THE LOGIC OF INSURGENT ELECTORAL VIOLENCE*

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Abstract

Competitive elections are essential to establishing the political legitimacy of democratizing regimes. Recognizing the symbolic value of voter participation, we argue armed actors who lack institutional power try to undermine the state's mandate through electoral violence. We study the logic of such violence, focusing on the crucial balance between disrupting elections and minimizing harm to potential supporters of the rebellion. We theorize when and where insurgents attack around elections. To test the observable implications of our theory, we perform a quantitative assessment of insurgent electoral violence in Afghanistan. This assessment incorporates novel geo-referenced data on polling stations, data on the ethnic composition and locations of villages, and newly declassified microdata on insurgent activity. Our results show that insurgents significantly increase the intensity of violence on election days during the hours before and as voting centers open, but harm relatively fewer civilians than non-election periods. Insurgents also deploy improvised explosive devices (IEDs) along roads connecting voters and polling stations, but rarely bomb these roads multiple times. We instrument for the timing and spatial distribution of attacks using early morning wind conditions and nighttime cloud cover and show that insurgent electoral violence effectively undermines voter participation. Our results provide important insights for safeguarding at-risk elections in emerging democracies.

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1 Introduction

Inclusive political institutions contribute importantly to state-building. Such institutions enable emerging states to consolidate control through establishing bureaucratic capacity (Besley and Persson, 2009), monopolizing violence (Tilly, 1993; Fukuyama, 2014), and enhancing the executive's policy engagement with diverse economic and social actors (North and Weingast, 1989; Acemoglu et al., 2001, 2005; Acemoglu and Robinson, 2006). Scholars and policymakers have advocated competitive elections as an inclusive institutional fix to bolster the strength of the state in developing, violence-prone societies (Hyde, 2011; Kelley, 2012).[1] In theory, elections reduce incentives for armed rebellion by allowing political contestation through formal institutions (Dunning, 2011; Roeder and Rothchild, 2005) that alleviate credibility problems between warring factions (Walter, 1999; Wantchekon, 2004). Electoral institutions, therefore, should decrease the likelihood of renewed fighting, especially if international involvement helps to arbitrate peace agreements (Matanock, 2012, 2014) or oversee and manage elections (Fearon, 2011).

Yet the empirical record reveals that elections often fail to meet these goals and instead trigger new or renewed violence (Collier and Vicente, 2014; Hafner-Burton et al., 2014; Hyde and Marinov, 2012), especially where states lack bureaucratic capacity and well-functioning security services (Collier, 2009). One reason election violence occurs is because formal attempts to incorporate former or potential rivals have not always proved inclusive on paper or in practice; power-sharing arrangements between formerly warring factions frequently do not hold or fail shortly after initiation (Brancati and Snyder, 2013; Hartzell and Hoddie, 2003; Mansfield and Snyder, 2005). Moreover, despite allowing participation by many or most parties, certain rules may impose practical constraints that affect competition. Efforts to encourage broad participation without restrictions may also be unsuccessful if insurgents explicitly opt-out of participation because their political goals or ideologies are anathema to democracy.

[1] While we label Afghanistan an emerging democracy because of our focus on competitive elections, we recognize that it might be considered a hybrid or semi-authoritarian regime similar to many cases in the developing world where elections occur but with restrictions on competition (Levitsky and Way, 2010; Magaloni, 2008; Blaydes, 2013).

We examine the logic of insurgent electoral violence and the impact this violence has on election outcomes. We argue that insurgents face an important strategic trade-off in their production of electoral violence. On the one hand, insurgent groups excluded from (or opting out of) formal institutions are likely to differentially increase attacks during election events to undermine the voting process by threatening political actors and the electorate for turning out. Insurgents do so because elections serve an important coordination point in the battle between the government and rebels for the "hearts and minds" of the population. Governments conduct elections as plebiscites to solidify their rule and strengthen legitimacy; insurgents increase attacks during elections precisely to undermine these goals and to signal to the civilian population that the government lacks a monopoly on the use of force.

On the other hand, given their desire to wrest control of the state, insurgents also aim to maintain or expand their public support. Thus, insurgents incur "governance" costs for harming civilians generally (Berman and Matanock, 2015; Shapiro, 2013; Horne, 2006), and this constraint likely binds sharply around elections because civilians are in greater proximity to government forces than normal, and incidents involving harm to civilians receive heightened media and popular attention. Killing voters at polling stations, or engaging in other violent acts that may be otherwise individually rational, can hurt the group's reputation and undermine their broader political project. From a tactical perspective, rebels are concerned about civilian blowback because they are particularly vulnerable to citizens' informing to the government (Berman and Matanock, 2015). As Berman et al. (2011b, 773) explain, "the silence of the population, or a substantial portion thereof, is critical for insurgent success." Consequently, insurgents' use of violence in and around elections is likely to be carefully executed to avoid outsize harm to civilians.

Empirical evidence from existing studies on the effects of insurgent electoral violence on political behavior is mixed. Bateson (2012), Bellows and Miguel (2009), and Blattman (2009) estimate a *positive* relationship between exposure to violence and political participation. To explain this pattern, Robbins et al. (2013, 498) reason that insurgents' use of terrorist tactics increases citizens' fear and anxiety, which makes citizens "more inclined to take part in the political process in order to ensure that their voices are heard," and find that pre-election terrorist incidents are positively

correlated with country-level turnout in a panel study of democracies. Voters may even explicitly support and turn out for politicians because they employ violent tactics (Gutierrez-Romero, 2014), especially if violence is used to serve ethnic or sectarian interests (Wilkinson, 2004). Conversely, violence may *depress* turnout if voters fear the consequences of their participation on their personal safety (Collier and Vicente, 2014). Prior exposure to violence in conflict settings may affect how individuals calculate risk (Callen et al., 2014) and perceived threats of violence might cause voters to avoid polls (Hidalgo and Driscoll, 2014; Ferree et al., 2015). Additionally, recent studies demonstrate that certain types of violence shift voters' political preferences, particularly in Israel (Berrebi and Klor, 2006, 2008; Gould and Klor, 2010; Getmansky and Zeitzoff, 2014) and Spain (Bali, 2007; Montalvo, 2011). In order to safeguard at-risk voters and elections, it is therefore important to understand how insurgent tactics influence voting behavior and electoral outcomes.

This paper improves our understanding of the logic of insurgent electoral violence by investigating when and where insurgents carry out election-related attacks in Afghanistan and examining the causal impact of these attacks on voter participation. Despite centralized leadership and unification of purpose in training, ideology, and goals, the Taliban allows a large degree of discretion for field commanders with respect to target choices (Semple, 2014), and whether and to what degree systematic empirical patterns of attacks follow the dictates of Taliban leadership remains an open question.[2]

We test important observable implications of our theory regarding when and where insurgents attack around elections. First, we hypothesize that insurgents will carry out more attacks on election days, but will carefully time these attacks to minimize civilian casualties. We expect most election day attacks will occur before and as polling stations open, and will cause no more civilian casualties than non-election periods. Second, insurgents will selectively deploy improvised explosive devices (IEDs) ahead of elections to undermine voter access to polling stations. In particular, we anticipate IEDs will be deployed to cut off roads likely to be used by voters on election day as they travel to the polls. In order to minimize potential harm to civilians, insurgents will avoid repeated bombings. Finally, because it remains unclear if or how these tactics of insurgent electoral violence

[2]Since the U.S. invasion in 2001, Afghanistan has held regular elections. Our main analysis focuses on the five competitive national elections held since 2005.

shape individual decisions to vote, we empirically investigate how insurgent violence influences turnout.

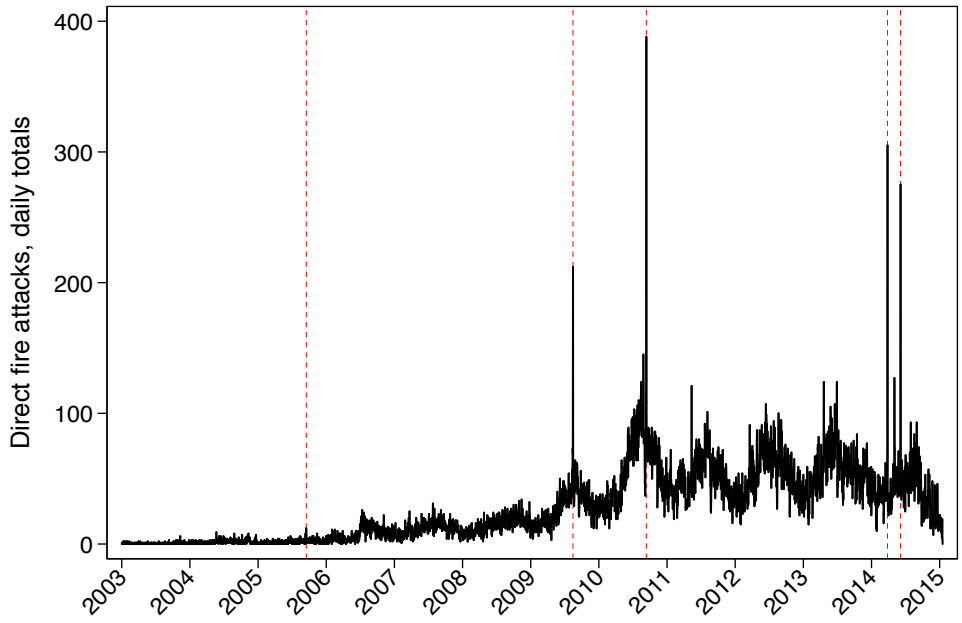
We contribute to the study of electoral violence and rational design of insurgency by exploring insurgents' tactical choices in unparalleled detail. Our investigation exploits newly declassified conflict data from the United States Central Command. Our version of the Significant Activities (SIGACTS) database for Afghanistan represents the most complete record of insurgent and coalition activity yet released for academic research. The detailed nature of this conflict data allows us to track insurgent activity by hour, to within several meters of the event location. This data also includes previously unreleased information on civilian casualties. We pair this conflict microdata with geo-referenced information on polling centers, electoral results, and the ethnic composition and locations of thousands of settlements. A high resolution map of Afghanistan's roads enables us to estimate the routes citizens likely used to cast their ballots during the most recent election.

To isolate the effect of violence on electoral outcomes, we employ instrumental variables to estimate the impact of plausibly exogenous variation in insurgent violence on turnout. We take advantage of two constraints on counterinsurgent detection of insurgent activity: surface wind conditions and nighttime cloud cover. In Afghanistan, windy conditions release excessive but temporary dust, affecting the ability of local national and coalition security forces to return fire. Nighttime cloud cover negatively affects the surveillance capabilities of security forces and makes human intelligence on IED emplacement less reliable. Recognizing that insurgents use low visibility conditions to shield their operations, we leverage fluctuations in ground wind conditions hours before voters cast their ballots and the density of nighttime clouds over Afghan roads in the month prior to the election to examine otherwise random deployment of violence. We demonstrate that insurgents respond to changes in these conditions, and we attempt to validate the exclusion assumption of our identification strategy by showing that windy conditions during the hours before voting and nighttime cloud cover ahead of elections are not significantly related with voting behavior except through their impact on violence.

Our results strongly suggest that insurgents in Afghanistan carefully calibrate electoral violence to disrupt democratic institutions while minimizing harm to civilians, and that this forms an

effective strategy to reduce voter turnout. Descriptively, we first demonstrate that insurgents increase attacks on election day. Figure 1 plots the daily intensity of direct fire attacks from 2003 to 2015. Dates of competitive national elections are represented by dashed red lines. Election days after 2005 are roughly two orders of magnitude more violent than non-election days. (We present a closer inspection of violence in 2005 in figure SI-6, which indicates that violence on election day was five to eight times higher than non-election days.)

Figure 1: Daily Direct Fire Attacks, 2003 through 2015. Dashed red lines represent election dates.



Next, we preview three core statistical results that offer substantial evidence consistent with the logic of our theory of insurgent electoral violence. First, regarding the within-day timing of election violence, we find that attacks are concentrated much earlier in the day than usual (i.e., before and as polling stations open to voters). Despite substantially increasing violence during these early morning hours on election days, we observe no more insurgent attacks resulting in civilians killed during election days in absolute terms. As a proportion of total attacks, substantially fewer attacks kill civilians on election days than in non-election periods.

Second, our results demonstrate that insurgents expanded the deployment of improvised ex-

plosive devices (IEDs) during the month before the 2014 election, but only along segments of the road network that would experience heightened traffic on election day by voters traveling to polling stations. While these roads were likely to be targeted at least once (extensive margin), insurgents were no more likely to bomb these roads multiple times than roads not used by voters on election day (intensive margin).

Finally, our instrumental variables estimates indicate that every additional early morning direct fire attack led to a 9–11% reduction in district-level turnout in the first and second rounds of the 2014 election. Our IV estimates also indicate that IED deployment along a given road decreased the total number of ballots cast at downstream polling centers by an average of 8,000 votes, roughly equivalent to shutting down eight polling centers.[3] Additional results indicate that roadside bombs were more likely to affect support for the Pashtun presidential candidate and eventual winner (Ashraf Ghani) compared to his competitor. Importantly, we show that voting patterns are not significantly associated with changes in early morning wind speed or nighttime cloud cover in the absence of their influence on insurgent violence.

The insights we draw from Afghanistan are relevant to other countries that suffer similar institutional weaknesses, face the threat of violence from insurgents acting outside the formal political process, and whose governments must compete with insurgents for the support and cooperation of the population. These results provide important evidence to consider how, in the context of growing violence around elections, counterinsurgency efforts might alter force deployments and tactics to decrease violence, increase voter participation, and reduce civilian casualties. These considerations offer comparative insights to other countries where violence threatens democratic consolidation after recent regime transitions, including Somalia, Yemen, Libya, and Egypt.

The paper proceeds as follows. Section 2 explains the setting for the study. We introduce descriptive qualitative evidence from primary and secondary sources that illuminate the Taliban's political objectives, constraints, and tactics. Section 3 presents our empirical strategy. We discuss the results of our analysis, as well as robustness checks, in Section 4, and Section 5 concludes with application of our results to numerous literatures.

[3] About 6,218 polling centers were open for voting in the first round and 6.6 million ballots were cast (NDI, 2014).

2 Setting: Afghanistan

Afghanistan provides an institutional environment characteristic of other weak states where elections occur but continue to be threatened by armed actors that have been excluded from formal participation in politics, both as the result of actions by the government and insurgents' pursuit of their own objectives (Mukhopadhyay, 2014; Chayes, 2006; Barfield, 2010).[4] Similar to other conflict settings, insurgent electoral violence has ebbed and flowed in intensity across five major electoral periods in Afghanistan since 2004. This remarkable variation affords us the opportunity to study patterns of violence while holding constant country-level factors that affect the dynamics of insurgent violence. Afghanistan also provides an unusually data-rich environment, allowing for higher quality estimates of the effects of violence on electoral outcomes, which we elaborate on below. Here, we discuss Afghanistan's electoral institutions and how Taliban insurgents demonstrates a constraint on the desire to disrupt elections while minimizing civilian casualties. We conclude with testable implications of our theory.

