The Effect of Conflict on Lending: Empirical Evidence from Indian Border Areas

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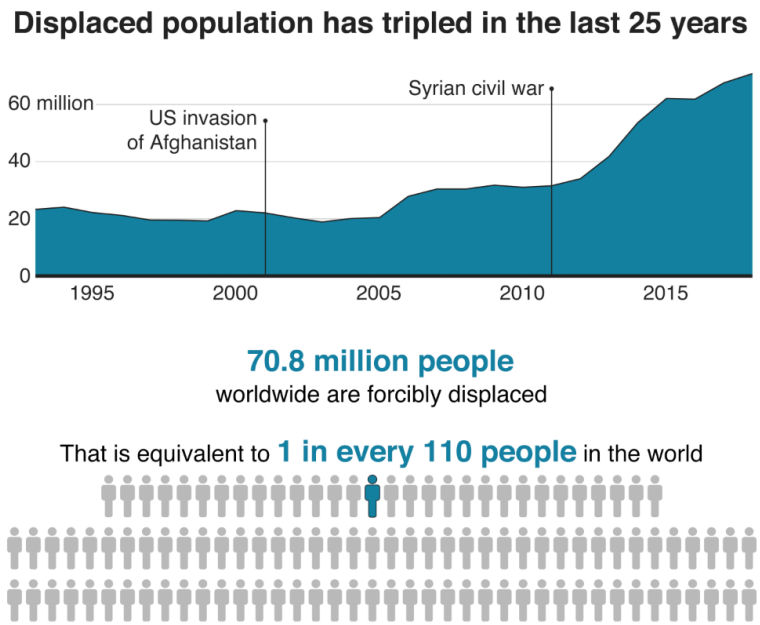
Why conflict matters? (1/3)

Conflict, in general has been trending down over the past decades (especially after World War II).

- The Long Peace - The Better Angels of Our Nature: Why Violence Has Declined (Steven Pinker).
- State monopoly on force, commerce, literacy and rational problem solving driving down conflict.

Why conflict matters? (2/3)



Why conflict matters? (3/3)

'Forgotten' war: Syria conflict a footnote at UN meeting

by ZEINA KARAM Associated Press | Wednesday, September 25th 2019

Helping Countries Navigate a Volatile Environment

Fragility, conflict, and violence (FCV) is **a critical development challenge that threatens efforts to end extreme poverty, affecting both low- and middle-income countries.** By 2030, FCV countries will be home to 46% of the world's extreme poor. Conflicts also drive 80% of all humanitarian needs and reduce gross domestic product (GDP) growth by two percentage points per year, on average.

Background and prior research

Experiences are instrumental in determining prejudices and ex-post behaviour (Crandall & Eshleman - Psychological Bulletin, 2003).

- A number of studies focus on how early life experiences affect cognitive abilities which influence decision making and outcomes (Bernile, Bhagwat & Rau - JF, 2016; Malmendier & Nagel - QJE, 2011; Malmendier & Nagel - QJE, 2015).
- However, our focus is more on how ensuing experiences affect outcomes.

Past work has also tried to point the alternating effect of the experience of conflict experience on risk taking.

- Voors, Nillesen, Verwimp, Bulte, Lensink, & Van Soest - AER, 2012 show evidence in favour of heightened risk taking after experiencing conflict using the civil war in Burundi as backdrop.
- Callen, Isaqzadeh, Long, & Sprenger - AER, 2014 demonstrate using data from Afghanistan that individuals prefer higher certainty equivalents i.e, increased risk aversion.

What do we do differently?

Measuring outcomes in conflict zones is not straightforward given data tractability issues. Hence, many studies on conflict outcomes resort to surveys.

- Our localized setting using a *region level loans database* is able to circumvent this concerns.

Voors et al. and Callen et. al use a ten and eight year interval respectively which could be subject to *recency effect* (Kahana - 2012), i.e., they attribute higher weights to most recent outcomes.

- We investigate the impact of *contemporaneous and repeated incidences of conflict on loan outcomes*. This minimizes bias in outcomes arising due to inter-temporal nature of human recall (Bjork and Whitten - 1974).

Callen et al. use a mix of attacks and prime the subjects with fear, which may affect past recollections in a precise manner.

