Rebel Capacity and Combat Tactics

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Motivation

- Internal conflict is economically disruptive ($\sim$14.3 trillion dollars annually, 13.4% of world GDP).
- Human loss and population displacement further undermine political stability and constrain growth.
- Understanding the political economy of rebellion, and how rebels plan for and time their attacks specifically, may yield actionable insights to thwart or resolve conflict.

Overview

- We **study** how resource endowments influence insurgency.
- We **argue** that rent extraction influences not just when conflicts emerge, but *how* they are fought and *when* attacks occur.
- We **model** the relationship rebel capacity and rebel tactics, focusing on the ability of insurgents to gather information about government vulnerabilities.
- We **test** our model using newly declassified military records from the Afghanistan war (unparalleled scale).
- We **find** robust evidence that revenue shocks lead to increased attack clustering. These effects are enhanced in areas where rebels can spy on troop/convoy/base activity. Labor scarcity and government surveillance have the opposite effect.

Theory

Intuition

- Rebels face resource constraints, and may allocate their operations across "time windows".
- As rebels acquire more capacity, they can gather intelligence about government vulnerabilities.
- Increasing revenue and, by extension, the precision of information available to insurgents decreases the temporal randomness of attack patterns.
- That is, production of violence is concentrated within certain "time windows".

Technical Details

Context

Rebel Financing and Combat in Afghanistan

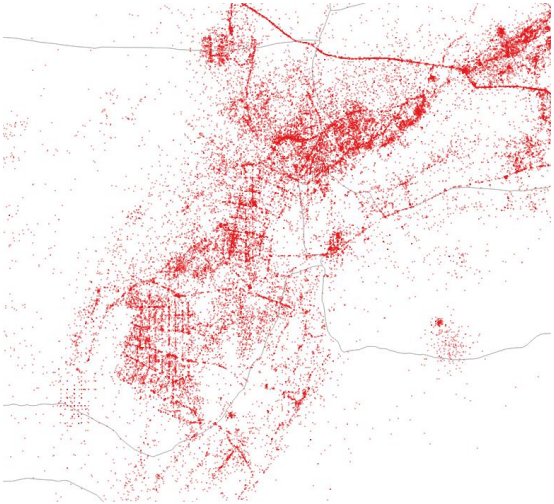
- We study rent extraction and rebel tactics during Operation Enduring Freedom (2006-2014).
- The Taliban are rely on taxes from opium farmers (*ushr*), charitable giving (*zakat*), and protection rackets.
- Rents from farmers and traffickers are primarily collected in the spring for use in the subsequent fighting season (June to September).
- The Central Finance Committee collects and audits earnings reports from regional commanders (who control provincial commanders >> district commanders >> local commanders).
- CFC redistributes some income to non-producing districts; CFC maintains control over commander assignments and rotations.

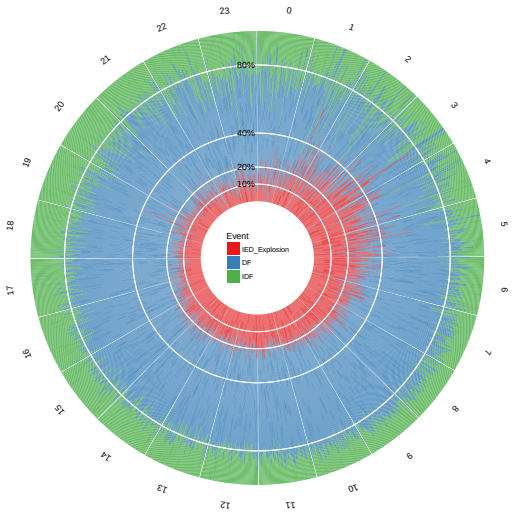
Data

Descriptive details: conflict data

We draw on newly declassified military records provided to us by US CENTCOM (N = ∼500,000).

- Each event is georeferenced and time-stamped (by minute).
- Our data include records are primarily composed of remote combat, close combat, improvised explosive device (IED) engagements.
- These records are supplemented by previously unreleased data: insurgent and counterinsurgent surveillance (spy) operations, insurgent security breaches, safe house raids, and insurgent detentions.
- They also include rebel attempts to intimidate civilians (e.g., night letters) as well as targeted killings of collaborators (informants, security force recruits, etc.).

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Descriptive details: revenue data

- We assemble district-year data on opium cultivation from UNODC's annual drug reports [398 district list].
- Starting in 2002, UNODC started using remote sensing techniques to estimate cultivation levels.
- We gather national and regional price data from these reports as well (which are constructed using producer and trafficker surveys).
- We also track variability in yield (kg per hectare) at the national and regional level, as well as the crop calendar.

Measuring temporal clustering

- For district-year, we observe the temporal distribution (hourly) of attacks.
- We randomly shuffle the empirical distribution (reassigning the hour of attack). This gives us a 'random' counterfactual distribution of attacks.
- We then compare the true distribution to the counterfactual distribution using a Kolmogorov-Smirnov test ($\times 1000$):
  - If attacks are clustered in time, the p-value will approach zero (real and random distributions are very different).
  - If attacks are randomly distributed in time, the p-value will approach one (real and random distributions are very similar). Technical Details

Main Specification

Main specification

We estimate the following least squares model:

$$Y_{d,y}^{t} = f_y + \beta_1(\textbf{Revenue}_{d,y}) + \beta_2 X_{d,y} + \epsilon_d, \tag{1}$$

where **Revenue** represents potential revenue from the opium trade (in logs), f_y represent year fixed effects, and $X_{d,y}$ indicates a set of district-year specific controls, including violence levels during the fighting, harvest, and planting seasons. We supplement this model with additional controls, described later. Standard errors are clustered by district.