2.1 Electoral Institutions

Elections have played an important role in efforts to democratize, legitimize, and strengthen the Afghan state over the past 15 years. Critical to these efforts in the post-Taliban transition era was the creation of a Constitutional Loya Jirga (CLJ), a large and inclusive governing council that gained membership from thousands of leaders and notables from all regions and many walks of Afghan life. After the overthrow of the Taliban in 2001 and during the Bonn Conference, the CLJ ratified Hamid Karzai, a Pashtun, as president, and worked to create democratically-elected presidential and parliamentary institutions. The government sought to legitimize these institutions by holding presidential elections in 2004 (which Karzai won), followed by parliamentary elections in

[4]Beyond the government's inability to quell insurgent violence in Afghanistan (Malkasian, 2016), state weakness characterizes corruption and ineptitude in the national police (Giustozzi and Isaqzadeh, 2012), nepotistic and authoritarian presidential policies under Hamid Karzai (Rashid, 2012), financial fraud within the country's previously largest bank (Rubin and Risen, 2011; Partlow, 2016), and wide-spread and persistent electoral fraud (Callen and Long, 2015).

2005. Karzai gained re-election in 2009 followed by parliamentary elections in 2010.[5] Policymakers and observers viewed both contests as critical benchmarks for demonstrating the government's control in the shadow of a Coalition withdrawal, but allegations of fraud and election violence further eroded the government's legitimacy. In 2014, Karzai stepped down due to term limits. Ashraf Ghani, another Pashtun, ran against Abdullah Abdullah, a Tajik, in a race that went to a second round run-off, which Ghani won, a victory disputed given allegations of fraud. Under diplomatic pressure, Ghani appointed Abdullah as a newly created chief executive officer in the government, effectively establishing a power sharing executive branch.

Importantly, while the formation of the CLJ demonstrated early attempts at inclusive politics, formal political processes and institutions *did not* include the Taliban.[6] New research suggests that Taliban leadership tried to negotiate a settlement with the newly formed Karzai government soon after the invasion, but the government and the US rejected these overtures (Rashid, 2012).[7] The growing realization of the need to include the Taliban in government for the long-term prospects of peace is reflected in the numerous (although controversial) attempts by the Afghan government and international community to find a political solution with the Taliban joining formal political processes (like elections) in exchange for laying down arms.

2.2 Disrupting Elections with Violence

Within this context, we explore whether and why insurgents disrupt elections. By design, insurgents desire to overturn the existing regime and institute a new political and social order. The political objective of the Afghan Taliban consistently has been to overthrow the (nominally democratic)

[5] Given the post-invasion transition of power in Afghanistan, we do not consider the 2004 presidential election competitive, and restrict our analysis to the 2005 parliamentary vote and more recent elections.

[6] After the overthrow of the Taliban in late 2001, Osama bin Laden (al-Qaeda's leader), Mullah Mohammad Omar (the Taliban leader), and other Taliban members fled to Pakistan.

[7] "Lakhdar Brahimi and Francesc Vendrell, the UN mediators who had negotiated the Bonn Agreement (establishing a provisional government in Afghanistan after the U.S. invasion) ... admitted that their biggest mistake had been omitting the Taliban from the table at Bonn. Including them might well have achieved a peace that avoided the revival of the the Taliban insurgency in 2003, but at the time the Americans were not interested. The first peace offer came in 2002, just after the Taliban's defeat, from a group of senior Taliban, including [Syed Tayyab] Agha and the movement's number two, Mullah Abdul Ghani Baradar. The group wrote a letter to Karzai accepting his nomination as president and expressing a willingness to surrender if they received immunity from arrest. Both Karzai and Baradar came from the same Popalzai tribe of the Durrani Pashtuns in Kandahar. The United States and the Northern Alliance, which dominated his cabinet, told Karzai to ignore the offer. Subsequent attempts by other Taliban groups to talk to Kabul were also squashed" (Rashid, 2012, 124).

government and impose an Islamist regime in Afghanistan (Marsden, 1998, 57-66). Therefore, they do not compete as a political party to win legislative seats like violent actors in other contexts, but rather subvert the regime altogether.[8] This is clear from how the Taliban ruled in the 1990s and after they came to power (Rashid, 2008a). Mullah Omar, the Taliban's founder and leader during this time, "appeared to genuinely believe that Afghanistan's foreign and domestic policies should follow his interpretation of Islam, not realpolitik or domestic politics" (Byman, 2005, 192). Articulating the overarching goal of the Taliban, Mullah Omar was quoted as saying that the organization sought "'to establish the laws of God on Earth and prepared to sacrifice everything in pursuit of that goal'" (Byman, 2005, 192).[9] Accordingly, the Taliban has sought since the invasion to undermine the legitimacy of the newly constituted government by undermining electoral institutions through violence.[10]

Given these political goals and a demonstrated willingness to use violence to accomplish them, we argue that elections offer a particularly attractive opportunity for insurgents to subvert democratic processes. Elections are an important symbolic and functional coordination point—they usually occur at one time and embody the most crucial activity in delegative democracy (Ferejohn, 1986; Fiorina, 1981). Governments conduct elections as plebiscites to solidify their rule and strengthen legitimacy, and elections thus serve as an important benchmark in the battle for the "hearts and minds" of the population. Accordingly, insurgents aim to undermine elections by decreasing turnout through violence (or the threat of violence) by raising the personal cost of voting. In line with this logic, we expect to see higher levels of insurgent violence on election day compared to non-election periods, even days leading up to or following elections.

As figure 1 demonstrates, the Taliban significantly increased the production of violence on

[8] "Of significant note is that the Taliban did not attempt to form a distinct party as a 'political wing' of their larger movement, but rather chose to run under the labels of existing conservative Pashtun parties. All of those who ran stressed their credentials as mujaheddin prior to switching allegiance to the Taliban, downplaying, but not denying, their Taliban past" (NDI, 2005, 24).

[9] For an authoritative account of Taliban rule in the 1990s, see Rashid (2008b).

[10] "The Taliban have given Islamic fundamentalism a new face and a new identity for the next millennium–one that refuses to accept any compromise or political system except their own" (Rashid, 2008b, 94). Mullah Amir Khan Motaqi, the Taliban's acting minister of information and culture, stated this view as early as 1996: "The Islamic state of Afghanistan, under the leadership of the Taliban Islamic movement, has put into practice everything that it has preached, according to God's law and the guidance of the magnificent Holy Qur'an. Any step which has been taken by the Islamic state has been in conformity with the Shari'a and whatever has been said in words has been implemented in action" (Marsden, 1998, 62).

election days, a pattern that is particularly evident in 2009, 2010, and over the two rounds in 2014. In figure SI-6, we focus more closely on the 2005 parliamentary vote, which occurred before the height of the insurgency. Although difficult to visualize when compared to the more violent, later elections, violence on and around the 2005 election was substantial.

In the lead up to the 2005 parliamentary race, some observers reported Taliban violence (NDI, 2005, 6-7), but others concluded that there "remain questions about whether the Taliban were actually interested in disrupting them [elections] at all" (Coburn and Larson, 2014, 168). Giustozzi (2008, 114) observes that "the Taliban showed their readiness to defer to the desire of local communities to vote and avoided any major effort to sabotage the electoral process, despite having declared their opposition to the elections." Although field reports yield inconsistent anecdotes regarding the degree to which violence was used to undermine the first parliamentary election, our microdata reveal a clear uptick in deliberate and indiscriminate insurgent violence during and preceding the voting period.

Before the 2009 and 2010 elections, the Afghan government and Coalition forces braced for increased electoral violence (Bumiller and Nordland, 2010). Election observers noted a significant increase in insurgent violence in 2009 and 2010, relative to earlier elections, including threats against political candidates, aid workers, and voters (DI 2011, 20-21; NDI 2011, 11; FEFA 2011, 45).[11] The Taliban increased their attacks against Coalition forces in the lead up to these elections (DI, 2010, 32) and distributed leaflets at mosques in the heavily Pashtun areas in the East and South, threatening to harm anyone who cast ballots, and these threats were backed up with incidents of violence (Vogt, 2010).[12] The security situation had not changed much by the 2014 race. UN statistics showed a 22% and 40% increase in security incidents in the 5-month lead up to the first round of the 2014 election, relative to the same period in 2013 and 2012, respectively (DI, 2015, 20). There were reports of violence on voting day of the first round of voting, though levels varied

[11] UNAMA data indicated a 31% increase in civilian casualties in the first six months of 2010 relative to the same period in 2009 (FEFA, 2011, 44).

[12] Possibly because insurgents issued thousands of night letters across the country stating their intention to carry out violence against civilians and electoral institutions on election day in 2009 and 2010 (DI, 2010, 18) (FEFA, 2011, 59), ISAF and ANSF reportedly carried out more than 2,800 counterterrorist operations in the three months leading up to election day in 2010 in the hope that this would keep insurgents from being able to launch large scale attacks on election day and disrupt the voting process (NDI, 2011, 17).

considerably across districts (DI, 2015, 23-25). In this latest election, we see evidence that the Taliban was intent on maximizing disruption via violence. Not only did Taliban leaders replace insurgent commanders in between the first and second rounds of the 2014 election for not producing enough attacks designed to impact the election, but "some commanders in eastern Afghanistan were even executed for negligence and dereliction of duty" (DI, 2015, 33-34).

2.3 The Logic of Insurgent Electoral Violence

Variation in insurgent violence, both within and across elections, raises the question: what factors shape insurgents' violent electoral tactics? Similar to other illicit organizations, insurgents face management problems that make the coordination of joint goals—such as violence—difficult in the shadow of illegality.[13] Hindering these organizations' ability to coordinate violence consistently is that there exist heterogeneous preferences among members along various dimensions, and the ability to shirk, along with the need for operational secrecy, create manifold managerial dilemmas for leaders. In addition to acts of violence, rebels also conduct criminal activities, including revenue extraction from illicit enterprises (e.g., the drug-trade or smuggling) to support operations, and may require coercion and policing of members and population (Gates, 2002; Weinstein, 2007). While insurgents like the Taliban face a variety of organizational constraints on their production of violence, they also are constrained by factors external to the organization. We argue a critical dimension involves how civilians respond to insurgent-produced violence in a context of "competitive governance," where the government and rebels compete for public support (Berman et al., 2011b; Berman and Matanock, 2015) and insurgents' realization of political goals depends on the cooperation of the population (Galula, 1964; Thompson, 1966).[14] Considerable evidence shows that in civil wars, people frequently withdraw support from insurgents or governments that

[13] On these principal-agent and management problems for terrorist groups, see Gates (2002); Shapiro and Siegel (2012). In his wide-ranging investigation of the organizational dynamics of terrorist groups, Shapiro (2013) surveys available documents recovered from covert organizations and finds evidence that these organizations exert considerable effort to calibrate their use of violence in order to achieve political goals, as rampant indiscriminate violence could waste resources, alienate civilians, and cause a strong counterinsurgent response.

[14] This dynamic may be attenuated in cases where the government and/or insurgents can rely heavily on support from outside actors (Wood et al., 2012). While both the Afghan government and Taliban insurgents receive political and material assistance from international actors, we demonstrate that the attempt to consolidate domestic political authority and legitimacy requires support from the population.

harm civilians in the course of conflict (Birnir and Gohdes, 2012; Valentino et al., 2004; Lyall et al., 2013).[15] The need for insurgents to obtain civilian support for operational success is also important because insurgents are particularly vulnerable to citizens' informing to the government (Berman and Matanock, 2015; Lyall et al., 2015). As Berman et al. (2011b, 773) explain, "the silence of the population, or a substantial portion thereof, is critical for insurgent success." Condra and Shapiro (2012) thus argue that civilians punish insurgents responsible for collateral damage by sharing more information about insurgents wth government forces and their allies, a phenomenon corroborated by Shaver and Shapiro (2016) using "tips" data from the Iraq war. This does not mean that rebel groups do not occasionally commit acts of seemingly indiscriminate violence against civilians (Weinstein, 2007; Kalyvas, 2006; Valentino, 2014),[16] but rather that groups whose aims include taking over the state and ruling over the population are more likely to be successful with the support of the population than without it.

While we expect insurgents to be mindful of avoiding harm to potential supporters as a general principle, because of intense violence executed around elections, greater proximity of civilians to potential insurgent targets, and heightened media reporting of election-day events, insurgents should be even more deliberate about avoiding harm to civilians than usual. Qualitative evidence demonstrates the Afghan Taliban calibrate their attacks to avoid undue harm to civilians. For example, there have been disagreements between high-level Taliban leadership over whether to increase the use of suicide bombing as a tactic because they worry about the adverse effects of resulting civilian casualties (Giustozzi, 2008, 117). Though civilian casualties are recognized as an unavoidable byproduct of IEDs and suicide bombings, the Taliban provide event-specific explana-

[15]This is well documented across many cases (Valentino, 2014). Shapiro (2013, 171) details how this dynamic affected the Provisional Irish Republican Army (PIRA) as it sought to challenge British rule: "The political goals of the PIRA required great care in the application of violence. The group had to place sufficient military pressure on the British so as to compel them to give up Northern Ireland, while at the same time avoiding excessive violence that would cost the PIRA the support of moderate Catholics or make it politically impossible for British politicians to 'abandon' the Protestant majority by leaving Northern Ireland". Additional examples of insurgents exercising such restraint in their treatment of civilians include the National Resistance Army in Uganda (Weinstein, 2005), Tuareg insurgents in Mali (Humphreys and Mohamed, 2005), and the Bougainville Revolutionary Army in Papua New Guinea (Pelton, 2002).

