and identity. Additional individual level controls are: reported harm during IS rule (pre-battle), grievances with the Iraqi government (pre-IS), vote participation in the 2014 parliamentary elections, and having paid taxes to IS. Neighborhood controls are: residential unit density, population density, and street density.

D.3 Additional Regressions

The tables below shows the results of endogenous regressions, where we regress perceived military legitimacy directly on reports of looting and harm. Table A-11 examines the effect of whether a respondent observed looting by Iraqi military in their neighborhoods, and Table A-12 the effect of detected harm.

Table A-11: The Effect of Looting on Military Legitimacy

	Perceived Military Legitimacy			
	(1)	(2)	(3)	(4)
Looting	-0.355*** (0.062)	-0.356*** (0.059)	-0.338*** (0.062)	-0.330*** (0.064)
Observations	993	990	972	968
Unconditional Mean	3.632	3.633	3.635	3.633
PARAMETERS				
Basic Demographic Controls		✓	✓	✓
Additional Individual Controls			✓	✓
Neighborhood Controls				✓

Note: *** p<0.01, ** p<0.05, * p<0.1; HC1 robust, neighborhood-clustered standard errors. Demographic controls are: gender, education level, age, pre-IS household income, and primary identity. Additional individual-level controls are: reported harm during IS rule (pre-battle), experienced various grievances with the Iraqi government (pre-IS), voted in the 2014 parliamentary elections, and paid taxes to IS. Neighborhood controls are: residential unit density, population density, and street density.

Table A-12: The Effect of Detected Harm on Military Legitimacy

	Perceived Military Legitimacy			
	(1)	(2)	(3)	(4)
Detected House Damage	-0.178*** (0.044)	-0.167*** (0.051)	-0.183*** (0.050)	-0.166*** (0.048)
Observations	993	990	972	968
Unconditional Mean	3.632	3.633	3.635	3.633
PARAMETERS				
Basic Demographic Controls		✓	✓	✓
Additional Individual Controls			✓	✓
Neighborhood Controls				✓

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; HC1 robust, neighborhood-clustered standard errors. Demographic controls are: gender, education level, age, pre-IS household income, and primary identity. Additional individual-level controls are: reported harm during IS rule (pre-battle), experienced various grievances with the Iraqi government (pre-IS), voted in the 2014 parliamentary elections, and paid taxes to IS. Neighborhood controls are: residential unit density, population density, and street density.

D.4 Disaggregated Results by Actor

In the survey we ask respondents about the perceived military legitimacy of all counter-insurgent actors participating in the Battle of Mosul. Our primary outcome averages across members of the Iraqi Armed Forces – the CTS, Army, and Police. In the primary analysis, we focus on the collective perception of actors because of tractability and because perceptions of the CTS, Army, and Police are all highly correlated. Table A-5 presents the correlation between the survey questions.

Below we analyze the perception of military legitimacy separately for each armed actor. Our treatment does not have a statistically significant effect on perceptions of the United States, a finding that is consistent with our theory because U.S. forces were primarily involved in air operations; they were not visibly involved in ground operations where civilians would have been able to directly observe and form judgments about just conduct and just cause. Additionally, the effect on legitimacy is largest for the federal police followed by the army, and then finally the CTS. This pattern is consistent with our qualitative and secondary-source evidence establishing that the CTS are widely perceived as the most professional and the federal police as the least professional of the actors involved in the battle.

Figure A-5: Correlation Matrix:
Perceived Military Legitimacy By Individual Actor