Main Results

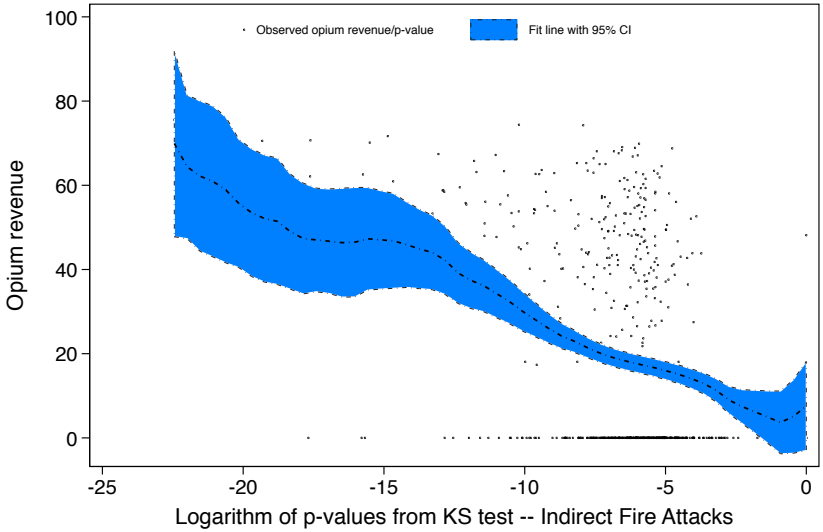

Observed opium revenue/p-value
Fit line with 95% CI
Opium revenue
100
80
60
40
20
0
-25
-20
-15
-10
-5
0
Logarithm of p-values from KS test -- Indirect Fire Attacks

Table 1: Impact of rebel capacity on within-day randomization of indirect fire attacks

	(1)	(2)	(3)	(4)
Opium Revenue	-0.0581***	-0.0588***	-0.0549***	-0.0549***
	(0.0137)	(0.0135)	(0.0125)	(0.0125)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.154	0.171	0.187	0.187

Main effect: 1 SD increase in revenue .3 SD decrease in randomness.

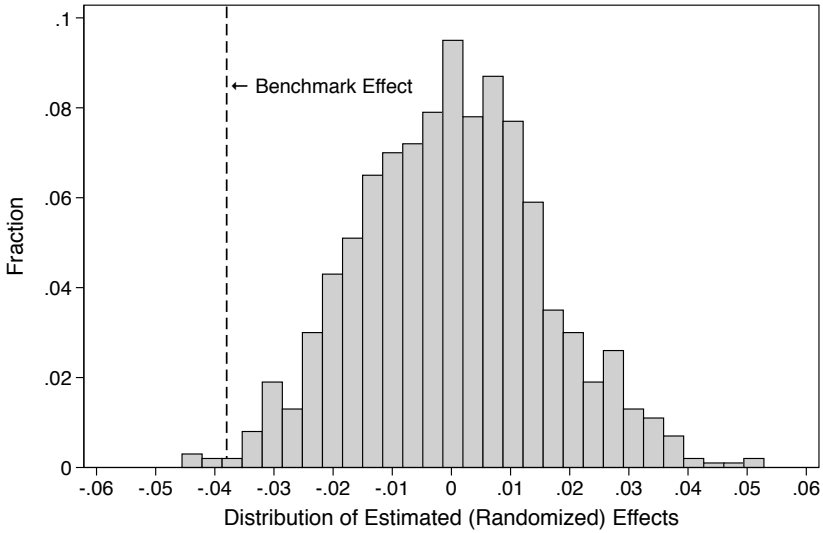
Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects. Column 2-4 add controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Robustness

Table 2: Impact of rebel capacity on within-day randomization of indirect fire attacks, robustness

	(1)	(2)	(3)	(4)	(5)	(6)
Opium Revenue	-0.0549***	-0.0450**	-0.0531***		-0.0543***	-0.0381**
	(0.0125)	(0.0220)	(0.0116)		(0.0126)	(0.0166)
Opium Revenue (Regional)				-0.0555***		
				(0.0128)		
Model Parameters						
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	Yes	Yes	Yes	Yes	Yes	Yes
Growing Season Activity (levels)	Yes	Yes	Yes	Yes	Yes	Yes
Planting Season Activity (levels)	Yes	Yes	Yes	Yes	Yes	Yes
Additional Parameters						
Province × Fighting Season FE	No	Yes	No	No	No	No
Weighted Least Squares	No	No	Yes	No	No	No
Regional Yield Adjust.	No	No	No	Yes	No	No
Early Harvest Only	No	No	No	No	Yes	No
District Fixed Effect	No	No	No	No	No	Yes
Model Statistics						
No. of Observations	600	600	600	600	588	563
No. of Clusters	154	154	154	154	150	117
R^2	0.187	0.379	0.188	0.184	0.184	0.503

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.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Distribution of Estimated (Randomized) Effects

Supplemental Checks

- **State capacity** State capacity is an omitted variable (and allocation of fighting effort may be influenced by opium revenue)
- **Coercion** Use of intimidation to promote opium cultivation
- **Placebo checks** Varying control of attack timing (quasi-placebo check) across event types
- **Coefficient stability** Use a Oster/Altonji et al bounds exercise to test for coefficient stability when additional covariates are added to the main specification.
- **Alternative samples** Exclude non-producers from the main sample.
- **Alternative revenue** Replicate revenue measure without log transformation $(+1)$.
- **Panel design** Demonstrate the theorized positive levels shock in violence (panel specification: violence is increasing in revenue).