[16]Indiscriminate violence has been noted in numerous conflicts, such as by the Lord's Resistance Army (LRA) in Northern Uganda, the Revolutionary United Front (RUF) in Sierra Leone, and recently with the Islamic State (ISIS) in Syria and Northern Iraq. Violence against civilians appears to have arisen with the LRA and RUF due to internal problems of command-and-control, whereas with ISIS it reflects their ideology and political goals.

tions for their actions to the population, showing a sensitivity to civilian reaction (Giustozzi, 2008, 117).[17] Taliban code of conduct documents (*Layha*) dating from at least 2006 provide primary evidence of this overriding concern in the use of violence: "If an official or an ordinary person harms the common people in the name of mujahedin, his senior officer is responsible for reforming him" (Clark, 2011, 26).[18]

Furthermore, evidence indicates that this constraint binds even more sharply around elections. Recalling the 2009 election, journalists observed that "the Taliban has conducted a series of calibrated attacks aimed at using the minimum amount of violence to reduce voting as much as possible" (Kagan 2009), while also trying to minimize civilian casualties. Regarding the 2014 elections, Semple (2014) notes that the Taliban rejected the legitimacy of the race, and that in issuing instructions to officials and commanders to disrupt the election, military leadership allowed field commanders discretion on choice of tactics and targets, in part reflecting concern over effects on civilians.[19] The qualitative record in Afghanistan is consistent with the argument that the Taliban's purpose for using violence on and around elections was not to inflict harm on civilians, but rather "one of intimidation, designed to deter rather than to actually kill voters" (DI, 2010, 36), "to give citizens the sense that they are unsafe and can become victims at any moment" (Coburn and Larson, 2014, 171). Indeed, the primary goal of violence in this context "is not the number of casualties, but the impact that it has on the wider population" (Coburn and Larson, 2014, 171).[20]

[17] The Taliban have even gone so far as to warn civilians in rural areas (but not urban ones) of impending attacks to avoid harm (Giustozzi, 2008, 117).

[18] From 2009: "In carrying out martyrdom operations, take great efforts to avoid casualties among the common people" (Clark, 2011, 21). From 2010: "The Taliban must treat civilians according to Islamic norms and morality to win over the hearts and minds of the people" (AP, 2010), and "All efforts must be made to avoid harming civilians in attacks" (AP, 2010). In a letter from Taliban leadership to UNAMA in 2013: "According to us civilians are those who are in no way involved in fighting. The white-bearded people, women, children and common people who live an ordinary life, it is illegitimate to bring them under attack or kill them" (UNAMA, 2013, 29). Taliban code of conduct (as quoted in Ahmed CS Monitor 2009): "'Every member of the Mujahideen must do their best to avoid civilian deaths, civilian injuries and damage to civilian property. Great care must be taken ... Suicide attacks should only be used on high and important targets. A brave son of Islam should be used for lower and useless targets.'"

[19] "[C]ommanders must decide whether to attack locations associated with the elections, personnel associated with the process, or voters and candidates. Some eastern field commanders expressed dissent about this guidance—not because they favor elections, but because their operating ability depends upon maintaining local popular consent. Attacking civilians associated with the election by intimidating voters would, for example, undermine that consent" (Semple, 2014).

[20] "Reports from Afghan news sources indicate that Taliban forces fired rockets at a number of polling stations across the country without generating many casualties...The Taliban has always faced a challenge in attempting to undermine the elections. Its cultural sensitivity leads it to avoid killing civilians whenever possible, but disrupting elections requires attacking targets with large numbers of civilians. The violence today suggests an attempt to square

However, while their tactical use of electoral violence is consistent with our argument, the effects of the Taliban's violence on turnout remains an open question. Anecdotally, their use of violence ahead of and during elections may have significantly influenced voting in some areas,[21] while having a minimal impact in other regions.[22]

2.4 Observable Implications

Our argument hinges on the trade-off between disrupting elections through violence and avoiding civilian blow-back. The field reports and Taliban primary documents reviewed above provide qualitative evidence consistent with our theory. We focus on two observable implications of our argument—outlining when and where insurgents attack around elections—and conclude by investigating how these tactics influence voting behavior. It remains unclear if or how the timing and targets of insurgent electoral violence shape individual decisions to vote and which candidates to support if they do.

First, our argument implies that insurgents will carefully consider the timing of attacks they carry out on or immediately preceding elections. Given the quality of the microdata used in our analysis, we can distinguish patterns in violence throughout the day, by hour. With this in mind, we hypothesize that insurgents are likely to carry out violence intended to deter civilians from voting during hours before civilians will be directly exposed to this violence. Although insurgents aim to disrupt the electoral process through a substantial increase in violence, we anticipate that they deliberately avoid harming civilians during elections specifically.

Second, we expect insurgents to consider the selection of their targets and spatial distribution of attacks. We hypothesize that insurgents will focus efforts on roads used by voters traveling to polling stations. Yet the expansion of IED deployment to these areas should only occur in the

the circle. Taliban forces fired rockets at polling places and into cities early in the morning when few people were around to be injured. They appear to have preferred to close roads rather than to attack polling sites or populated areas. It is important to recognize such Taliban activity for what is is: carefully calibrated use of force to induce terror among the population while minimizing civilian causalties" (Kagan 2009).

[21] "In both Gardez and in Qara Bagh, there were failed bomb attacks in 2009 that people were still discussing in 2010 and which clearly shaped debates over the approaching parliamentary poll" (Coburn and Larson, 2014, 171).

[22] "[R]elatively few people we talked to appeared to actually decide not to vote [in 2010] based on this threat [of Taliban violence], with the effectiveness of parliament and corruption of the electoral process much more likely to deter them" (Coburn and Larson, 2014, 169-70). See also Condra et al. (2016), who report on systematic survey evidence of voters in 2010 consistent with this observation.

period leading up to the election, when potential voters are assessing the viability of travel and the looming threat of violence has the greatest effect on voter perceptions of personal security. What's more, insurgents might also restrain the intensity with which they target even the most strategically important roads. For example, if a single IED detonation is enough to credibly signal the ability of the insurgency to target a particular road, the marginal gain from repeated bombings is minimal. Repeatedly bombing a given road might also increase the likelihood of civilian harm, making insurgents operating in the area more vulnerable to informing by civilians.

Finally, we test whether these shifts in insurgent tactics are strategically beneficial for disrupting the election in terms of violence's effect on turnout. After all, minimizing harm to civilians when using violence makes little sense if that violence is not effective in deterring voting. To overcome common inferential challenges inherent in observational studies of this kind–since the relationship between violence and voting may be endogenous or driven by spurious factors–we leverage two environmental factors that constrain the timing and type of violence insurgents can produce as instruments to isolate the effect of violence on turnout.

3 Empirical Strategy

In the previous section, we provided descriptive evidence to support the claim that insurgents in Afghanistan increase attacks on election day, while minimizing loss of life to civilians. In this section, we turn to a description of our data and the empirical strategy we use to test our hypotheses on insurgent electoral tactics in Afghanistan. At least two sets of empirical and methodological challenges have stymied efforts to estimate the relationship between violence and electoral outcomes, like turnout. The first is that most contexts that would be suitable for empirical testing lack the necessary fine-grained data. The second involves the difficulty in systematically isolating the effects of electoral violence on electoral outcomes that are independent from factors that affect insurgents' decision-making on the use of violence and also correlate with turnout; a source of exogenous variation in violence is required but seldom available.

Afghanistan provides not only a theoretically relevant case in which to investigate these dynamics, but as we describe below, our study overcomes these critical obstacles that usually limit

the ability to draw meaningful and robust inferences. The country has undergone multiple rounds of presidential and parliamentary elections while in the throes of insurgency, allowing for testing over multiple 'cases' while holding country-level factors constant. Critically, working with others in the academic and development communities, we have obtained and developed a rich body of data on elections and on insurgent violence perpetrated on and around those days. Throughout the ongoing conflict, ISAF and Afghan security forces have tracked insurgent attacks by documenting the approximate time (often down to the minute) and precise (geo-referenced) location of attacks perpetrated against those forces or reported to them. This dataset includes more than 200,000 individual observations of insurgent attacks between 2003 and 2015, each of which is identified by attack type (e.g., direct fire attack, improvised explosive device), prepared and released to the academic community by Shaver and Wright (2016).

The Taliban has undertaken three primary types of attacks throughout the war involving direct fire, indirect fire, and IEDs. Direct fire includes attacks perpetrated with weapons including small arms and rocket-propelled grenades. Individual insurgents (often acting in groups) carry out these attacks in a variety of ways. Indirect fire refers to attacks that include mortars and rockets. Unlike direct fire, indirect fire attacks can be launched from much greater distances. However, they tend to be far less accurate in hitting their target. Nevertheless, even when mortars and rockets fail to strike their intended target, they often create large explosions that can be heard over relatively large distances. Finally, IEDs tend to be directed against moving targets (e.g., vehicle patrol and convoys) and are typically placed on or immediately around roadways. For brevity, we use direct fire attacks to evaluate the timing of insurgent violence. All timing results also hold for indirect fire attacks. Because the spatial distribution of IEDs is critical to roadway access, we use this type of attack to study where insurgents deploy violence ahead of elections.

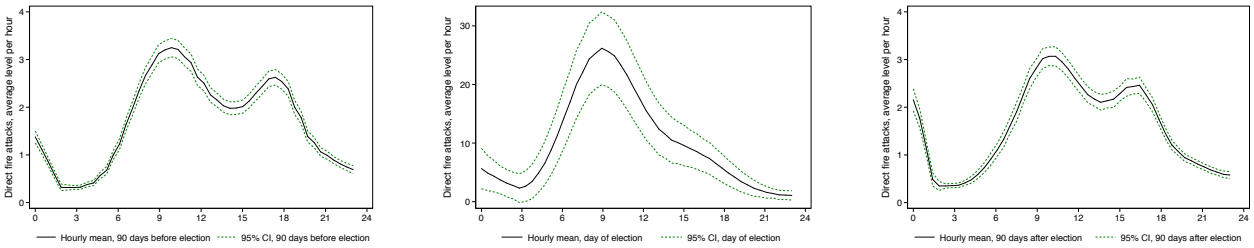
3.1 Timing of Attacks

As figure 1 demonstrates, the Taliban significantly increased the production of violence on election days. But do patterns of violence on those days conform to predictions that insurgents attempted

to minimize voter turnout without harming large numbers of civilians? If so, we expect the organization to have concentrated its attacks—and direct fire, in particular—in the hours leading up to the opening of polling stations at 0700 across elections (Callen and Long, 2015). In doing so, insurgents would generate significant levels of loud noise to cause psychological distress and discourage voting without running the risk of hitting any large group of voters gathered at polling stations.

As a preliminary investigation of our first observable implication, we first plot a local polynomial fit of the distribution of direct fire attacks on election days by hour of the day (figure 2b). We then repeat this exercise, plotting the distribution of all insurgent attacks by hour of the day for the ninety-day period preceding (figure 2a) and succeeding those election days (figure 2c).[23] This allows us to explore visually whether the distribution of attacks on election days appear to differ from comparable days. These plots appear in figure 2. We also repeat this process for indirect fire attacks. These plots appear in figure SI-2.

Figure 2: Direct fire attacks, by hour of day, before, on, and after election days



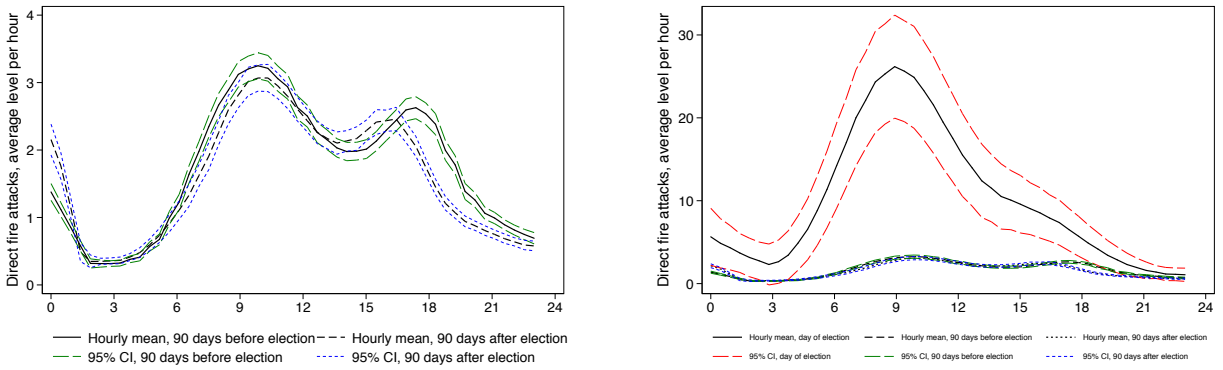
(a) 90 days before election (b) Election day (c) 90 days after election

Differences in these timing-of-violence distributions are stark. Direct fire and indirect fire attacks are all highly concentrated during morning hours on election days, but spread more evenly across daytime hours on non-election comparison days. As a baseline statistical assessment of these

[23] Although each incident of insurgent violence in the data is time stamped, plots of the data reveal two important characteristics. First, a disproportionately large number of observations are coded as taking place at exactly 0000 hours. We suspect that a midnight designation was given to incidents for which an actual event time was not reported. Thus, we drop all incidents of insurgent attacks reported as taking place at exactly 0000 hours. (We retain, however, all observations reported as taking place at any other time on that hour (e.g., 0024).) Second, the plots show that although attack times were often recorded down to the minute (e.g., 1234 hours), they are skewed toward natural rounding numbers—thus, for instance, there tend to be more listed on the 45th minute of an hour (e.g., 1245) than on, say, the 43rd minute (e.g., 1243). Because we are concerned with attacks at the hour level, we round all attacks for a given hour to the hour within which they fall.

distributions, we perform a series of Kolmogorov-Smirnov tests, comparing each election day distribution of violence to the preceding and succeeding distributions of violence. Across all elections and attack types, we reject the null hypothesis that the timing of violence on election days is the same as a normal day. Conversely, across the same conditions, we fail to reject the null hypothesis that the timing of pre- and post-election violence are identical. We provide visual evidence of these differences in figure 3. On the left panel (figure 3a), the temporal trends in violence 90 days before and 90 days after Afghan elections are nearly indistinguishable. However, the right panel (figure 3b) plots election day violence against the 90 days before and after. It is clear that violence is orders of magnitude greater during voting periods than normal periods, and concentrated earlier in the day.

Figure 3: Comparing trends in direct fire attacks, by hour of day



(a) 90 days before vs. 90 days after election

(b) Pre/post trends with Election Day

Next, to formally examine whether the Taliban carried out relatively more early morning attacks (and relatively fewer afternoon attacks) on election days compared to other days, we test three estimating equations, jointly expressed as follows:

$$A_{d_i} = \zeta + \sum_{i=1}^{24}(\vartheta_i Hour_{d_i}) + \sum_{i=1}^{24}(\alpha_i Hour_{d_i} * Election) + \xi_d + \varepsilon_{d_i} \quad (1)$$

where A denotes number of insurgent attacks (direct fire in the main analysis, indirect fire in supporting information) and $Hour$ and $Election$ are indicator variables for the hour of the day and election day. d denotes the day and i notes the hour of day $\{q, ..., r\}$. Finally, a time fixed effect is

given by ξ_d. We calculate results with both month and, separately, week fixed effects. The omitted base hour is 1300 hours local time.

These models are estimated over a 90 day counterfactual period (before each election, $n = 10,416$) at the national level (i.e., country-hour). We then replicate these tests at both the province and district levels.[24]

3.2 Spatial Distribution of Attacks

The second empirical implication of our theory suggests that insurgents should adjust tactics regarding the spatial allocation of IEDs ahead of elections. We are especially interested in identifying variation in the use of IEDs along Afghanistan's road network and whether it reflects strategies to disrupt the process, while minimizing loss of life.