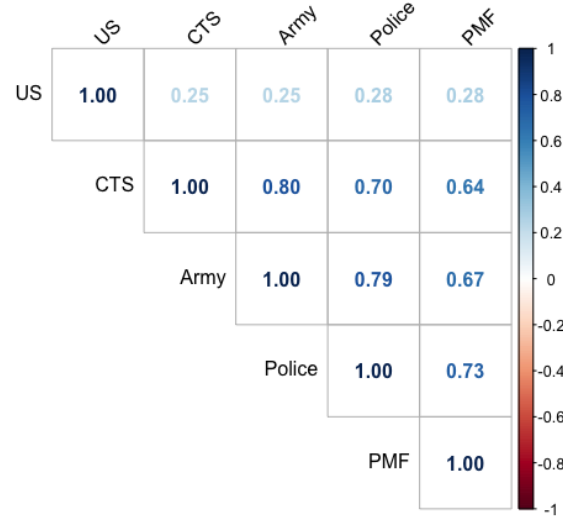


Table A-13: Military Legitimacy of Individual Actors Between East & West Mosul

	Perceived Military Legitimacy				
	US	CTS	Army	Police	PMF
	(1)	(2)	(3)	(4)	(5)
Treated (West Mosul)	-0.130 (0.093)	-0.124** (0.047)	-0.185*** (0.051)	-0.196*** (0.059)	-0.108** (0.049)
Observations	954	961	959	961	958
Unconditional Mean	2.017	2.017	2.017	2.017	2.017
Oster's δ	28.092	16.759	12.121	13.065	55.982
PARAMETERS					
Basic Demographic Controls	✓	✓	✓	✓	✓
Additional Individual Controls	✓	✓	✓	✓	✓
Neighborhood Controls	✓	✓	✓	✓	✓

Note: *** p<0.01, ** p<0.05, * p<0.1; HC1 robust, neighborhood-clustered standard errors. Demographic controls are: gender, education level, age, pre-IS household income, and primary identity. Additional individual-level controls are: reported harm during IS rule (pre-battle), experienced various grievances with the Iraqi government (pre-IS), voted in the 2014 parliamentary elections, and paid taxes to IS. Neighborhood controls are: residential unit density, population density, and street density.

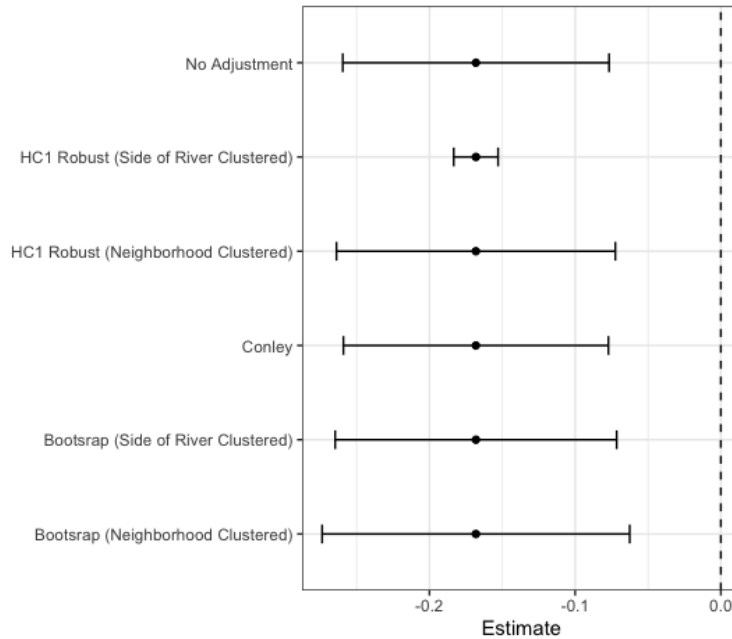
D.5 Alternative Standard Errors

In this section, we employ alternative calculations for the standard errors of our estimates. Our primary specification estimates HC1 robust, standard errors. Errors are clustered at the neighborhood level, the primary sampling unit of our survey. Respondents within a neighborhood are exposed to similar battle conditions, and thus errors should be correlated within the neighborhood.

Conventional practice is to cluster standard errors at the level of treatment to adjust for hierarchical correlation of the errors. Our bundled treatment is assigned by a respondent's location in regard to the side of the river. Since there are only two sides of the river (two treatment clusters), this complicates standard approaches for clustering standard errors.

In Figure A-6 we probe the robustness of our primary specification from Table 4 Column 4, by displaying alternative corrections for geographically correlated errors. Below we visualize our estimate and associated confidence intervals from various approach. The first row applies no correction. The second row clusters standard errors by sides of the river. The third row displays standard errors clustered by the neighborhood. The fourth row employs Conley standard errors which account for spatial auto-correlation of data points based on exact locations. Row 5 and 6 mirror rows 2 and 3 but standard errors are calculated non-parametrically through bootstrapping. Results are robust to all specifications.