IV Estimation

Identifying 'as if' random variation in opium revenue

- We gather district-day data on weather inputs (temperature, rainfall) and a high resolution cross section of soil quality. We use these to construct a high dimensional vector of agronomic conditions (degree-days, precipitation-days, $\times$ soil quality).
- **IV 1:** Use panel data and full agronomic parameter space to estimate an opium suitability index that is district-growing season specific.
- **IV 2:** Use panel data and LASSO-optimized set of agronomic parameters to estimate opium suitability (as in above).
- **IV 3:** Estimate standard 2sls with baseline degree-day and precipitation-day vector as IVs (note: many IVs; non-parametric).

Plausbility of IV validity

- **IV strength**: first stage = strong (by construction and w/ non-parametric IV); second stage F statistics are large (min = 44 w/ non-param IV).
- **Exclusion restriction**: weather conditions = growing season (not fighting season); any persistent effects would be captured in levels (model parameter) and unlikely to influence timing across fighting season. [Robust results directly accounting for temp/rainfall in seasonal levels.]
- **Independence assumption**: govt could strategically reallocate aid projects in response to agronomic conditions; bias direction unclear (+ if aid capture or - if projects reduce production).
- **Instrument compliance**: account for variability in irrigation access; no evidence of weaker compliance via irrigation using pre-invasion FAO data.

Table 3: Impact of rebel capacity on within-day randomization of indirect fire attacks, instrumental variables approach (second stage)

	(1)	(2)	(3)	(4)
Opium Revenue	-0.0793***	-0.0787***	-0.0741***	-0.0741***
	(0.0271)	(0.0268)	(0.0247)	(0.0247)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.136	0.155	0.173	0.173
IV Specification				
IV Type	Benchmark	Benchmark	Benchmark	Benchmark
Kleibergen-Paap *F* Statistic	190.9	188.4	188.9	187.4

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year instrumented using an opium suitability index interacted with the prior year's production (inverted). All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Heterogeneous Effects

Mechanisms

- There are two primary channels through which we anticipate revenue shocks will impact combat tactics (temporal clustering): intelligence gathering and labor constraints.
- **Intel:** Use cross section of rebel spy network (at beginning of sample).
- **Labor scarcity:** Use battlefield losses as proxy for labor scarcity (partially out intensive margin of combat activity).
- **Government surveillance:** Government surveillance increases the cost of attack clustering.

Extensions

Extensions: wages and savings technology

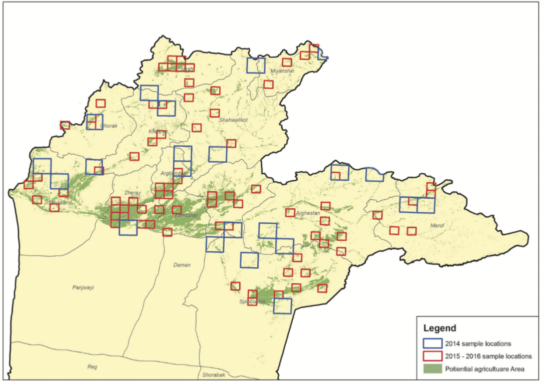
- **Reservation wages:** Opium shocks increase rebel and civilian wealth in levels. This is true if rate of rent capture is equivalent across districts. Use variation in (potential) informal taxes to capture locations where income growth (via opium) is differentially flatter. Military surveys help us capture administrative corruption.
- **Savings technology:** Investigate if rebels with higher income volatility save more (ie, consumption smooth). Classify districts via full panel.

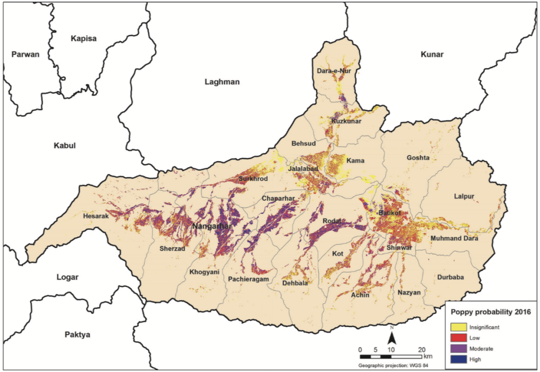
Core Insights

Core insights of this study

- We model how rent extraction influences combat operations and provide empirical evidence from an ongoing conflict.
- Our results suggest the timing of rebel attacks becomes more concentrated (temporally) as they extract more rents.
- This finding is robust to addressing a number of threats to inference, which are usually unobservable.
- The relationship we estimate is enhanced by demonstrated capability to gather intelligence and infiltrate government forces.
- Future work may quantify the revenue potential of trafficking schemes.