We use the most comprehensive road network data currently available, which maps all paved roads in Afghanistan R composed of intersections N and roadways E (so, $R = (N, E)$). Voters attempt to travel from their villages (figure SI-9) to publicly announced polling stations (figure SI-10) where they vote. This polling station map was released in February 2014. The village centroids and polling stations are drawn from administrative data for the 2014 election. Each voter attempts to minimize the cost of travel. For simplicity, let each roadway $e \in E$ have a cost function determined by the length (l_e) of the road, so the expense of traveling along a given road is equal to $c_e(l_e)$.

If traversing $n \in N$ is costless, then the total cost of a potential election day route p is $V(p) = \sum_{e \in p} c_e(l_e)$. We assume movement through intersections is costless to avoid imposing additional assumptions on this optimization exercise. Let $P_{v,s}$ denote the set of all possible routes between connected villages v and polling stations s. Voters optimize routes such that:

$$\min_{p \in P_{v,s}} V(p). \tag{2}$$

The resulting routes are plotted in figure 7.[25] We use a similar spatial model to calculate the intensity of non-election day traffic. To identify high traffic roads, we map the routes linking

[24] For the national and provincial level results, we relax the counterfactual period to include all days. Results are highly consistent and available upon request.

[25] We follow similar methods as Dell (2015) and Wright (2016).

Afghanistan's one hundred largest population centers to the national capital in Kabul. We use these details to decompose our empirical results below. We then snap deployed IEDs to the road network (figure SI-11) and generate road specific, time-varying, measures of IED exposure.

We estimate the following linear probability model:

$$Y_r = \alpha + (Route_r)\beta_1 + (Length_r)\beta_2 + (Violence_{r,w})\beta_3 + X_r\beta_4 + \epsilon_r, \tag{3}$$

where r indicates road specific measure. In the primary analysis, Y_r is a binary indicator of IED deployment along a given road in the month preceding the election. $Route_r$ is an indicator of whether a road falls along at least one election day traffic route. $Length_r$ measures the length of each road segment, which, in expectation, should covary positively with probability of deployment. $Violence_{r,w}$ is a road-specific violence trend, with time window w. In the main analysis, we set w to six months and confirm robustness to a range of possible w values. Throughout the analysis, X_r will capture a basket of covariates relevant to the analysis. In particular, we examine intensity of road use, ethnic population connected by each road, an indicator variable of high traffic intensity *independent of the election*, and administrative fixed effects. We present heteroskedasticity consistent standard errors used to address concerns regarding spatial clustering of insurgent activity.

3.3 The Impact of Violence on Voting

We estimate the impact of the timing and spatial distribution of violence on voting. Although pre-election and election day violence pose a physical threat to voters, it remains unclear if attacks actually deter voting and effectively undermine the process. Insurgents may time and deploy their violence to maximize disruption while minimizing harm to civilians, but are also responding strategically to factors we may not know and cannot incorporate in our models. To identify the impact of violence on voting, we need a source of plausibly exogenous variation in the timing and spatial distribution of attacks. Our strategy is to leverage two environmental constraints on insurgent and counterinsurgent operations: surface wind speeds and nighttime cloud cover.

In Afghanistan, strong ground winds cause dusty conditions and reduce visibility (Carter and Veale, 2013), which has been shown to affect combat decisions in other conflicts (Winters et al.,

2001). Low visibility conditions create opportunities for direct fire attacks, where insurgents can avoid immediate detection of their position while engaging security forces. Coalition and local national forces are also trained not to return fire when they cannot clearly distinguish potential attackers from civilians. This situation is likely compounded on election days, when civilians are more active than usual.

To estimate the impact of early morning violence on turnout, we gather district voting returns from the first and second round of the 2014 election. Combined with district population figures, we calculate turnout for both rounds. We also assemble district-level wind speed data on each of the election days at three times: 0430, 1030, and 1630 hours.[26] Our first measure, which we use as an instrument, is measured hours before polling stations open at 7:00 AM (Callen and Long, 2015). However, because windy conditions may be correlated across the day, and dust plumes might reduce turnout, we include the latter two measures in all models as control variables. When studying the timing of direct fire attacks on election days, we estimate the following model:

$$Y_{d,e} = \alpha + (\widehat{Attacks}_{d,e,t})\beta_1 + X_{d,e}\beta_2 + \epsilon_{d,e}. \tag{4}$$

where the point estimate on $(\widehat{Attacks}_{d,e,t})$ is the quantity of interest, with t indicating the time window used to calculate early to late morning attacks. In the main analysis, we set t to the range 0500 to 1100 hours. We confirm our results are robust to all pre-afternoon values of t. We measure turnout, $Y_{d,e}$, by district d and election round e. Our covariates $X_{d,e}$ usually include election fixed effects, voting hour wind speeds, population, and several models incorporate three election day measures of precipitation and ambient temperature as included instruments.

Next, we use nighttime cloud cover as an instrument for the distribution of IEDs ahead of the 2014 election.[27] Although IEDs may be deployed at any hour, conducting deployment operations at night reduces the probability of immediate detection by civilians and security forces. The intensity of nighttime cloud cover also affects the ability of counterinsurgents to directly observe

[26]The baseline climate reanalysis was prepared by The National Centers for Environmental Prediction (NCEP) and Department of Energy using state-of-the-art assimilation techniques (Saha et al., 2010). These data are derived from reanalysis (climate modeling) of underlying meteorological data.

[27]We extract this data from NCEP raster files (Saha et al., 2010).

rebel activity using various remote surveillance tools. To estimate the impact of pre-election IED deployment on voting, we collect voting records on all operational polling stations during the first round of the 2014 election. We then extract a measure of nighttime cloud cover—the percentage of nights in March 2014 with dense coverage—at the road segment level. The cloud cover data is gridded and we cluster our standard errors accordingly. Because cloud cover may be correlated with rainfall, and flooding could have a persistent effect on voting, we control for a road-specific measure of precipitation during the pre-election period. To assess the consequences of pre-election IED deployment, we estimate the following model:

$$Y_r = \alpha + (\widehat{IED_r})\beta_1 + (Length_r)\beta_2 + (Violence_{r,w})\beta_3 + X_r\beta_4 + \epsilon_r. \tag{5}$$

where the point estimate on $(\widehat{IED_r})$ is the quantity of interest, indicating whether a road has been targeted during the pre-election period. We measure vote totals, Y_r, by road r, summing the ballots cast during the first round at all stations connected by a given road. This allows us to estimate the total number of votes not cast because of IED deployment along a given road. Our covariates X_r usually include district fixed effects, population, and several models incorporate road-specific measures of pre-election precipitation as an included instrument.

4 Results

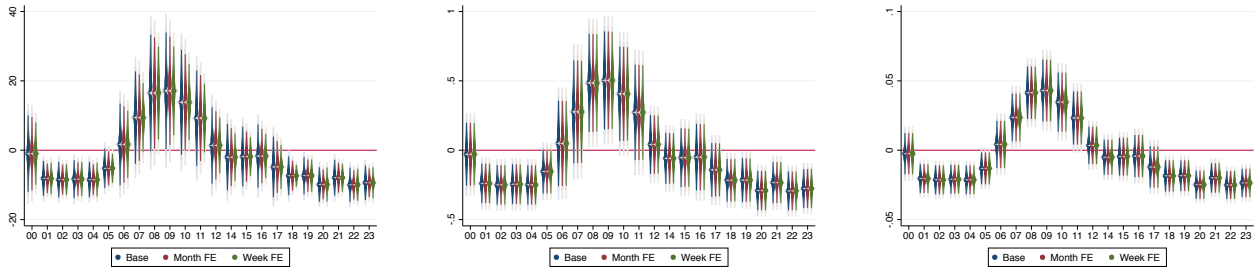
4.1 Timing of Attacks

We carry out the analysis in several stages. For purposes of interpretation, we select 1300 hours as the base (omitted) hour for all regression specifications. We begin by regressing each hour of the day on attack numbers. These results indicate that, in general, insurgents tend to carry out greater numbers of attacks during the morning hours between 0600 and 1200 hours. All other hours of the day tend to experience fewer attacks than the base hour. Next, we add the election day indicator to the model. As expected, this variable is positive and significant, indicating that elections tend to be more violent than other days of the conflict.

The main quantities of interest are the election day interaction terms. These indicate whether

specific hours on election day are more violent. To ease interpretation of the 207 point estimates of interest, we plot these coefficient estimates for direct fire attacks in figure 4 and introduce results for indirect fire attacks in figure SI-4. For comparison at the national, province, and district levels, we focus on models using the ninety-day window.[28] We observe a general and highly robust pattern: although morning hours tend to be the most violent for the average conflict day, on election days the period between 0700 and 1000 hours are especially violent. These results are remarkably persistent when we incorporate month and, separately, week fixed effects. On election days, the Taliban significantly increased the number of attacks it carried out during this morning period, consistent with expectations.

Figure 4: Direct fire attacks by hour, election day vs. non-election day using ninety-day window (national, province, district). 95% confidence intervals reported using robust standard errors.



(a) National (b) Province (c) District

If the insurgent's optimization problem binds, we anticipate that the Taliban will maximize election disruption while minimizing civilian casualties. Our results suggest that the hour-of-election day timing of attacks yields evidence of restraint: the substantial increase in violence during the early morning hours of election day mirrors a decline in violence, of all types, by an order of magnitude after 10 AM. To achieve electoral disruption without respect for harm to civilians, insurgents would maintain a high level of violence throughout the day of voting. But insurgents produce a tremendous amount of violence *before* polls open and voting has started to credibly signal their ability to wield a battery of violence through the early morning, without the collateral damage of attacks during voting hours.

[28] Models leveraging all data are restricted (for computational reasons) to the national and province levels. These results are highly consistent and available upon request.

Beyond minimizing damage to civilians, the specific timing of election-day attacks we observe could be consistent with a few other insurgent strategies, which we address. First, the early hours of the day could reflect times when insurgents more easily coordinate activities, or attacks are more likely to be successful, regardless of their effects on civilians. For this to be true, we should observe a concentration of attacks in the early morning across all days, not just election days. However, our results demonstrate that the concentration of the timing of attacks in the morning is unique to election day.

Second, the Afghan government and ISAF could differentially alter their force deployments on election day in the early morning, and insurgents could respond because changes in deployments might offer differential levels or quality of targets if, for instance, the election morning meant that more patrols were out and created more targets. However, we note that whereas force deployments did change to provide protection for the electoral process and voters, the deployments and lay-down of forces was enacted two days before the election, and would have been in place from then through election day and the conclusion of voting and counting at polling centers (Condra et al., 2016).[29] Therefore, changes in deployments cannot account for the specific timing of attacks on election day. Moreover, we note that deployments for the election mandated significantly *fewer* patrols by ISAF forces (to reduce the likelihood of attacks against convoys),[30] and placed Afghan forces in concentric rings around polling centers, but not directly adjacent to polling centers (NDI, 2011, 16-17). Therefore, the timing of attacks on election day does not correspond to a strategy that would help insurgents find more Afghan security or ISAF targets, and if anything, would provide fewer opportunities near polling centers.

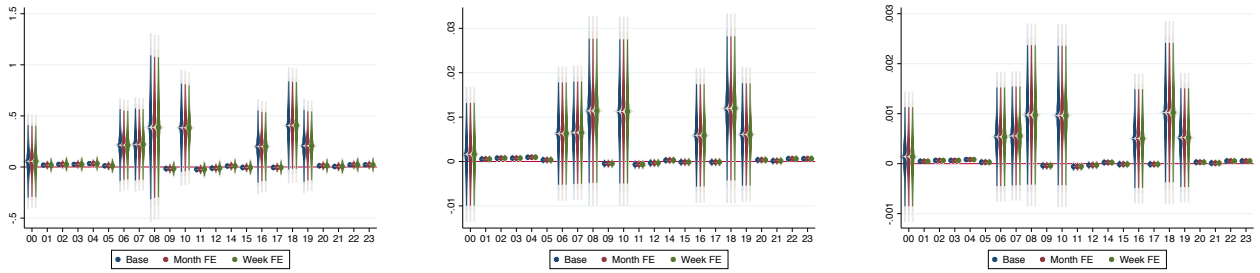
As a final test of our argument on this point, in figure 5, we repeat our time-of-day analysis but replace our outcome of interest with direct fire attacks that *cause civilian casualties*. Notice that the levels of fatal attacks on election days do not significantly increase during the hours when insurgents carry out the majority of their attacks. In absolute terms, this measure of harm to

[29] Author [Long] was an accredited election observer in 2009, 2010, and the 2014 vote audit, and was privy to briefings by Afghan, ISAF, and IEC officials who relayed this deployment strategy. Further details can be found in Condra et al. (2016).

[30] Indeed, in later elections, ISAF was to respond to election day threats only *"in extremis"*, with the Afghan National Army and Police taking primary responsibility for maintaining security (NDI, 2011, 17).

civilians is either decreasing (0900) or remaining the same as the preelection period. In relative terms, given the substantial increase in direct fire intensity on election days, these results indicate a substantial decline in harm to civilians during voting periods. We demonstrate the same result for indirect fire attacks in figure SI-5. This serves as remarkable systematic quantitative evidence of the Taliban's efforts to strategically avoid harm to civilians even as they dramatically increased the production of violence on election day, and it accords with qualitative evidence presented above that the organization recognized this as a binding constraint on their ability to disrupt elections.

Figure 5: Direct fire attacks causing civilian casualties by hour, election day vs. non-election day using ninety-day window (national, province, district). 95% confidence intervals reported using robust standard errors.



(a) National (b) Province (c) District

We have argued that insurgents target elections with violence because elections are symbolically and functionally important in democratic politics, and not (just) because population movement makes these days more vulnerable to attack than non-election periods. In contrast to this argument, it could be that the patterns of insurgent violence we observe on election days are indistinguishable from patterns of violence observed during large-scale, non-election events that are similarly associated with substantial population movement and public assembly. If, in fact, violence in and around election periods and salient non-election events closely resemble one another, insurgents may be less concerned with disrupting elections because they legitimate the state than our theoretical argument or main results indicate.