- The use of a loans database following *actual incidents* allows us to objectively estimate the after effects of the conflict episodes without conditioning individuals.

Our contribution

Limited research on how political and economic shocks affect lending (extent as well as the drivers of the mechanism).

- We observe that the loan terms offered tend to be *worse* off for the borrowers.
- Understanding how restricting credit availability by could *accentuate downward spirals* and (or) credit freezes.
- We conjecture the mechanism responsible for this to be either *changing beliefs* or *changing risk preferences*.

The context

1. We use the armed conflict between Indian and Pakistan in the districts (on the Indian side) along the International Border (IB) as our setting.
   - The IB is a *de-jure* border also known as the Radcliffe line and any acts of aggression tantamount to war.
   - The inter-state conflict in these border districts manifests itself primarily through *shelling* i.e., mortar gun firing.
2. The *shelling* maybe sporadic, isolated and hard to document.
   - We confine ourselves to those events where the damage was so large that it caused a large scale temporary migration of residents.
   - These large scale incidences took place starting in 2014 which coincides with our data availability from January 2011 - June 2017.

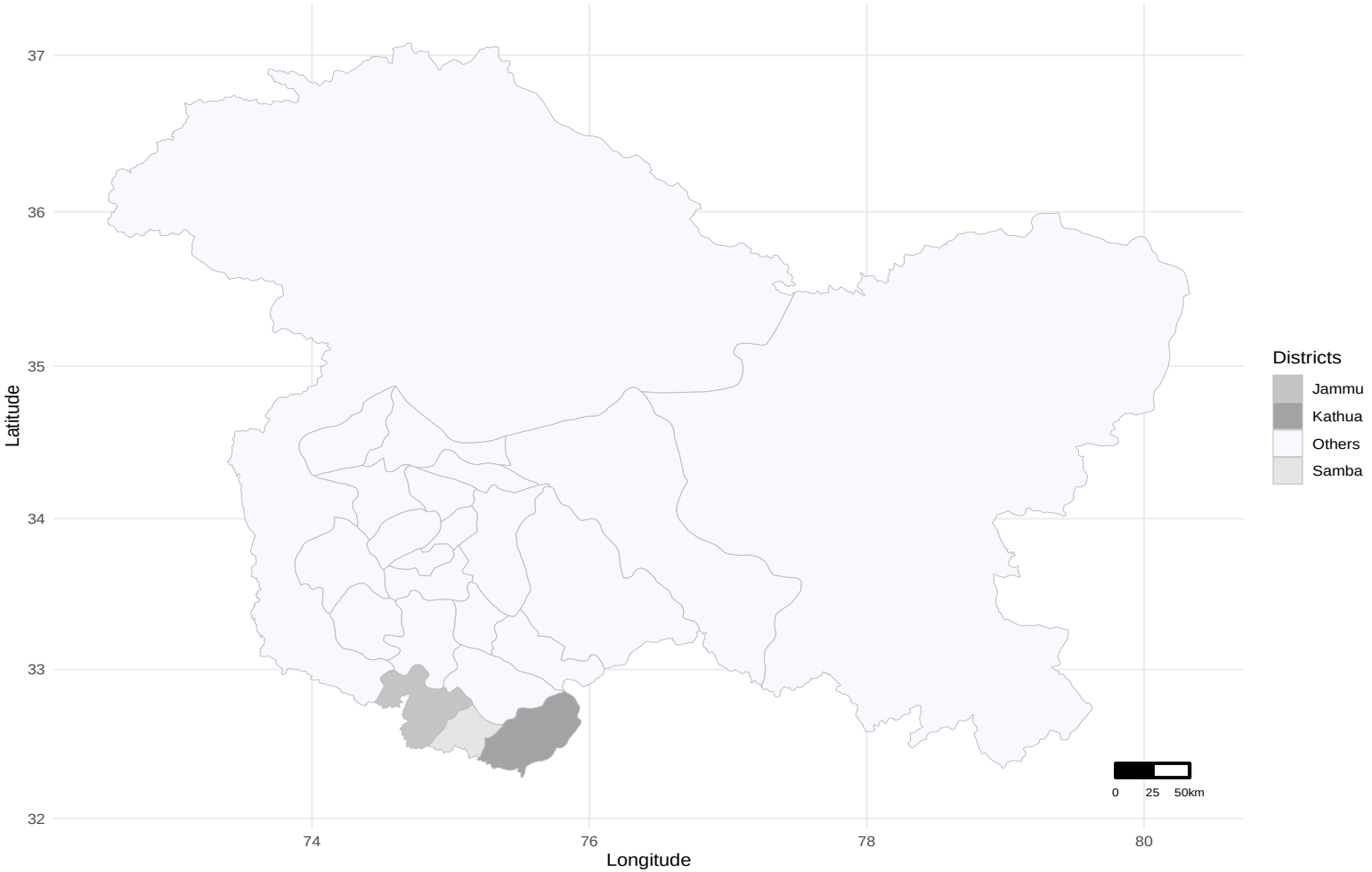
The princely states of British India

The (many) boundaries of the erstwhile princely state of Jammu & Kashmir

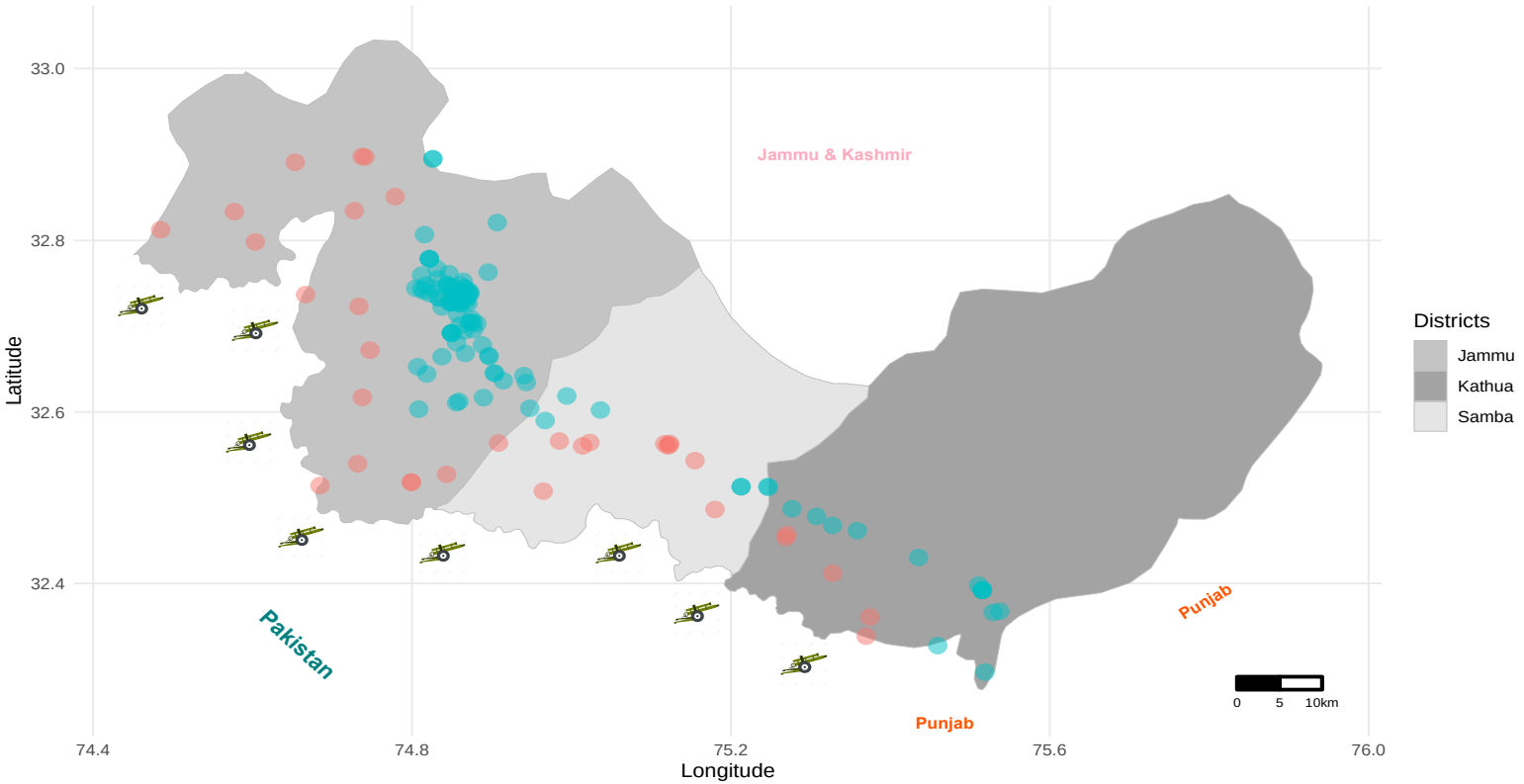
Divisions and districts of Jammu & Kashmir