Main Slides (Figures)





Source: Government of Afghanistan - National monitoring system implemented by UNODC/MCN
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Main Slides (Tables)

Table 4: Heterogeneous effects of rebel capacity on within-day randomization of indirect fire attacks with respect to potential intelligence gathering by spies

	(1)	(2)	(3)	(4)	(5)
Opium Revenue	-0.0581***	-0.0207***	-0.0224***	-0.0194***	-0.0194***
	(0.0137)	(0.00669)	(0.00661)	(0.00663)	(0.00664)
Surveillance		0.605*	0.758**	0.952**	0.953**
		(0.320)	(0.337)	(0.405)	(0.400)
Surveillance × Revenue		-0.0671***	-0.0669***	-0.0678***	-0.0678***
		(0.0193)	(0.0191)	(0.0190)	(0.0191)
Model Parameters					
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	No	Yes
Model Statistics					
No. of Observations	600	600	600	600	600
No. of Clusters	154	154	154	154	154
R^2	0.154	0.206	0.219	0.233	0.233

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Effects of rebel capacity and battlefield losses on within-day randomization of indirect fire attacks

	(1)	(2)	(3)	(4)	(5)
Opium Revenue	-0.0191***	-0.0222***	-0.0209***	-0.0201***	-0.0200***
	(0.00574)	(0.00660)	(0.00686)	(0.00700)	(0.00698)
Battlefield Losses		0.0456**	0.0486**	0.0485**	0.0486**
		(0.0230)	(0.0211)	(0.0207)	(0.0207)
Model Parameters					
Fighting Season (FS) Fixed Effect	Yes	Yes	Yes	Yes	Yes
FS Activity (levels)	No	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	No	Yes
FS Combat Operations (all, levels)	Yes	Yes	Yes	Yes	Yes
Model Statistics					
No. of Observations	600	600	600	600	600
No. of Clusters	154	154	154	154	154
R^2	0.496	0.501	0.504	0.506	0.506

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Fighting season parameters are notated with the abbreviation FS. Battlefield losses in our sample have a mean of 4.605 and standard deviation of 10.547. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6: Effects of rebel capacity and government surveillance missions on within-day randomization of indirect fire attacks

	(1)	(2)	(3)	(4)	(5)
Opium Revenue	-0.0191***	-0.0203***	-0.0190***	-0.0181***	-0.0181***
	(0.00574)	(0.00601)	(0.00623)	(0.00646)	(0.00644)
Government Surveillance Operations		0.0916***	0.0917***	0.0932***	0.0930***
		(0.0209)	(0.0215)	(0.0210)	(0.0211)
Model Parameters					
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	No	Yes
FS Combat Operations (all, levels)	Yes	Yes	Yes	Yes	Yes
Model Statistics					
No. of Observations	600	600	600	600	600
No. of Clusters	154	154	154	154	154
R^2	0.496	0.501	0.504	0.506	0.506

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Fighting season parameters are notated with the abbreviation FS. Government Surveillance in our sample have a mean of .425 and standard deviation of 3.22. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: Heterogeneous effects of rebel capacity on within-day randomization of indirect fire attacks with respect to variation in reservation wages (via informal taxation by corrupt officials)

	(1)	(2)	(3)	(4)	(5)
Opium Revenue	-0.0581***	-0.0177**	-0.0269***	-0.0268***	-0.0270***
	(0.0137)	(0.00688)	(0.00745)	(0.00750)	(0.00740)
Corruptible Officials		-0.215	-0.676*	-0.669	-0.681*
		(0.358)	(0.390)	(0.405)	(0.405)
Corruptible × Revenue		-0.0430***	-0.0329**	-0.0291**	-0.0288**
		(0.0152)	(0.0133)	(0.0125)	(0.0124)
Model Parameters					
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	No	Yes
Model Statistics					
No. of Observations	600	600	600	600	600
No. of Clusters	154	154	154	154	154
R^2	0.154	0.164	0.182	0.196	0.196

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8: Heterogeneous effects of rebel capacity on within-day randomization of indirect fire attacks with respect to variation in income volatility

	(1)	(2)	(3)	(4)	(5)
Opium Revenue	-0.0581***	-0.0583***	-0.0588***	-0.0550***	-0.0551***
	(0.0137)	(0.0146)	(0.0143)	(0.0121)	(0.0121)
High Revenue Volatility		-0.890*	-0.851*	-0.864*	-0.866*
		(0.495)	(0.477)	(0.489)	(0.488)
High Revenue Volatility × Revenue		-0.00215	-0.00253	-0.00210	-0.00198
		(0.0336)	(0.0324)	(0.0340)	(0.0343)
Model Parameters					
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	No	Yes
Model Statistics					
No. of Observations	600	600	600	600	600
No. of Clusters	154	154	154	154	154
R^2	0.154	0.164	0.180	0.196	0.196

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix

Technical details of model

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- The government has resources to protect $R < N$ windows.
- Rebels receive noisy signals about the vulnerability of each window.
- They launch attacks based on the quality of information gathered with marginal costs for violence production and intelligence gathering.
- If the window is unprotected, one attack's chance of success is p; if protected, zero.
- Rebels maximize probability of a successful attack; the game is zero-sum.

Proposition 1: Equilibrium

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i There exists a unique equilibrium, in which the government protects R "time windows" chosen randomly and uniformly across all possible combinations and rebels follow the signals that they receive.

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i the higher is the temporal concentration of attacks.

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For any number of attacks, the higher is the precision of information that rebels receive:

i the higher is the temporal concentration of attacks.

ii the lower is the expected number of windows attacked and the larger is the expected number of attacks (both successful and total) per window attacked.