To test this conjecture, we investigate patterns of violence on four other days comparable to elections in their national significance and similarly characterized by public celebration, congregations of large groups, and road-borne travel. The first three are annual religious festivals and

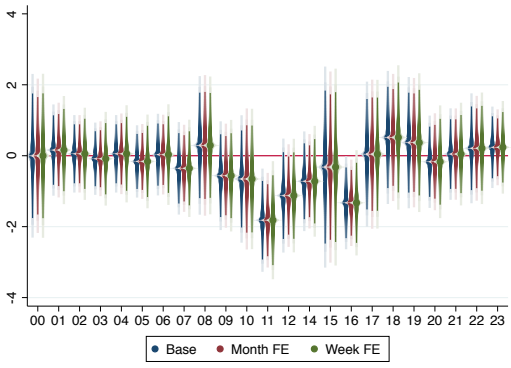
celebrations. Eid al-Fitr marks the end of Ramadan and the month of fasting, and Eid al-Adha commemorates Abraham's obedience to God demonstrated through willingness to sacrifice his son in the Old Testament. These are among the holiest days on the Islamic calendar and people may travel to visit friends and family to celebrate, as well as go to mosque for prayer. Mowlud Sharif commemorates the birth of the Prophet Mohammad and features public celebrations and processions. Finally, and because these festivals are religiously significant in a way that elections are not, we examine patterns of violence on Afghanistan's Independence Day, celebrated on August 19.[31] Independence Day commemorates the formal end of Anglo-Afghan hostilities in 1919. It is not only a long-standing holiday in Afghan society, but also predates the Taliban's rule and the formal fusion of religion and politics that came with it. Thus, its secular nature and national significance likely make the Afghan Independence Day the closest direct comparison to election days.

For each of these events, we replicate our analysis of direct fire attacks shown in in figure 4, which compares the intensity of direct fire attacks on election and non-election days by hour. In figure 6, we plot the distribution of attacks for each of the events, during the period from 2009 to 2014.[32] We point out two important observations from these plots. First, there is no consistent pattern in the violence distributions across holidays. Second, while figure 4a reveals a highly statistically significant and substantial uptick in violence concentrated in the early morning hours of the day, there is no such uptick discernible in the within-day distribution of violence for any of these other salient public events.

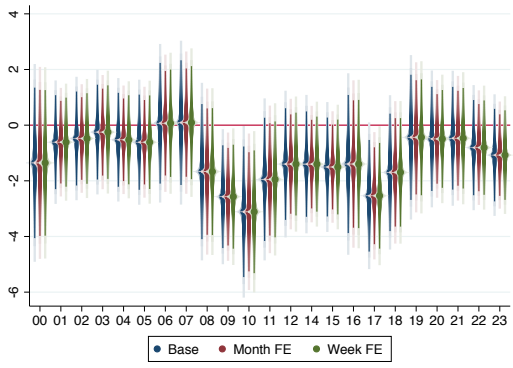
[31] The other festivals and holy days are celebrated on different days each year, as they run on a lunar calendar. We take this into account in our empirical analysis below.

[32] The results are consistent if we study the entire period, as we present, or only election years.

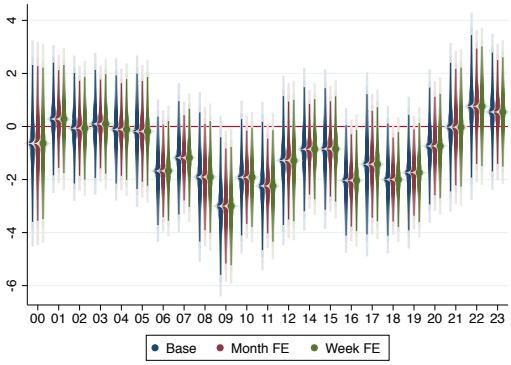
Figure 6: Direct fire attacks by hour, holiday vs. non-election day using ninety-day window (national, 2009-2014). 95% confidence intervals reported using robust standard errors.



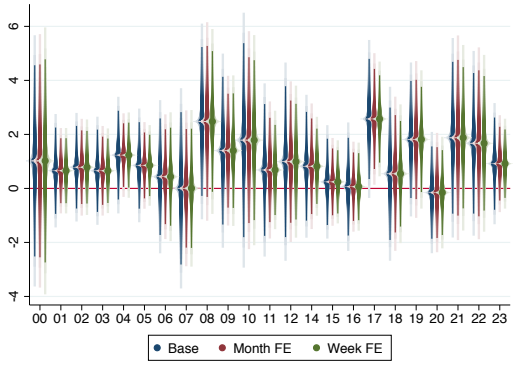
(a) Mowlud Sharif



(b) Eid al-Adha



(c) Eid al-Fitr



(d) Afghan Independence Day

4.2 Spatial Distribution of Attacks

We next estimate how insurgent deployment of IEDs changed ahead of the 2014 election to disrupt the process. We utilize data from this election because we have comprehensive data on the location of polling stations across the country, and the government initiated a moratorium on coverage of insurgent activity ahead of the election. This moratorium created an information problem for insurgents attempting to disrupt voter turnout on the day of the first round of elections: absent journalistic coverage, civilians and potential voters would not be able to anticipate whether or not a stretch of road is dangerous. We leverage this uncertainty by expanding the "pre-election" period to include March through April 4, 2014. We study IED deployment along the road network to detect if insurgents were strategic in the allocation of their fighting effort. As discussed above, we identify traffic equilibria—paths along the road network—that link voters with the closest polling station available for their use.[33] This involves mapping population centers, identifying polling stations, and linking these objects to a comprehensive network of Afghanistan's roads. We also perform a population-weighted calculation of traffic intensity along the road network that enables us to identify which roads are subject to high traffic flows across time, independent of election day. This process allows us to distinguish which elements of the road network experience high traffic flow regardless of the election, those roads with heightened traffic only on election day, and those elements of the network that are largely irrelevant.

Our main analysis, presented in Panel A of table 1, illustrates how IED deployment shifted across the road network that connected potential voters to polling stations, compared to roads that experienced limited traffic on election day. Importantly, the outcome of interest is not the intensity of road disruption on the day of the election. Instead, we examine how insurgents deployed IEDs during the period immediately preceding the election. In column (1), we find that roads used as an election day route experienced a significant uptick in violence during March and early April 2014, compared to less relevant roads. Because Taliban subunits are traditionally restricted in their mobility, we introduce a district fixed effect in column (2) of Panel A. This is our preferred

[33] Afghans register to vote by province and are able to vote anywhere within that province; therefore, they are not subject to registration that only allows voting at a particular station.

specification, and confirms that IED deployment within and across districts follows a consistent pattern.

In column (3), we show results from a falsification test, leveraged from the fact that the map of polling station locations was released in February 2014. If it is true that the reason insurgents targeted these particular roads with IEDs was because these roads connected villagers to polling stations and not because of some other (unobserved) feature of the roads, then before these roads were revealed to have this connective feature, insurgents should not have bothered targeting them any more than other roads. That is, IED deployment in January 2014 should be unrelated to election day routes. This is, indeed, exactly what we find, and this null result serves as an additional piece of evidence to buttress the causal nature of our argument (Condra and Shapiro, 2012; Draca et al., 2011; Sexton, forthcoming; Shapiro and Weidmann, 2015).

Next, we investigate a possible measure of insurgent restraint—not targeting roads multiple times—in column (4). Here we substitute a measure of deployment intensity for the primary outcome variable. Our results indicate that roads used by election day routes were no more likely than other roads to be bombed multiple times.

In columns (5) and (6) of Panel A we introduce substantial evidence that the targeting of pre-election traffic was disproportionately focused on deterring Pashto-speaking voters (primarily from the Pashtun ethnic group) from turning out.[34] To assess this effect, we trace routes back to their village origins and calculate ethnic populations for each connected village, allowing us to assign a population flow to each element of the network. A road along multiple routes, for example, may connect two villages—one Pashtun and another Uzbek. A different road may connect a dozen villages to their polling station, all with varying ethnic populations. These measures allow us to identify whether the magnitude of traffic matters, as well as the ethnicity of that traffic. Naturally, these figures can only be identified for roads that actually connect villages to stations, so our sample and counterfactual, varies from columns (1) through (4). Rather than comparing strategic and largely irrelevant roads, columns (5) and (6) unpack variation within strategic roads to see which populations are exposed to disproportionate insurgent violence. Notice that relative to all

[34]Due to outliers, we winsorize the Pashto population data at the 99th percentile.

other ethnicities, Pashto speakers are the most at risk of disenfranchisement through limited access to stations. This result holds with and without conditioning on the total population connected by a given road (columns (6) and (5), respectively).

In Panel B, we introduce several robustness checks. In columns (1) through (3), we substitute the six month road-specific violence trend for three, four, and five month trends, respectively. Column (4) limits our sample to districts that experienced pre-election IED deployment, while column (5) excludes high traffic corridors from the main analysis. Column (6) combines these two conditions. The restriction imposed in column (4) seems natural: we want to estimate the distribution of violence within areas with positive levels of violence. This becomes the preferred specification in our instrumental variable estimation below. We omit high traffic roads in column (5) because these are strategically valuable targets independent of the election. Across all these specifications, the main result remains unchanged.

These findings on targets and the spatial distribution of attacks advance our understanding of the constraints that bind the tactical choices of insurgents, according to our theory. All told, these results give us confidence that insurgents were strategic in their use of IEDs to thwart the 2014 election. Our findings yield strong evidence that certain ethnic groups—Pashtun voters, in particular—reside in areas that were disproportionately targeted by insurgents hoping to spoil turnout, even while minimizing loss of life. This finding in particular coheres with our argument that the Taliban faced an important dilemma in using violence to affect the electoral process while avoiding harm to civilians. The Taliban's ability to do this in Pashtun areas may reflect areas where they have greater control, but also reflect a strategy to undermine the legitimacy of the government by stopping voting in the places and among the population most likely to support the Taliban in its challenge against the government.

4.3 The Impact of Violence on Voting

Next, we evaluate how the timing and spatial distribution of insurgent violence in Afghanistan has influenced election participation. We begin with an investigation of early morning violence and conclude by studying IED deployment during the pre-election period of 2014. To isolate

the causal effect of violence on voting, we need a source of plausibly exogenous variation in the timing and distribution of attacks. We leverage two environmental constraints on insurgent and counterinsurgent operations: surface wind conditions and nighttime cloud cover. We begin by evaluating the identifying assumptions of our estimation strategy, and then present results.

The identifying assumption of our first set of causal estimates is that early morning wind conditions strongly influence where, when, and how much violence insurgents produce on election day and only influence voting through the violence channel. In table 2, Panel C, we present evidence that surface winds at 0430 and direct fire attacks from 0500 through 1100 are strongly and positively correlated. As we anticipated, windy conditions—associated with low visibility—create opportunities for insurgent violence.[35] The reduced form results presented in Panel B offer consistent evidence of a negative relationship between early morning wind speeds and turnout. To address concerns regarding the exclusion restriction, all models include measures of surface wind speeds during voting hours. In columns (5) and (6) we include rainfall as an additional included instrument (Gomez et al., 2007). This allows us to address any correlation between windy conditions and precipitation. In column (6) we also incorporate district-specific measures of temperature at three times during election day (Anderson, 1987; Anderson et al., 2000). Perhaps the most compelling evidence of the exclusion assumption is that the primary reduced form result among districts that experienced no violence on either election day in 2014 is statistically indistinguishable from zero. These estimates are reported in table 4, Panel A, below. Notice this holds across districts that did not experience insurgent activity on election days (column (1)), as well as districts that were unaffected by direct fire attacks six months prior to the first round of voting (column (2)). That is, surface winds had no discernible influence on turnout in districts where insurgents were not operational.

We now turn our attention to Panel A of table 2. The OLS estimate of the impact of early morning violence on voting is statistically significant and negative, but relatively weak. This result indicates that each early morning attack reduces district turnout by roughly 2%. The 2SLS estimates in columns (1) through (6) indicate that the true impact is nearly five times greater. In

[35]The reported Kleibergen-Paap F statistics are above the standard threshold of 10, with one exception (9.871).

column (1), we compare turnout across all districts during the two rounds of the 2014 election. In column (2) we employ a similar design, but drop the election fixed effect in favor of clustering our standard errors by election.

If insurgents were highly mobile and capable of substituting violence in one region with another, this specification might correct for dependence within election rather than across districts. In both specifications, our point estimate indicates that each direct fire attack between 0500 and 1100 reduces turnout by more than 11%.

Our qualitative research indicates that Taliban subunit decisions are made and executed at or below the district level, and accords with Giustozzi and Isaqzadeh (2012). In columns (3) through (6) we focus solely on districts where insurgents carried out at least one attack during either of the two voting rounds; just over half of Afghanistan's 398 districts. Column (4) clusters standard errors by district, while columns (5) and (6) add rainfall and temperature as controls. Across these models, our point estimates are consistent: each additional attack reduces turnout by roughly 10%.

Our choice to instrument direct fire attacks from 0500 to 1100 was motivated by the regression results plotted in figure 4. In table 3, we confirm that our findings are not an artifact of this classification. In columns (1) through (6) we vary the upper window from 0700 to 1200 hours. The results indicate that our main analysis may underestimate the true effect of early morning violence on turnout. If, for example, we evaluated violence from 0500 to 0700, our point estimate is 50% larger. These results give us confidence that each additional attack before or immediately after polls open reduces district turnout by roughly 10%.

We next turn our attention to how IED deployment during the pre-election period influences voter participation. To isolate random variation in IED deployment, we leverage plausibly exogenous differences in the intensity of nighttime cloud cover in the month ahead of the April round of voting. Panel C of table 5 yields some evidence of a positive but inconsistently significant relationship between cloud cover and IED deployment. Although the coefficients do not meet standard thresholds for statistical significance, standard errors are still relatively small. Additional evidence of the relevance of cloud cover for IED deployment can be found in the Kleibergen-Paap F statistics, all of which are above 7.5. The least strong first stage result is presented in column (3), where

we exclude high traffic roads from our sample. Importantly, in the just identified case (an equal number of instruments and endogenous variables), the 2SLS is median unbiased even when the F statistic is below the conventional level of 10.

Our reduced form results, in Panel B, are consistently negative and significant, indicating that nighttime cloud cover during the month ahead of the election is related to voter participation. Although there is no evidence of a direct effect on turnout, we incorporate rainfall as an included instrument in column (4). In this specification, our first stage and reduced form results are strengthened, giving us more confidence in the validity of our instrument. To evaluate the exclusion assumption, we consider the reduced form relationship between nighttime cloud cover and voting behavior in districts that did not experience an IED deployment during the preelection period. These estimates are reported in table 4, Panel B. We find little evidence of a reduced form relationship between cloud density and ballots cast in areas that were unaffected by preelection improvised explosives. This holds across areas that did not experience insurgent activity immediately prior to the election, as well as areas that were unaffected by roadside bombs six months prior to the first round of voting.