Division	District	Area (sq. km)	Population (2011 Census)
	Kathua	2,651	615,711
	Jammu	3,097	1,526,406
	Samba	904	318,611
	Udhampur	4,550	555,357
Jammu	Reasi	1,719	314,714
	Rajouri	2,630	619,266
	Poonch	1,674	476,820
	Doda	11,691	409,576
	Ramban	1,329	283,313
	Kishtwar	1,644	231,037
Total		26,293	5,350,811
	Anantnag	3,984	1,069,749
	Kulgam	1,067	423,181
	Pulwama	1,398	570,060
	Shopian	613	265,960
Kashmir Valley	Budgam	1,371	755,331
	Srinagar	2,228	1,250,173
	Ganderbal	259	297,003
	Bandipora	398	385,099
	Baramulla	4,588	1,015,503
	Kupwara	2,379	875,564
Total		15,948	6,907,622
	Kargil	14,036	143,388
Ladakh	Leh	45,110	147,104
Total		59,146	290,492

Position of the three districts in Jammu & Kashmir



Location of treated and control branches in the three districts



Details of the mortar gun used by the security forces

ARMAMENT RESEARCH & DEV. ESTABLISHMENT

MINISTRY OF DEFENCE PROD - RAWALPINDI

120mm MORTAR

120 mm Mortar is a simple weapon which combines mobility with fire power. It is developed as a light field artillery against enemy troops. It fires a variety of ammo and provides all round fire support from 500m (min) to 7150m (max). The mortar is developed for firing by a crew of five. Weapon is currently in use with Pakistan Army

Weight	**402 Kg**
Elevation	**45° to 80°**
Traverse	**17°**
Rate of fire	**8 RPM**

Data

1. We obtain our loan-level data from the largest lender (close to a monopolist) in the state of J&K.
   - For the financial year 2017-18, the lending targets allocated to them were 72% of the overall lending targets in the state of J&K.
   - Also have considerable reach accounting for 45% of the branches, 65% of the BCs (Bank correspondents) and 44% of the ATMs in the state as of 31st December, 2017.
2. Our data-set covers the period spanning from January 2011 - June 2017.
   - An assessment of the news articles collected by the SATP portal reveals that shelling occurred around 5^{th} Oct - 11^{th} Oct 2014, 4^{th} Jan - 5^{th} Jan 2015, 26^{th} Oct - 27^{th} Oct 2015 and 2^{nd} Oct - 1^{st} Nov 2016.
3. The geocodes of each branch are hand collected using Google Maps. Subsequently, we use this information to calculate the shortest distance of each branch from the border.

Shelling events and displaced population

- The table below only depicts the displaced population. Actual affected population would be higher.

Shelling Date(s)	Affected Districts	Displaced population(approx.)
5th Oct, 2014 - 5th Jan, 2015	Jammu, Samba and Kathua	30,000
26th Oct, 2015 - 27th Oct, 2015	Samba and Kathua	3,000
2nd Oct, 2016 - 1st Nov, 2016	Jammu, Samba and Kathua	10,800

Summary statistics for affected and unaffected branches

	(1) Affected branches			(2) Unaffected branches		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Panel A. Loan Terms and Lending Variables						
Interest rate (%)	50,334	7.03	4.81	136,602	6.92	5.84
Log(Interest rate)	37,523	2.20	0.30	84,579	2.38	0.28
Amount (INR)	50,367	145057.7	270709.2	136,660	219669.1	367484.2
Log(Amount)	31,908	11.41	1.70	81,197	12.19	1.36
% Loan collateralized	31,908	0.65	0.94	81,197	0.78	1.25
Loan maturity (months)	14,195	68.15	30.44	55,409	71.35	33.45
Any collateral	50,367	0.29	0.46	136,660	0.28	0.45
Productive loan	47,203	0.52	0.50	119,684	0.21	0.41
Panel B. Branch Specific Variables						
Distance from IB (km)	50,367	6.41	2.29	136,660	16.17	2.63
Lagged supply slippage (%)	22,415	0.56	0.15	82,604	0.60	0.15