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ii When the marginal cost of an individual attack increases, the optimal number of attacks decreases.

iii More resources in the government's disposal results in lower demand for information, and, therefore, lower concentration of attacks.

iv More efficient attack types result in a higher demand for information and, therefore, higher temporal concentration of combat operations. back

Technical details of bootstrap method

Quantifying temporal randomness, details

1. Fit a local polynomial regression to the observed distribution of violence by hour.
2. Identify the sequence of district-hours that experience insurgent activity. For each district-hour, we know the sum of each attack type.
3. Randomly shuffle the sequence above. This is equivalent to a randomization or permutation test.
4. Fit a local polynomial regression to the randomly shuffled distribution of violence by hour. The simulated distribution of fitted values is stored.

Execute the bootstrap Kolmogorov-Smirnov test. This test is composed of four elements.

1. Compute the T_{dfi}^{KS} for the fitted values of the empirical and simulated distributions, where: $T_{dfi}^{KS} = \left(\frac{n_1 n_0}{n}\right)^{\frac{1}{2}} \sup_{y \in \mathbb{R}} |F_{1,n_1}(y) - F_{0,n_1}(y)|$.
2. Resample observations with replacement from observed and simulated distributions. Split the resampled set into two distributions and calculate $T_{dfi,b}^{KS}$. Store $T_{dfi,b}^{KS}$.
3. Repeat prior two steps 1,000 times.
4. Calculate and store the likelihood parameter of the tests as $\sum_{b=1}^{1000} \frac{1T_{dfi,b}^{KS} > T_{dfi}^{KS}}{1{,}000}$.

Repeat permutation and test stages 10,000 times. Evaluate the central tendency (mean) of the likelihood parameters.
Replace zero values with the minimum observed non-zero rank value and calculate the log. Back

COIN and Intimidation/Coercion

Table 9: Impact of rebel capacity on within-day randomization of indirect fire attacks, accounting for state capacity measures (part i)

	(1)	(2)	(3)	(4)
Opium Revenue	-0.0549***	-0.0420***	-0.0346***	-0.0274***
	(0.0125)	(0.00989)	(0.00785)	(0.00945)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	Yes	Yes	Yes	Yes
Growing Season Activity (levels)	Yes	Yes	Yes	Yes
Planting Season Activity (levels)	Yes	Yes	Yes	Yes
Additional Parameters				
Weapon Caches Cleared	No	Yes	No	No
Close Air Support	No	No	Yes	No
IEDs Cleared	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.187	0.243	0.299	0.320

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 10: Impact of rebel capacity on within-day randomization of indirect fire attacks, accounting for state capacity measures (part ii)

	(1)	(2)	(3)	(4)
Opium Revenue	-0.0549***	-0.0539***	-0.0528***	-0.0477***
	(0.0125)	(0.0120)	(0.0116)	(0.0103)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	Yes	Yes	Yes	Yes
Growing Season Activity (levels)	Yes	Yes	Yes	Yes
Planting Season Activity (levels)	Yes	Yes	Yes	Yes
Additional Parameters				
Coalition Surveillance	No	Yes	No	No
Safe House Raids	No	No	Yes	No
Detention of Susp. INS	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.187	0.188	0.193	0.221

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 11: Impact of rebel capacity on within-day randomization of indirect fire attacks, accounting for rebel intimidation tactics

	(1)	(2)	(3)
Opium Revenue	-0.0549***	-0.0492***	-0.0484***
	(0.0125)	(0.0121)	(0.0104)
Model Parameters			
Fighting Season Fixed Effect	Yes	Yes	Yes
Fighting Season Activity (levels)	Yes	Yes	Yes
Growing Season Activity (levels)	Yes	Yes	Yes
Planting Season Activity (levels)	Yes	Yes	Yes
Additional Parameters			
Taliban Intimidation	No	Yes	No
Collaborator Killings	No	No	Yes
Model Statistics			
No. of Observations	600	600	600
No. of Clusters	154	154	154
R^2	0.187	0.204	0.227

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Additional IV Results: IV2 and IV3

Table 12: Impact of rebel capacity on within-day randomization of indirect fire attacks, instrumental variables approach (second stage) using LASSO selection in suitability index estimation

	(1)	(2)	(3)	(4)
Opium Revenue	-0.0759***	-0.0757***	-0.0701***	-0.0701***
	(0.0270)	(0.0266)	(0.0248)	(0.0248)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.142	0.160	0.178	0.178
IV Specification				
IV Type	Lasso	Lasso	Lasso	Lasso
Kleibergen-Paap *F* Statistic	114.7	113.2	117.9	118.2

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year instrumented using an opium suitability index interacted with the prior year's production (inverted). All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 13: Impact of rebel capacity on within-day randomization of indirect fire attacks, instrumental variables approach (second stage) using agronomic inputs as instrumental variables

	(1)	(2)	(3)	(4)
Opium Revenue	-0.0681***	-0.0679***	-0.0617***	-0.0617***
	(0.0203)	(0.0197)	(0.0188)	(0.0188)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.150	0.168	0.185	0.185
IV Specification				
IV Type	Agronomic	Agronomic	Agronomic	Agronomic
Kleibergen-Paap *F* Statistic	44.56	42.48	44.48	44.43

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year instrumented using degree-day (temperature-day) and precipitation-day instruments. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Additional IV Results: Baseline