We conclude by discussing Panel A, our main effects.[36] Due to concern over a small number of outlying observations, we winsorize our vote totals at the 99th percentile. The OLS estimates indicate a small but positive relationship between IED deployment and vote totals. One could interpret pre-election violence as triggering voter participation. We caution against this interpretation since our 2SLS estimates are consistently negative, significant, and substantial. In column (1), across all districts, our estimate indicates that IED deployment in the month ahead of the election reduced the vote total of linked polling stations by more than 15,000 ballots. In columns (2) through (6), we limit our sample to districts with at least one targeted road. Among this sample, our estimate ranges from roughly 7,700 to 8,800 fewer votes cast at affected polling stations. This effect is equivalent to each roadside bomb shutting down eight polling stations. Yet not all candidates were

[36]In this section, we focus on vote totals at connected polling stations, not on voter turnout. We do this because of concerns about the quality of population data at the settlement level (e.g., we observe a large number of settlements with reported populations of 0). These concerns aside, we constructed a turnout measure (total votes at connected polls divided by total population of connected settlements), and estimate consistent, but much stronger effects than those reported here (and available upon request). We believe the results reported in the main text are conservative estimates.

equally affected by violence. Ashraf Ghani, the eventual winner of the second round, lost nearly 4,000 votes per targeted road while Abdullah Abdullah, the vote leader after the first round, lost just over 1,600 votes per incident.

These results combined yield compelling evidence that insurgent violence ahead of and during the 2014 election substantially depressed voter participation and may have undermined support for the eventual president during early voting.

5 Conclusion

We investigate the logic of insurgent electoral violence. We argue that insurgents recognize the symbolic value of disrupting the state's mandate by undermining electoral institutions. Yet attempts to challenge these institutions with violence are constrained by the "governance" costs insurgents pay if they harm potential supporters of the rebellion. Combining numerous statements made by the Taliban and journalistic coverage of the insurgent group with new and extensive micro-level data on violence and electoral features, our results demonstrate that insurgents carefully calibrate their use of violence, and reveal the rational design of insurgency. We show that insurgents increase attacks during the campaign and on election day to interrupt the voting process, but time these attacks on election day to deter turnout while minimizing direct harm to voters. We also find that insurgents expanded the deployment of IEDs during the month before the 2014 election, but only along segments of the road network that would experience heightened traffic on election day. While they targeted these roads more frequently on the extensive margin, insurgents rarely bombed these roads multiple times. The instrumental variable estimation of violence's negative effect on turnout shows how effectively these insurgent tactics damaged the electoral process by depressing voter turnout.

We advance a theory that unpacks the logic of insurgent electoral violence and anticipates when and where rebels attack around elections. Similar to other criminal entities such as gangs (Skarbek, 2014; Levitt and Venkatesh, 2000a,b), mafias (Gambetta, 1993), pirates (Leeson, 2007), and terrorists (Berman, 2011; Shapiro, 2013; Berman and Laitin, 2008), insurgents face managerial dilemmas and principal-agent problems that shape how they successfully achieve joint goals in the shadow of

illegality (Dixit, 2004; Leeson, 2007). But rather than relying primarily on informal within-group institutions to further proscribed activities (Gambetta, 2009; Skarbek, 2014), insurgents form a unique class of unlawful actors who ultimately seek control of formal and legal state institutions through criminal and political violence. In so doing, they face manifold external constraints as they compete with the incumbent government to capture the state and "hearts and minds" of the public. We explore the logic of insurgents' use of violence to take over the state while minimizing civilian harm, distinct from other kinds of criminals that may deploy violence differently by maximizing damage to official government targets or indiscriminately attacking civilians. Highlighting this constraint, we explore the empirical implications of when and where insurgents attack, contributing to a literature exploring insurgents' strategic use of violence (Carter, 2016).

This article contributes to a burgeoning literature in behavioral economics and psychology on how violence in developing countries affects a range of citizen behavior. We specifically examine how insurgent violence affects citizens' electoral participation and voter turnout, an aspect of a larger literature on how prior exposure or threats of violence from diverse political actors impacts political participation (Bellows and Miguel, 2009; Collier and Vicente, 2014; Ferree et al., 2015; Hidalgo and Driscoll, 2014; Gutierrez-Romero, 2014; Collier and Vicente, 2012). Mixed results from these studies demonstrate that violence and intimidation could generate *both* higher or lower political engagement and mobilization depending on context and other individual-level factors. Our results on the negative effect of insurgent violence on turnout serve as a counterpoint to studies that show a positive effect on political participation from such factors as recent criminal victimization (Bateson, 2012) and previous exposure to violence through abduction into insurgent groups (Blattman, 2009). The dramatic decline in turnout that we document in Afghanistan does not challenge the validity of these and other results, but it does demonstrate that violence's effects on political participation may vary considerably depending on the type of participation and violence under study. Our empirical analysis provides important evidence on the degree to which insurgent actions undermine democratic institutions by affecting electoral participation.

Third, we speak to a literature in the political economy of development regarding the institutional components of state-building (Greif, 2006; Acemoglu et al., 2001, 2005; Engerman and

Sokoloff, 1997; Besley and Persson, 2014; Evans and Rauch, 1999). Our findings highlight the importance of carefully crafting, managing, and maintaining inclusive state institutions. Scholars have noted that state capacity grows when diverse social and economic actors gain institutional inclusion and representation (Acemoglu and Robinson, 2006; Acemoglu et al., 2014; Besley and Persson, 2009; Besley and Robinson, 2010). We address elections as one such institution, leveraging a large theoretical and policy concern regarding the role of democratic institutions and inclusiveness in peace-building after civil wars. Our results underscore the importance of efforts to persuade insurgents to lay down arms and participate formally in the political process. More thought could be paid to how insurgents continue to destabilize elections and democratic consolidation in the series of cases where there are both elections and insurgency, rather than primarily focusing on incorporating former combatants during transition from previously conflict-ridden non-democratic regimes to democracy. Policy responses addressing ongoing insurgencies during democratic consolidation could look very different from how peace is negotiated at the outset of transition. Accordingly, whereas the Afghan government originally rejected the Taliban's overtures to join formal politics, they may reconsider that policy to stave off future insurgent election violence.

This article also provides guidance for policymakers concerned with developing and deploying effective counterinsurgency strategies (Berman et al., 2013; Crost et al., 2014, 2016). Our findings provide important evidence to consider how, in the context of growing violence around elections, counterinsurgency efforts might alter force deployments and tactics to decrease violence, increase voter participation, and reduce civilian casualties. This article adds to a growing literature on counterinsurgent strategies to combat and deter terrorist violence (Berman et al., 2011a,b; Condra et al., 2010; Shaver and Shapiro, 2016; Beath et al., 2013), including the role played by outside actors working with host governments to win "hearts and minds" of the civilian population (Lake, 2016). Securing elections would no doubt help weak states strengthen political order and democratic institutions while protecting citizens' participation.

The stakes in Afghanistan continue to be enormous. The U.S. Congress has appropriated over 60.7 billion dollars over the last decade to spend on Afghan security forces (Boyer, 2015), and the Afghan government has trained, paid, and deployed hundreds of thousands of police and army forces

specifically to secure elections (NDI, 2011). Better understanding the logic of insurgent electoral violence should allow the government to develop better counterinsurgent strategies that hope to safeguard at-risk elections and consolidate peace.

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Figure 7: Equilibrium traffic routes, in red, and high flow traffic areas, in blue, compared to irrelevant road segments, in green.

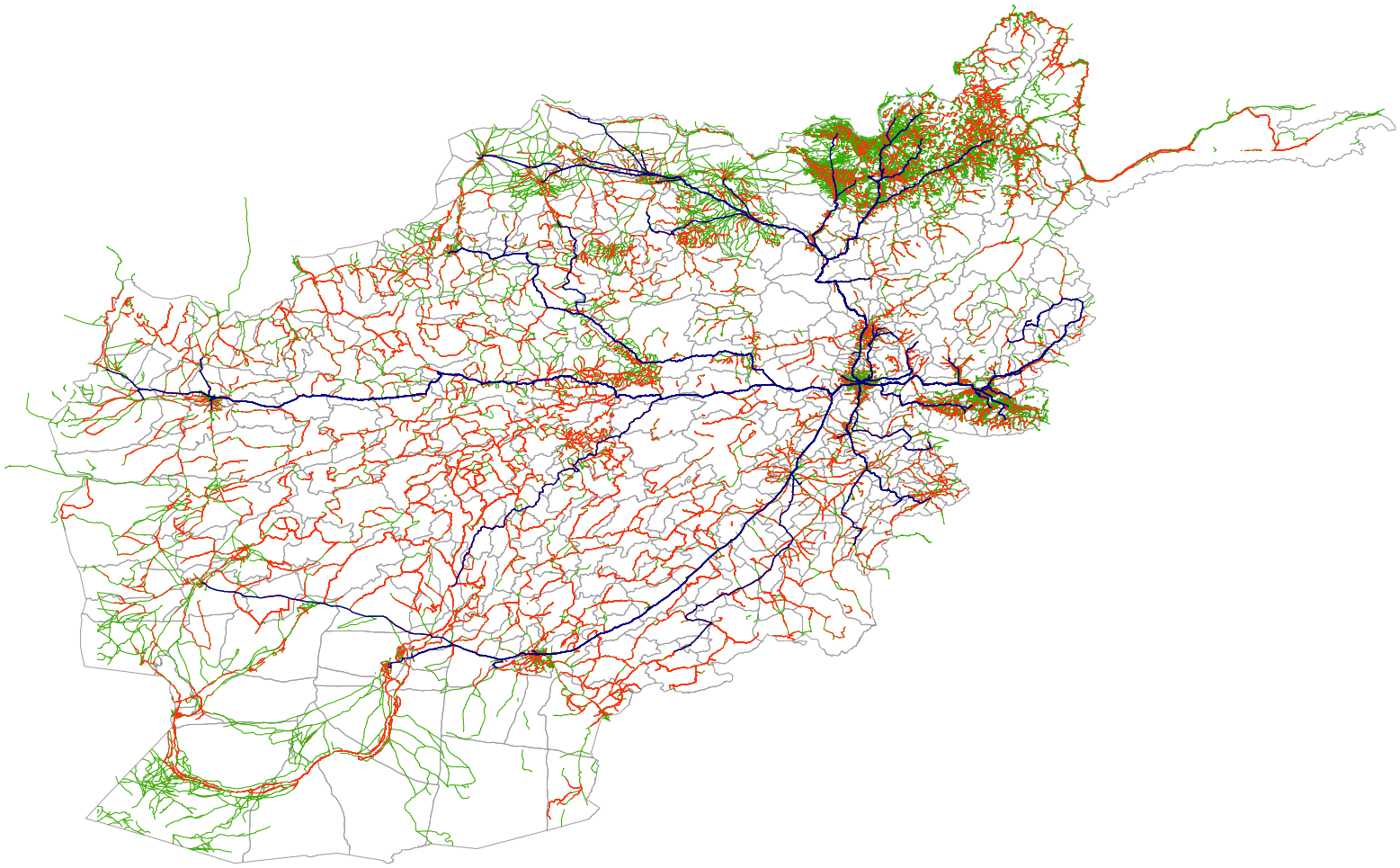


Table 1: IED deployment along the Afghan road network ahead of 2014 election

Panel A: IED deployment along election day routes

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome	Deployment	Deployment	Placebo	Count	Deployment	Deployment
Election day route	0.00446***	0.00370*	0.00284	-0.0000215		
	(0.00112)	(0.00184)	(0.00215)	(0.00330)		
Pashtun pop. (10k)					0.00977*	0.0107**
					(0.00387)	(0.00392)
District FE	No	Yes	Yes	Yes	Yes	Yes
Road length	Yes	Yes	Yes	Yes	Yes	Yes
Violence trend	6M	6M	6M	6M	6M	6M
N	72876	72698	72698	72698	17100	17100
Clusters		393	393	393	388	388
R^2	0.0999	0.0626	0.0494	0.195	0.0940	0.0946

Panel B: Robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment
Election day route	0.00437*	0.00412*	0.00385*	0.00615$^{\gamma}$	0.00336$^{\gamma}$	0.00581$^{\gamma}$
	(0.00187)	(0.00187)	(0.00185)	(0.00338)	(0.00180)	(0.00334)
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Road length	Yes	Yes	Yes	Yes	Yes	Yes
Violence trend	3M	4M	5M	6M	6M	6M
Violent districts	Mixed	Mixed	Mixed	Yes	Mixed	Yes
High traffic roads	Mixed	Mixed	Mixed	Mixed	Exclude	Exclude
N	72698	72698	72698	44011	70878	43019
Clusters	393	393	393	132	387	131
R^2	0.0484	0.0538	0.0606	0.0722	0.0516	0.0578

Dependent Variables: deployment of IED (binary) on road during the preelection period (March 1 until April 4, 2014). The placebo condition is the same measure, but evaluated during January 2014 (before the polling station map was made public). Column 5 of Panel A measures the intensity of deployment during the preelection period (count).

- High traffic roads connect Afghanistan's top 100 population centers to the national capital Kabul.
- Ethnic populations are averaged for each village serviced by a given road.
- Column 6 of Panel A includes an omitted population-on-road control.
- Clustered standard errors (by district) in parentheses. Column 1 reports robust standard errors.