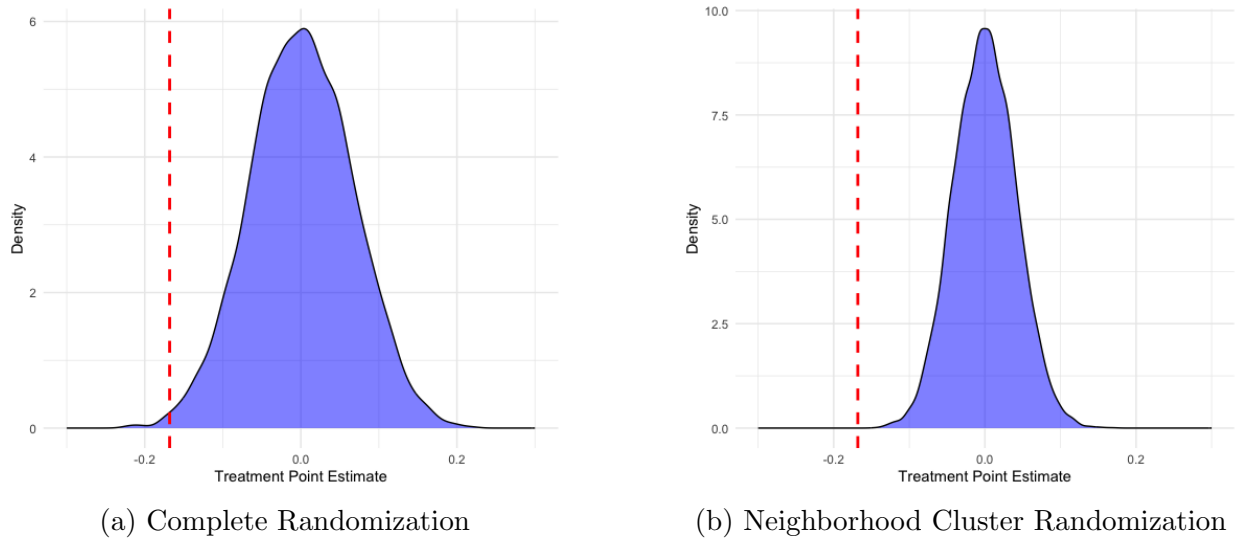
Figure A-6: Robustness to Standard Error Specifications



Additionally, we conduct randomized inference. If a respondent were randomly assigned to living on a side of the river, and thus randomly exposed to the treatment conditions

specific to the different phases of the battle, would it be likely that our estimated results could have occurred by chance? To investigate the robustness of our result to randomized inference, we simulate 10,000 possible permutations of the treatment assignment and estimate our primary specification. Figure A-7 plots the 10,000 simulated coefficients from randomizing the treatment assignment. Panel (A) randomize the treatment assignment at the respondent level and panel (B) cluster randomizes at the neighborhood level. In either case, it is extremely improbable that our results could have occurred by chance. When randomizing at the neighborhood, only 45 of 10,000 estimated coefficients were larger than our estimated effect, resulting in a one-sided p-value of 0.0045 and two-sided p-value of 0.009.

Figure A-7: Randomization Inference



D.6 Size of Buffers

In Table A-14 we expand the size of the buffer to detect harm in a larger vicinity. We replicate our result from Column (4) of Table 4, but we measure satellite-detected within a variety of distances (between 10, 50, 100, and 500 meters) from the respondent's home. In other words, here we attempt to control for damage to a respondent's immediate neighborhood but not necessarily to the respondent's own home. That our results are robust to a variety of radii further suggests that differences in perceived military legitimacy between East and West Mosul are not merely driven by differences in levels of collateral damage alone.

Table A-14: Military Legitimacy Between East & West Mosul Controlling for Various Buffers of Detected Harm

	Perceived Military Legitimacy			
	(1)	(2)	(3)	(4)
Treated (West Mosul)	-0.152*** (0.046)	-0.131*** (0.046)	-0.122*** (0.045)	-0.132*** (0.046)
Observations	951	951	951	951
Unconditional Mean	3.633	3.633	3.633	3.633
PARAMETERS				
Basic Demographic Controls	✓	✓	✓	✓
Additional Individual Controls	✓	✓	✓	✓
Neighborhood Controls	✓	✓	✓	✓
Intermediate Controls	✓	✓	✓	✓
Reported House Damage	✓	✓	✓	✓
Reported HH Death or Injury	✓	✓	✓	✓
Detected House Damage (10m)	✓			
Detected House Damage (50m)		✓		
Detected House Damage (100m)			✓	
Detected House Damage (500m)				✓

Note: *** p<0.01, ** p<0.05, * p<0.1; Demographics controls are: gender, education level, age, and pre-IS household income. Additional individual level controls are: reported harm during IS rule (pre-battle), experienced various grievances with the Iraqi government (pre-IS), voted in the 2014 parliamentary elections, and paid taxes to IS. Neighborhood controls are: residential unit density, population density, and street density. Intermediate Controls are: primary identity, support for Sharia law, attendance at Friday prayer, preferences for IS governance, evaluation of IS corruption, fairness of IS taxation, and evaluation of Iraqi government corruption.