Table 14: Impact of suitability instrument on opium revenue, instrumental variables approach (first stage, main estimating sample)

	(1)	(2)	(3)	(4)
Suitability × Agg. Production	24.17***	24.20***	23.71***	23.72***
	(1.749)	(1.763)	(1.725)	(1.732)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.465	0.467	0.472	0.473

Notes: Outcome of interest is opium revenue for a given district-year. The quantity of interest is the opium suitability index interacted with the prior year's production (inverted). All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 15: Impact of suitability instrument on opium revenue, instrumental variables approach (first stage, full panel sample)

	(1)	(2)	(3)	(4)
Suitability × Agg. Production	20.54***	20.42***	20.04***	20.01***
	(1.093)	(1.083)	(1.073)	(1.076)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	3582	3582	3582	3582
No. of Clusters	398	398	398	398
R^2	0.304	0.304	0.310	0.311

Notes: Outcome of interest is opium revenue for a given district-year. The quantity of interest is the opium suitability index interacted with the prior year's production (inverted). All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 16: Impact of suitability instrument on within-day randomization of indirect fire attacks, instrumental variables approach (reduced form, main estimating sample)

	(1)	(2)	(3)	(4)
Suitability × Agg. Production	-1.917***	-1.904***	-1.758***	-1.758***
	(0.666)	(0.660)	(0.594)	(0.595)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.129	0.141	0.160	0.160

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is the opium suitability index interacted with the prior year's production (inverted). All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Additional IV Results: LASSO

Table 17: Impact of suitability instrument on opium revenue, instrumental variables approach (first stage, main sample, LASSO selection)

	(1)	(2)	(3)	(4)
Suitability^LASSO × Agg. Production	22.87***	22.88***	22.39***	22.39***
	(2.135)	(2.150)	(2.063)	(2.059)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.429	0.431	0.435	0.436

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is the opium suitability index interacted with the prior year's production (inverted) where inputs are selected via LASSO. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 18: Impact of suitability instrument on opium revenue, instrumental variables approach (first stage, full panel sample, LASSO selection)

	(1)	(2)	(3)	(4)
Suitability^LASSO × Agg. Production	18.05***	17.92***	17.51***	17.49***
	(1.186)	(1.168)	(1.150)	(1.150)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	3582	3582	3582	3582
No. of Clusters	398	398	398	398
R^2	0.257	0.258	0.264	0.266

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is the opium suitability index interacted with the prior year's production (inverted) where inputs are selected via LASSO. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 19: Impact of suitability instrument on within-day randomization of indirect fire attacks, instrumental variables approach (reduced form, main sample, LASSO selection)

	(1)	(2)	(3)	(4)
Suitability^LASSO × Agg. Production	-1.735***	-1.731***	-1.569***	-1.569***
	(0.653)	(0.645)	(0.589)	(0.589)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.111	0.124	0.143	0.143

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is the opium suitability index interacted with the prior year's production (inverted) where inputs are selected via LASSO. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Agronomic Inputs IV

Table 20: Impact of agronomic instruments on opium revenue, instrumental variables approach (first stage, main sample, multiple IV approach)

	(1)	(2)	(3)	(4)
Precip Days, 0-.05	-1.528***	-1.533***	-1.549***	-1.548***
	(0.436)	(0.436)	(0.433)	(0.434)
Precip Days, 0.5-1	-1.583***	-1.592***	-1.618***	-1.617***
	(0.489)	(0.486)	(0.483)	(0.484)
Precip Days, 1-2	-1.090**	-1.112**	-1.165**	-1.164**
	(0.547)	(0.554)	(0.552)	(0.554)
Precip Days, 2-3	-1.409**	-1.379**	-1.397**	-1.396**
	(0.674)	(0.670)	(0.666)	(0.669)
Precip Days, 3-4	-0.726	-0.747	-0.780	-0.780
	(0.747)	(0.748)	(0.745)	(0.746)
Precip Days, 4-5	-1.214	-1.264*	-1.306*	-1.306*
	(0.767)	(0.758)	(0.753)	(0.754)
Precip Days, 5+	-1.166	-1.187	-1.083	-1.086
	(0.874)	(0.868)	(0.857)	(0.854)
Temp Days, up to 270	-0.207*	-0.216*	-0.227**	-0.227**
	(0.117)	(0.116)	(0.113)	(0.112)
Temp Days, 270-275	-0.284*	-0.292*	-0.298*	-0.299*
	(0.158)	(0.156)	(0.153)	(0.154)
Temp Days, 275-280	-0.0866	-0.0924	-0.108	-0.109
	(0.187)	(0.186)	(0.182)	(0.181)
Temp Days, 280-285	0.0702	0.0605	0.0423	0.0414
	(0.127)	(0.127)	(0.125)	(0.124)
Temp Days, 285-290	0.108	0.0990	0.0817	0.0814
	(0.193)	(0.193)	(0.189)	(0.188)
Temp Days, 290-295	-0.300	-0.304	-0.327	-0.327
	(0.258)	(0.258)	(0.257)	(0.257)
Temp Days, 295-300	0.916***	0.912***	0.909***	0.910***
	(0.205)	(0.204)	(0.206)	(0.205)
Temp Days, 300-305	1.451***	1.454***	1.420***	1.418***
	(0.351)	(0.352)	(0.350)	(0.357)
Temp Days, 305-310	2.609**	2.628***	2.566**	2.567**
	(1.002)	(1.006)	(1.007)	(1.007)
Temp Days, 310-315	-1.431	-1.765	-1.332	-1.312
	(3.158)	(3.179)	(3.130)	(3.181)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.455	0.457	0.459	0.459