Main Empirical specification

$$Terms_{it} = \beta_0 + \beta_1 Treated_i \times Post_t + \beta_2 Treated_i + \beta_3 Post_t + \eta_{jt} + \mu_k + \epsilon_{mt} \quad (1)$$

Where:

- *Terms* denotes either of the loan terms, i.e., Interest rate, Loan amount or % Loan collateralized.
- *Treated* is a dummy variable which equals 1 for loans given by all branches within 0-10 kilometres of the IB where as it is 0 for loans given by all branches within 10-20 kilometres of the IB.
- η denotes district $\times$ time (quarter) fixed effects allowing us to control for demand (Fisman, Paravisini, & Vig - AER, 2017) where as μ denotes loan type fixed effects.
- Anecdotal evidence suggest temporary migration leads to permanent migration as well.

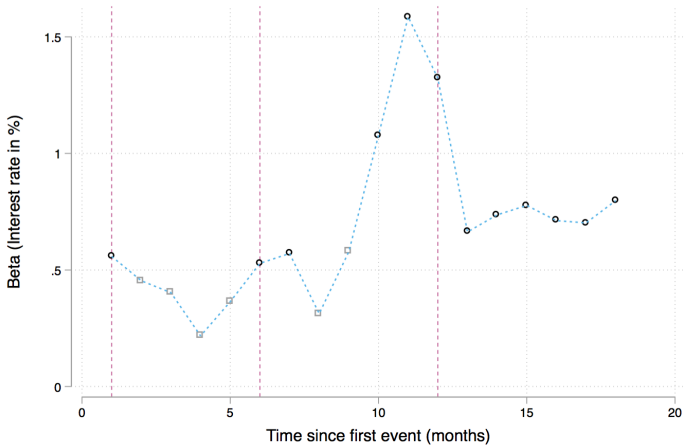
Change in loan terms for branches in affected areas (1/2)

	First Shelling Event			Second Shelling Event		
	(1) Log(Interest rate)	(2) Log(Amount)	(3) Log(% Collateralized)	(4) Log(Interest rate)	(5) Log(Amount)	(6) Log(% Collateralized)
Affected×Post(10^{-2})	0.498**	7.032*	−8.810***	0.492**	4.609	1.756
	(0.249)	(3.840)	(2.933)	(0.244)	(3.206)	(2.708)
Affected(10^{-2})	−0.725***	−8.327***	0.764	−0.565***	−6.004***	−5.457***
	(0.179)	(2.758)	(2.191)	(0.191)	(2.321)	(2.033)
Post(10^{-2})	−1.215	−16.992	9.268	−2.158***	10.623***	−4.590**
	(0.759)	(11.505)	(6.118)	(0.211)	(2.509)	(2.258)
District × Quarter fixed-effects	Y	Y	Y	Y	Y	Y
Loan-type fixed-effects	Y	Y	Y	Y	Y	Y
R^2	0.964	0.550	0.394	0.950	0.533	0.376
Observations	7,540	7,523	4,434	11,201	11,188	5,284

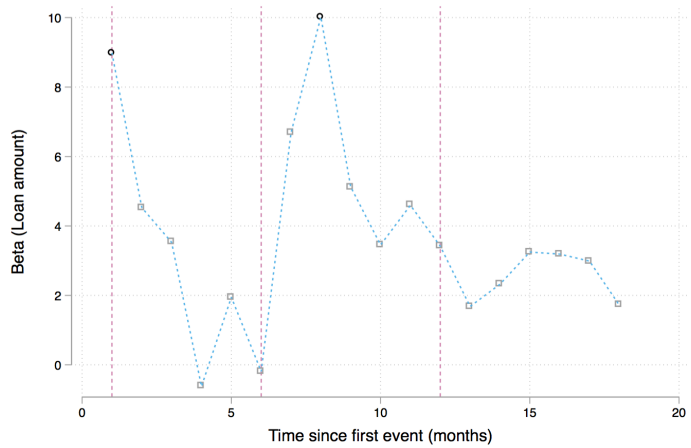
Change in loan terms for branches in affected areas (2/2)