$^{\gamma}$ $p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2: Impact of early morning attacks on voter turnout

Panel A: Impact of morning attacks on voting

		(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Outcome	Turnout	Turnout	Turnout	Turnout	Turnout	Turnout	Turnout
Attacks, 5-11AM	-0.0219***	-0.144$^{\gamma}$	-0.112***	-0.100*	-0.100*	-0.0987*	-0.0981*
	(0.00558)	(0.0835)	(0.0267)	(0.0429)	(0.0508)	(0.0473)	(0.0450)
Election FE	Yes	Yes	No	Yes	Yes	Yes	Yes
Election clusters	No	No	Yes	No	No	No	No
District clusters	No	No	No	No	Yes	Yes	Yes
Violent districts	Mixed	Mixed	Mixed	Yes	Yes	Yes	Yes
Surface winds		Yes	Yes	Yes	Yes	Yes	Yes
Rainfall		No	No	No	No	Yes	Yes
Temperature		No	No	No	No	No	Yes
N	786	786	786	410	410	410	410
Clusters			2		205	205	205

Panel B: Reduced form results

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome	Turnout	Turnout	Turnout	Turnout	Turnout	Turnout
Surface winds, 430 AM	-0.0175$^{\gamma}$	-0.0137$^{\gamma}$	-0.0194**	-0.0194**	-0.0196**	-0.0196**
	(0.00936)	(0.00212)	(0.00648)	(0.00740)	(0.00742)	(0.00724)
Election FE	Yes	No	Yes	Yes	Yes	Yes
Election clusters	No	Yes	No	No	No	No
District clusters	No	No	No	Yes	Yes	Yes
Violent districts	Mixed	Mixed	Yes	Yes	Yes	Yes
Surface winds	Yes	Yes	Yes	Yes	Yes	Yes
Rainfall	No	No	No	No	Yes	Yes
Temperature	No	No	No	No	No	Yes
R^2	0.0350	0.0113	0.0757	0.0757	0.0784	0.0983

Panel C: First stage results

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome	Attacks, 5-11AM	Att.	Att.	Att.	Att.	Att.
Surface winds, 430 AM	0.122***	0.122	0.193***	0.193**	0.199***	0.200***
	(0.0305)	(0.0223)	(0.0507)	(0.0615)	(0.0568)	(0.0564)
Election FE	Yes	No	Yes	Yes	Yes	Yes
Election clusters	No	Yes	No	No	No	No
District clusters	No	No	No	Yes	Yes	Yes
Violent districts	Mixed	Mixed	Yes	Yes	Yes	Yes
Surface winds	Yes	Yes	Yes	Yes	Yes	Yes
Rainfall	No	No	No	No	Yes	Yes
Temperature	No	No	No	No	No	Yes
KP F statistic	16.02	29.93	14.51	9.871	12.22	12.59
R^2	0.0317	0.0317	0.0603	0.0603	0.108	0.114

Dependent Variables: voter turnout at the district level during the two rounds of voting in the 2014 election.
- All columns include an omitted district population control.
- All 2SLS models include controls for surface winds during voting hours (1030 AM and 430 PM). Models with rainfall and temperature controls track conditions at 430 AM, 1030 AM, and 430 PM.
- Clustering of standard errors is noted for each column. To cluster by election, column 2 omits the election fixed effect (since there are only two rounds of voting).
$^{\gamma}$ $p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: Evaluating impact of attacks across varying times on voter turnout

	(1)	(2)	(3)	(4)	(5)	(6)
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Outcome	Turnout	Turnout	Turnout	Turnout	Turnout	Turnout
Attacks, varying windows	-0.156*	-0.130*	-0.116*	-0.106*	-0.0981*	-0.0914*
	(0.0765)	(0.0629)	(0.0552)	(0.0495)	(0.0450)	(0.0413)
Time window	5-7AM	5-8AM	5-9AM	5-10AM	5-11AM	5-12PM
Election FE	Yes	Yes	Yes	Yes	Yes	Yes
District clusters	Yes	Yes	Yes	Yes	Yes	Yes
Violent districts	Yes	Yes	Yes	Yes	Yes	Yes
Surface winds	Yes	Yes	Yes	Yes	Yes	Yes
Rainfall	Yes	Yes	Yes	Yes	Yes	Yes
Temperature	Yes	Yes	Yes	Yes	Yes	Yes
N	410	410	410	410	410	410
Clusters	205	205	205	205	205	205
KP F statistic	9.734	10.13	10.70	11.73	12.59	13.97

Dependent Variables: voter turnout at the district level during the two rounds of voting in the 2014 election.
- All columns include an omitted district population control.
- All models include controls for surface winds during voting hours (1030 AM and 430 PM) as well as rainfall and temperature controls evaluated at 430 AM, 1030 AM, and 430 PM.
- Standard errors are clustered by district.
$^{\gamma}$ $p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Impact of windspeed and cloud cover on turnout in nonviolent areas (placebo reduced form results)

Panel A: Early morning windspeed and voter turnout in non-violent districts

	(1)	(2)
	District turnout	District turnout
Surface winds, 430 AM	-0.0145	0.00902
	(0.0243)	(0.0118)
N	376	160
Clusters	188	80
R^2	0.0437	0.0575
Election FE	Yes	Yes
Election clusters	No	No
District clusters	Yes	Yes
Violent districts	No (during elections)	No (6 months before first round)
Surface winds	Yes	Yes
Rainfall	No	No
Temperature	No	No

Panel B: Cloud cover and voting in non-violent areas

	(1)	(2)
	Total votes	Total votes
Nighttime cloud cover	-10.74	-10.24
	(7.179)	(8.918)
N	8637	5452
Clusters	251	168
R^2	0.151	0.138
District FE	Yes	Yes
Road length	Yes	Yes
Violence trend	6M	6M
Violent districts	No (month prior to election)	No (6 months before first round)
High traffic roads	Mixed	Mixed
Rainfall	No	No

Dependent Variables: Panel A reports voter turnout at the district level during the two rounds of voting in the 2014 election. Panel B reports total votes cast at polling center(s) connected by road, winsorized at the 99th percentile. We report results for two samples each: areas not experiencing violence during or in the month ahead of the election (column 1) and areas not experiencing violence six months ahead of the first round of voting (column 2).

- Models follow the relevant main specification. In Panel A, see Model 4 in table 2. In Panel B, see Model 2 in table 5.

$^{\gamma}$ $p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: Impact of IED deployment along the Afghan election day routes on voting

Panel A: Impact of IED deployment on voting

		(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Outcome	Total votes	Total votes	Total votes	Total votes	Total votes	Ghani	Abdullah
IED deployment	372.5***	-15346.3**	-7754.3*	-8813.8*	-7697.6**	-3864.4**	-1638.2$^{\gamma}$
	(89.36)	(5564.9)	(3087.0)	(3916.5)	(2824.6)	(1412.9)	(968.8)
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Road length	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Violence trend	6M	6M	6M	6M	6M	6M	6M
Violent districts	Mixed	Mixed	Yes	Yes	Yes	Yes	Yes
High traffic roads	Mixed	Mixed	Mixed	Exclude	Mixed	Mixed	Mixed
Rainfall	No	No	No	No	Yes	No	No
N	16100	16154	7462	7008	7462	7462	7462
Clusters	380	370	128	125	128	128	128

Panel B: Reduced form results

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome	Total votes	Total votes	Total votes	Total votes	Ghani	Abdullah
Nighttime cloud cover	-14.16*	-19.84*	-19.59*	-21.34**	-9.886***	-4.191
	(5.715)	(8.128)	(8.699)	(8.088)	(2.838)	(3.853)
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Road length	Yes	Yes	Yes	Yes	Yes	Yes
Violence trend	6M	6M	6M	6M	6M	6M
Violent districts	Mixed	Yes	Yes	Yes	Yes	Yes
High traffic roads	Mixed	Mixed	Exclude	Mixed	Mixed	Mixed
Rainfall	No	No	No	Yes	No	No
R^2	0.111	0.0720	0.0400	0.0728	0.0414	0.0343

Panel C: First stage results

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome	Deployment	Deploy.	Deploy.	Deploy.	Deploy.	Deploy.
Nighttime cloud cover	0.000959$^{\gamma}$	0.00256	0.00222	0.00277$^{\gamma}$	0.00256	0.00256
	(0.000556)	(0.00157)	(0.00157)	(0.00158)	(0.00157)	(0.00157)
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Road length	Yes	Yes	Yes	Yes	Yes	Yes
Violence trend	6M	6M	6M	6M	6M	6M
Violent districts	Mixed	Yes	Yes	Yes	Yes	Yes
High traffic roads	Mixed	Mixed	Exclude	Mixed	Mixed	Mixed
Rainfall	No	No	No	Yes	No	No
KP F statistic	10.07	10.37	7.547	12.48	10.37	10.37
R^2	0.0918	0.114	0.0809	0.115	0.114	0.114

Dependent Variables: total votes cast at polling center(s) connected by road, winsorized at the 99th percentile. In columns 5 and 6, we evaluate votes cast for Ghani and Abdullah.
- All columns include an omitted population-on-road control.
- High traffic roads connect Afghanistan's top 100 population centers to the national capital Kabul.
- Clustered standard errors (by district) in parentheses.
$^{\gamma}$ $p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

SUPPORTING INFORMATION
— For Online Publication —

Figure SI-1: Daily Indirect Fire Attacks, 2005 through 2014. Dashed red lines represent election dates.

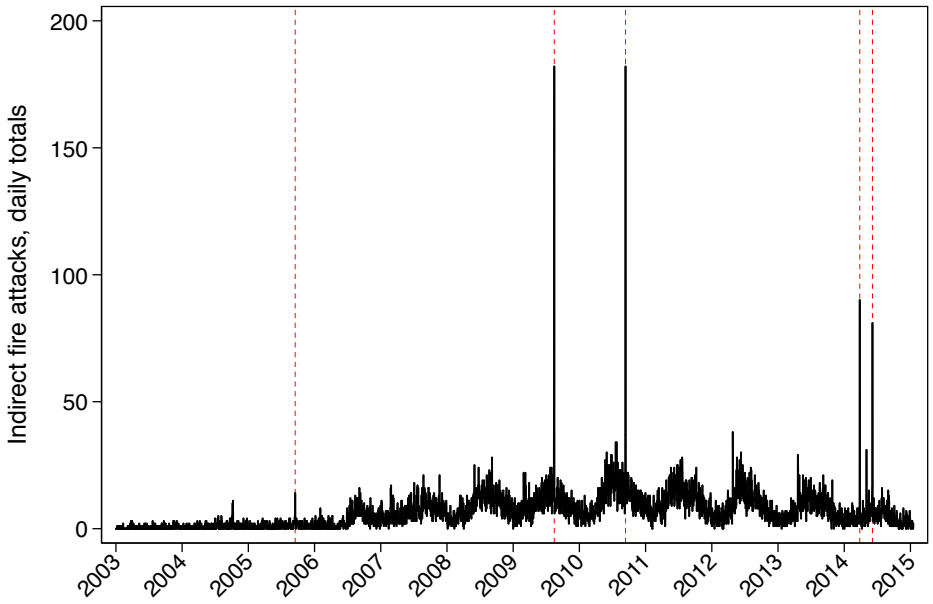
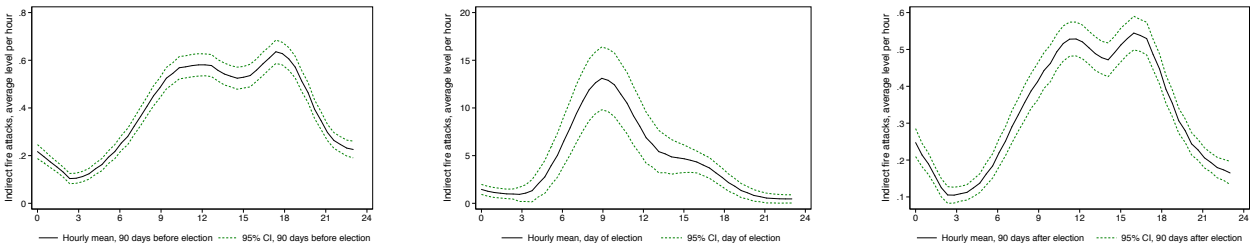
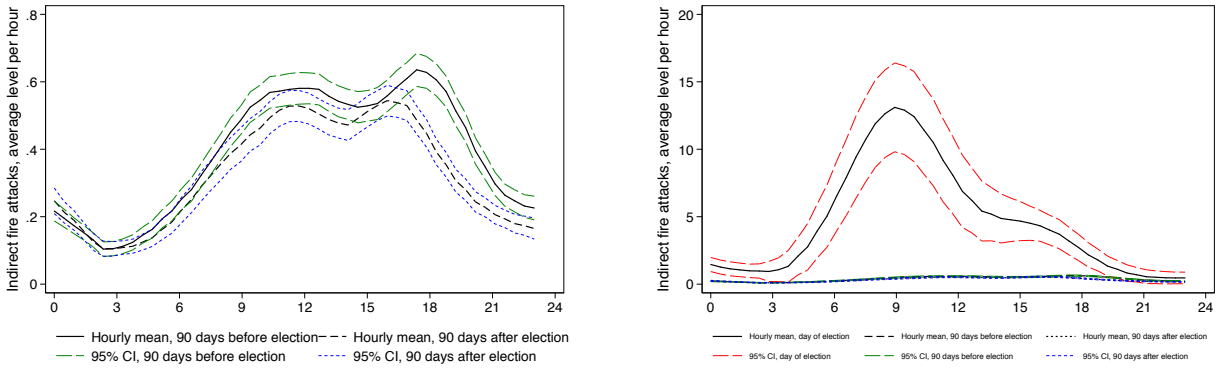


Figure SI-2: Indirect fire attacks, by hour of day, before, on, and after election days



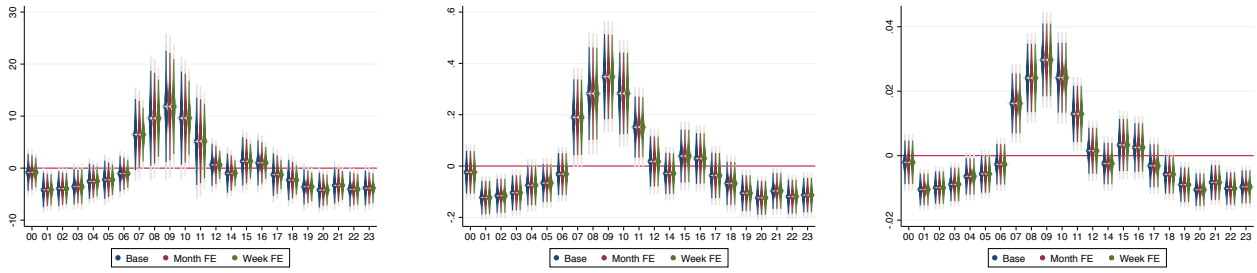
(a) 90 days before election (b) Election day (c) 90 days after election

Figure SI-3: Comparing trends in indirect fire attacks, by hour of day



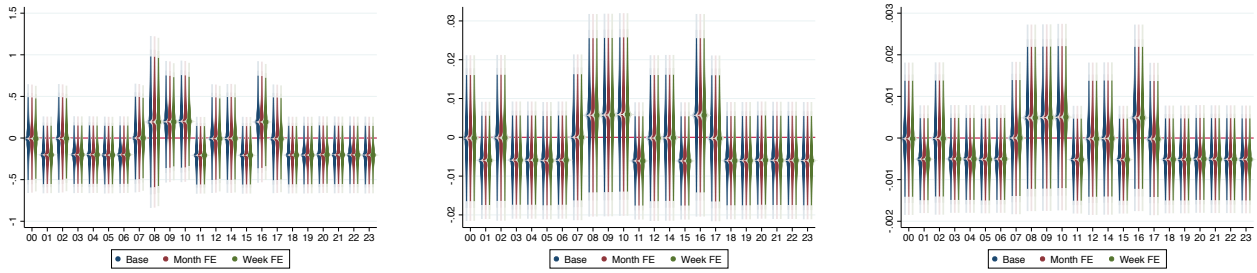
(a) 90 days before vs. 90 days after election (b) Pre/post trends with Election Day

Figure SI-4: Indirect fire attacks by hour, election day vs. non-election day using ninety-day window (national, province, district). 95% confidence intervals reported using robust standard errors.



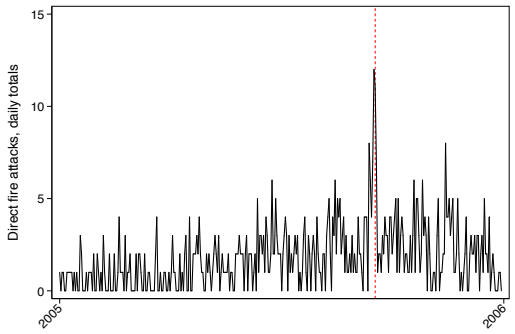
(a) National (b) Province (c) District

Figure SI-5: Indirect fire attacks causing civilian casualties by hour, election day vs. non-election day using ninety-day window (national, province, district). 95% confidence intervals reported using robust standard errors.