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantities of interest are the estimated effects of various precipitation-day and temperature-day binned classifications. Precipitation is in millimeters and temperature is in Kelvin. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 21: Impact of agronomic instruments on opium revenue, instrumental variables approach (first stage, full panel sample, multiple IV approach)

	(1)	(2)	(3)	(4)
Precip Days, 0-.05	-0.768***	-0.748***	-0.742***	-0.738***
	(0.218)	(0.218)	(0.219)	(0.219)
Precip Days, 0.5-1	-0.795***	-0.766***	-0.766***	-0.757***
	(0.246)	(0.246)	(0.247)	(0.247)
Precip Days, 1-2	-1.054***	-1.008***	-1.009***	-1.001***
	(0.282)	(0.283)	(0.283)	(0.283)
Precip Days, 2-3	-1.048***	-1.031***	-1.023***	-1.015***
	(0.267)	(0.267)	(0.268)	(0.268)
Precip Days, 3-4	-0.225	-0.196	-0.204	-0.207
	(0.314)	(0.315)	(0.316)	(0.316)
Precip Days, 4-5	-0.675**	-0.638**	-0.652**	-0.651**
	(0.294)	(0.295)	(0.294)	(0.294)
Precip Days, 5+	-0.738**	-0.706*	-0.646*	-0.654*
	(0.371)	(0.370)	(0.370)	(0.371)
Temp Days, up to 270	-0.225***	-0.224***	-0.229***	-0.231***
	(0.0663)	(0.0664)	(0.0660)	(0.0660)
Temp Days, 270-275	-0.194**	-0.192**	-0.198***	-0.202***
	(0.0752)	(0.0753)	(0.0749)	(0.0749)
Temp Days, 275-280	-0.332***	-0.336***	-0.339***	-0.343***
	(0.0936)	(0.0936)	(0.0927)	(0.0929)
Temp Days, 280-285	-0.0596	-0.0581	-0.0743	-0.0803
	(0.0745)	(0.0748)	(0.0750)	(0.0748)
Temp Days, 285-290	-0.0811	-0.0786	-0.0916	-0.0934
	(0.0793)	(0.0797)	(0.0791)	(0.0789)
Temp Days, 290-295	-0.127	-0.126	-0.137	-0.136
	(0.109)	(0.109)	(0.109)	(0.109)
Temp Days, 295-300	0.381***	0.376***	0.384***	0.389***
	(0.121)	(0.120)	(0.120)	(0.120)
Temp Days, 300-305	0.857***	0.843***	0.793***	0.772***
	(0.193)	(0.192)	(0.191)	(0.192)
Temp Days, 305-310	1.320***	1.340***	1.268***	1.263***
	(0.407)	(0.401)	(0.396)	(0.394)
Temp Days, 310-315	8.374***	8.261***	9.125***	9.382***
	(3.033)	(2.911)	(2.863)	(2.956)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	3582	3582	3582	3582
No. of Clusters	398	398	398	398
R^2	0.204	0.206	0.213	0.214

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantities of interest are the estimated effects of various precipitation-day and temperature-day binned classifications. Precipitation is in millimeters and temperature is in Kelvin. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 22: Impact of agronomic instruments on within-day randomization of indirect fire attacks, instrumental variables approach (reduced form, main sample, multiple IV approach)

	(1)	(2)	(3)	(4)
Precip Days, 0-.05	0.0462	0.0442	0.0524	0.0525
	(0.0795)	(0.0788)	(0.0793)	(0.0794)
Precip Days, 0.5-1	0.0443	0.0408	0.0543	0.0547
	(0.0849)	(0.0845)	(0.0855)	(0.0857)
Precip Days, 1-2	0.0484	0.0393	0.0666	0.0668
	(0.0898)	(0.0873)	(0.0877)	(0.0877)
Precip Days, 2-3	0.0784	0.0905	0.100	0.100
	(0.117)	(0.113)	(0.111)	(0.112)
Precip Days, 3-4	0.107	0.0986	0.115	0.115
	(0.143)	(0.143)	(0.148)	(0.148)
Precip Days, 4-5	0.115	0.0950	0.116	0.116
	(0.109)	(0.108)	(0.108)	(0.108)
Precip Days, 5+	-0.0768	-0.0850	-0.138	-0.139
	(0.210)	(0.210)	(0.202)	(0.202)
Temp Days, up to 270	0.0237	0.0203	0.0260	0.0259
	(0.0178)	(0.0172)	(0.0172)	(0.0172)
Temp Days, 270-275	0.0420*	0.0388*	0.0421*	0.0420*
	(0.0233)	(0.0230)	(0.0227)	(0.0230)
Temp Days, 275-280	0.0369	0.0346	0.0425*	0.0424*
	(0.0248)	(0.0243)	(0.0249)	(0.0251)
Temp Days, 280-285	0.0193	0.0154	0.0247	0.0245
	(0.0217)	(0.0216)	(0.0221)	(0.0226)
Temp Days, 285-290	0.0206	0.0169	0.0258	0.0257
	(0.0288)	(0.0283)	(0.0263)	(0.0263)
Temp Days, 290-295	0.0832**	0.0817**	0.0937**	0.0937**
	(0.0402)	(0.0400)	(0.0416)	(0.0416)
Temp Days, 295-300	0.00547	0.00387	0.00505	0.00512
	(0.0344)	(0.0339)	(0.0339)	(0.0341)
Temp Days, 300-305	-0.171**	-0.171**	-0.154**	-0.154**
	(0.0750)	(0.0738)	(0.0739)	(0.0747)
Temp Days, 305-310	-0.607*	-0.600**	-0.568**	-0.568**
	(0.308)	(0.303)	(0.284)	(0.284)
Temp Days, 310-315	3.420***	3.285***	3.063***	3.067***
	(1.013)	(0.988)	(0.907)	(0.914)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	600	600	600	600
No. of Clusters	154	154	154	154
R^2	0.149	0.160	0.183	0.183

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantities of interest are the estimated effects of various precipitation-day and temperature-day binned classifications. Precipitation is in millimeters and temperature is in Kelvin. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Additional Heterogeneous Effects

Table 23: Heterogeneous effects of rebel capacity on within-day randomization of indirect fire attacks with respect to potential intelligence gathering via security base breaches

	(1)	(2)	(3)	(4)	(5)
Opium Revenue	-0.0581***	-0.0564***	-0.0574***	-0.0537***	-0.0537***
	(0.0137)	(0.0143)	(0.0141)	(0.0131)	(0.0131)
Infiltration		0.888***	0.740***	0.760**	0.761**
		(0.239)	(0.257)	(0.307)	(0.307)
Infiltration × Revenue		-0.0418***	-0.0350**	-0.0308*	-0.0308*
		(0.0131)	(0.0146)	(0.0160)	(0.0161)
Model Parameters					
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	No	Yes
Model Statistics					
No. of Observations	600	600	600	600	600
No. of Clusters	154	154	154	154	154
R^2	0.154	0.157	0.173	0.188	0.188

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 24: Heterogeneous effects of rebel capacity on within-day randomization of indirect fire attacks with respect to potential intelligence gathering via insider attacks

	(1)	(2)	(3)	(4)	(5)
Opium Revenue	-0.0581***	-0.0461***	-0.0470***	-0.0433***	-0.0433***
	(0.0137)	(0.0110)	(0.0111)	(0.00921)	(0.00920)
Insiders		-2.026	-1.924	-1.868	-1.861
		(1.479)	(1.385)	(1.526)	(1.511)
Insiders × Revenue		-0.0932***	-0.0899***	-0.0903***	-0.0909***
		(0.0302)	(0.0296)	(0.0335)	(0.0344)
Model Parameters					
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	No	Yes
Model Statistics					
No. of Observations	600	600	600	600	600
No. of Clusters	154	154	154	154	154
R^2	0.154	0.256	0.263	0.278	0.278

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 25: Effects of rebel capacity and battlefield losses on within-day randomization of indirect fire attacks, accounting for counterinsurgent operations from Tables 9 and 10]

	(1)	(2)	(3)
Opium Revenue	-0.0191***	-0.0200***	-0.0215***
	(0.00574)	(0.00698)	(0.00670)
Battlefield Losses		0.0486**	0.0828***
		(0.0207)	(0.0274)
Model Parameters			
Fighting Season (FS) Fixed Effect	Yes	Yes	Yes
FS Activity (levels)	No	Yes	Yes
Growing Season Activity (levels)	No	Yes	Yes
Planting Season Activity (levels)	No	Yes	Yes
FS Combat Operations (all, levels)	Yes	Yes	No
FS COIN Operations (all, levels)	No	No	Yes
Model Statistics			
No. of Observations	600	600	600
No. of Clusters	154	154	154
R^2	0.496	0.506	0.542

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects as well as controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Additional parameters are noted in the table footer. Fighting season parameters are notated with the abbreviation FS. Battlefield losses in our sample have a mean of 4.605 and standard deviation of 10.547. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Varying Control over Timing

Table 26: Impact of rebel capacity on within-day randomization of direct fire attacks

	(1)	(2)	(3)	(4)
Opium Revenue	-0.0309***	-0.0110***	-0.0121***	-0.0119***
	(0.00780)	(0.00292)	(0.00328)	(0.00327)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	1128	1128	1128	1128
No. of Clusters	236	236	236	236
R^2	0.0963	0.448	0.450	0.464

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects. Column 2-4 add controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 27: Impact of rebel capacity on within-day randomization of IED attacks

	(1)	(2)	(3)	(4)
Opium Revenue	-0.00849**	0.000559	-0.000232	-0.00000219
	(0.00385)	(0.00259)	(0.00280)	(0.00270)
Model Parameters				
Fighting Season Fixed Effect	Yes	Yes	Yes	Yes
Fighting Season Activity (levels)	No	Yes	Yes	Yes
Growing Season Activity (levels)	No	No	Yes	Yes
Planting Season Activity (levels)	No	No	No	Yes
Model Statistics				
No. of Observations	653	653	653	653
No. of Clusters	161	161	161	161
R^2	0.0700	0.179	0.186	0.186

Notes: Outcome of interest is the (log) p-value of the randomness test. The quantity of interest is opium revenue for a given district-year. All regressions include fighting season fixed effects. Column 2-4 add controls for the intensive margin of fighting during the fighting, harvest, and planting seasons respectively. Heteroskedasticity robust standard errors clustered by district are reported in parentheses. Stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.