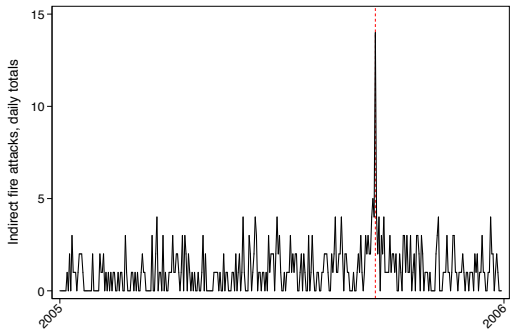


(a) National (b) Province (c) District

Figure SI-6: Daily Direct and indirect fire attacks, 2005. Dashed red line represents 2005 national election.

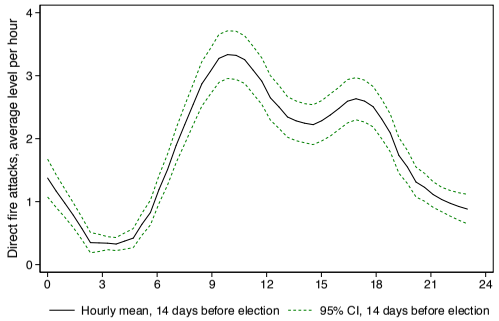


(a) Direct fire attacks, daily total

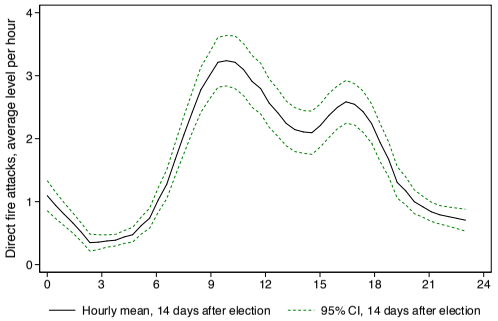


(b) Indirect fire attacks, daily total

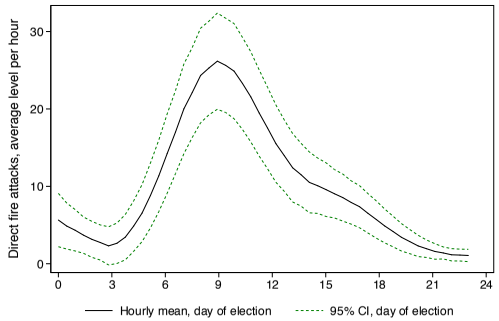
Figure SI-7: Direct fire attacks, by hour of day, before, on, and after election days



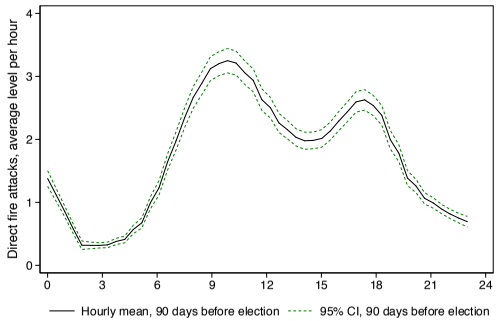
(a) 14 days before election



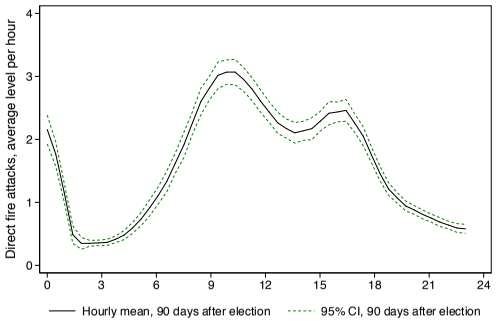
(b) 14 days after election



(c) Election day

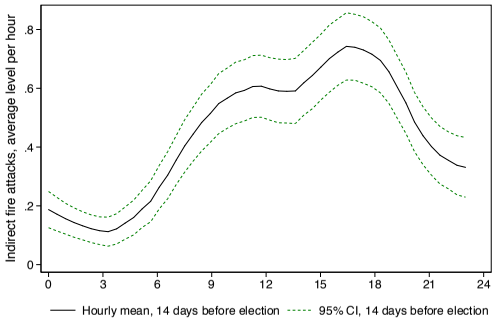


(d) 90 days before election

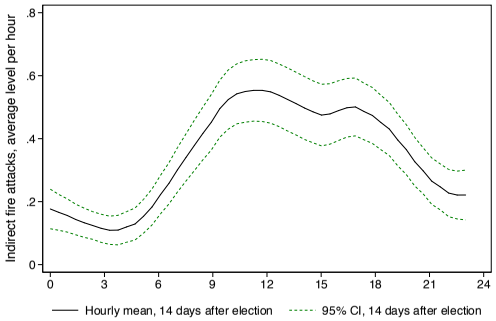


(e) 90 days after election

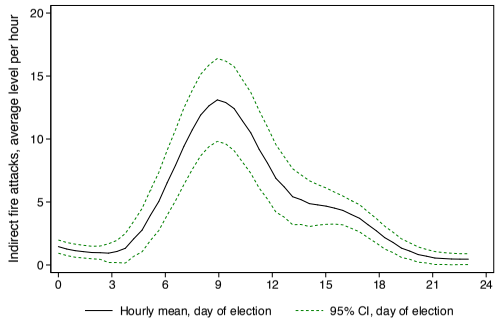
Figure SI-8: Indirect fire attacks, by hour of day, before, on, and after election days



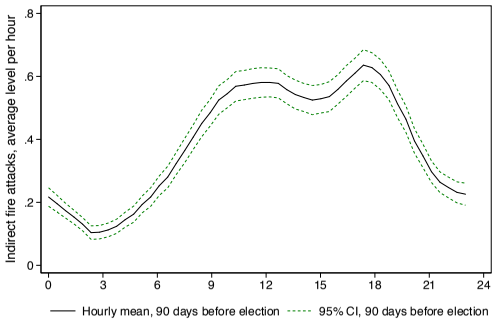
(a) 14 days before election



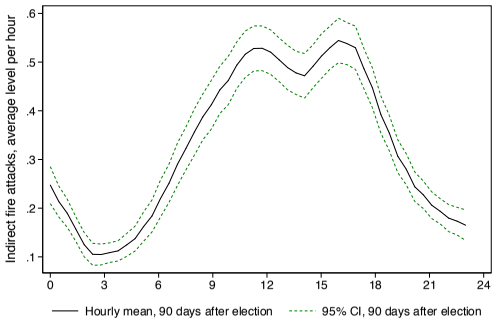
(b) 14 days after election



(c) Election day



(d) 90 days before election



(e) 90 days after election

Figure SI-9: Population settlements.

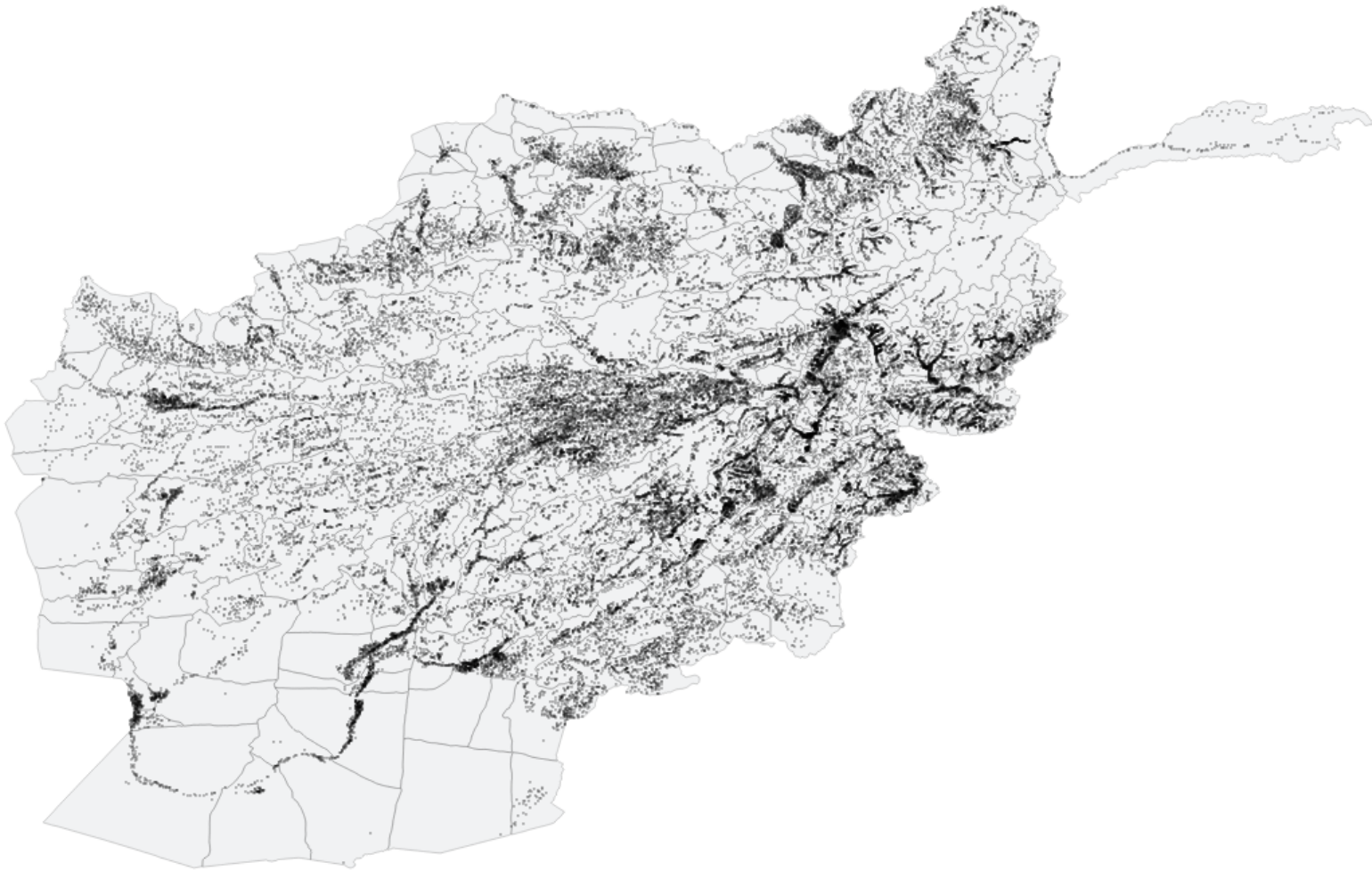


Figure SI-10: Announced polling stations, 2014 Presidential Election.

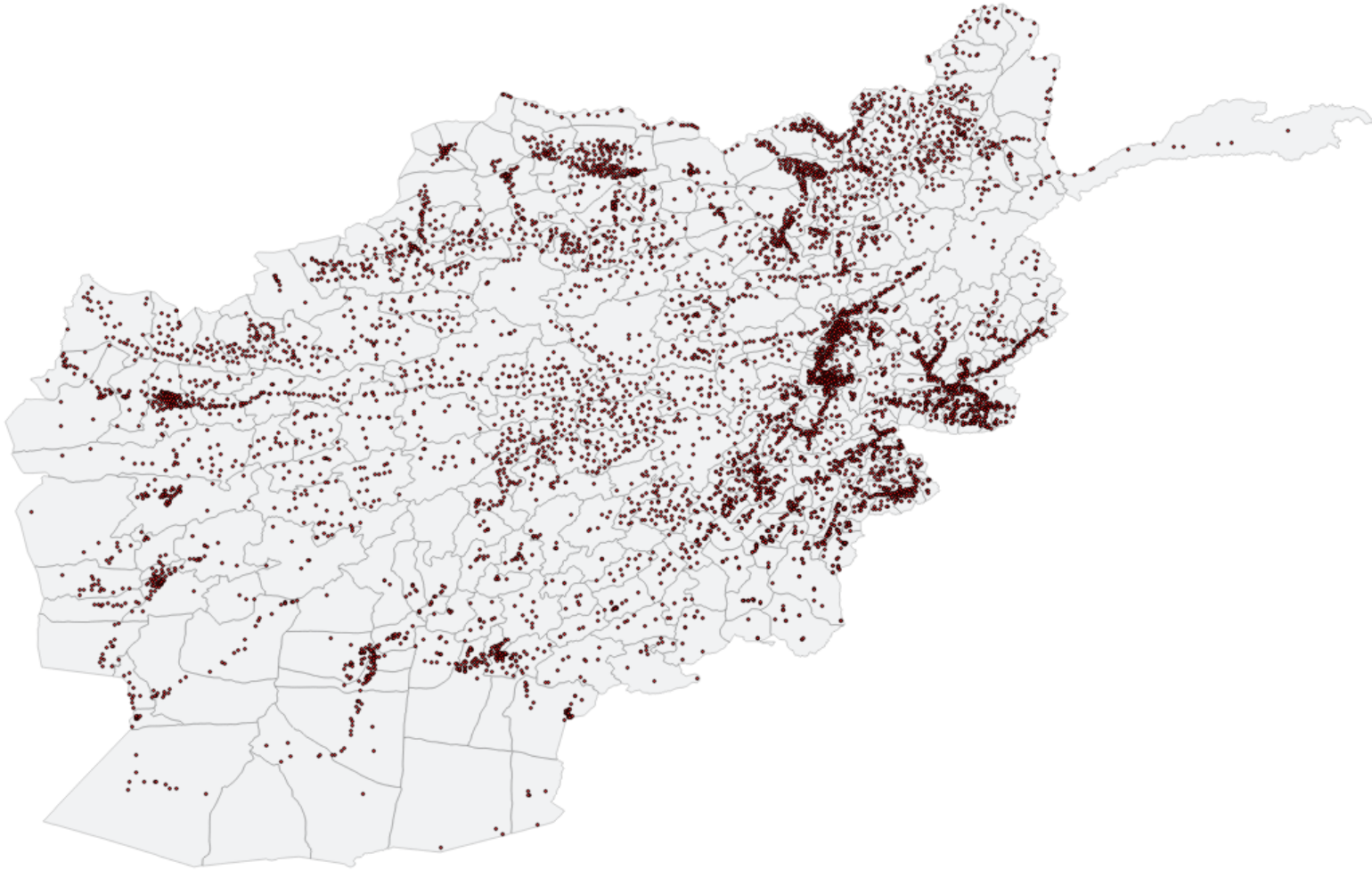


Figure SI-11: Incidents of improvised explosive device deployment, snapped to relevant elements of the road network.