Third Shelling Event		
(7)	(8)	(9)
Log(Interest rate)	Log(Amount)	Log(% Collateralized)
0.588***	1.139	4.170*
(0.124)	(2.588)	(2.435)
−0.385***	−6.686***	−3.330*
(0.102)	(2.092)	(1.862)
−2.724***	−3.707	−8.852***
(0.136)	(2.402)	(2.540)
Y	Y	Y
Y	Y	Y
0.969	0.565	0.205
18, 926	18, 921	6, 800

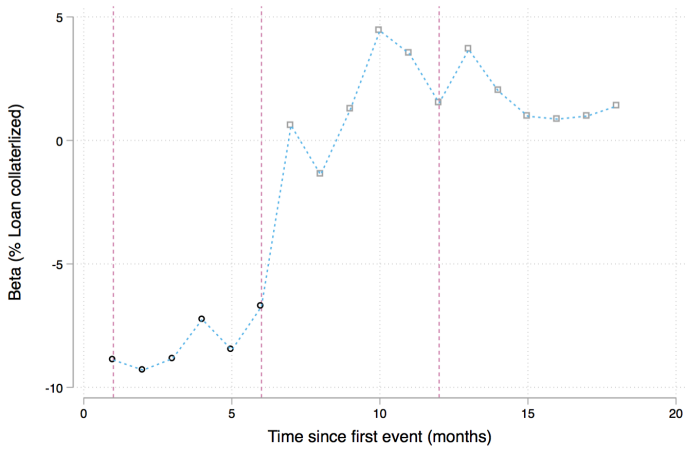
Initial overreaction followed by reversion to (higher) mean?



Interest Rate



Loan Amount



% Loan Collateralized

Controlling for non-shelling induced supply effects

$$Supply\ Slippage_{lq} = 1 - \frac{\sum_{i=1}^{n} Cumulative\ Loan\ Volume_{lq}}{Lending\ Volume\ Target_{l}} \quad (2)$$

- Lagged *Supply Slippage* allows us to control for any supply effects which arise from the lenders' side due to shortfall in loan volume targets.
- We modify our primary specification as follows:

$$\begin{aligned} Terms_{it} = {} & \beta_0 + \beta_1 Treated_i \times Post_t + \beta_2 Treated_i + \beta_3 Post_t \\ & + \beta_4 Supply\ Slippage_{q-1} + \eta_{jt} + \mu_k + \epsilon_{mt} \end{aligned} \quad (3)$$

Change in loan terms for branches in affected areas controlling for demand-supply effects

	Second Shelling Event			Third Shelling Event		
	(1) Log(Interest rate)	(2) Log(Amount)	(3) Log(% Collateralized)	(4) Log(Interest rate)	(5) Log(Amount)	(6) Log(% Collateralized)
Affected×Post(10^{-2})	0.497**	5.556*	2.015	0.582***	0.840	4.274*
	(0.245)	(3.294)	(2.719)	(0.124)	(2.632)	(2.438)
Supply Slippage(%)	0.045	1.516	8.426	0.455*	−0.629	−4.711
	(0.247)	(6.159)	(6.969)	(0.250)	(6.304)	(3.002)
Affected(10^{-2})	−0.565***	−7.070***	−5.587***	−0.379***	−6.870***	−3.353*
	(0.191)	(2.377)	(2.035)	(0.102)	(2.123)	(1.862)
Post(10^{-2})	−2.159***	10.302***	−4.656**	−2.747***	−3.937	−8.641***
	(0.212)	(2.591)	(2.259)	(0.137)	(2.512)	(2.546)
District × Quarter fixed-effects	Y	Y	Y	Y	Y	Y
Loan-type fixed-effects	Y	Y	Y	Y	Y	Y
R^2	0.950	0.526	0.377	0.969	0.557	0.205
Observations	11, 201	11, 188	5, 284	18, 926	18, 921	6, 800

Effects more pervasive in loan types impaired by shelling (1/2)

	First Shelling Event			Second Shelling Event		
	(1) Log(Interest rate)	(2) Log(Amount)	(3) Log(% Collateralized)	(4) Log(Interest rate)	(5) Log(Amount)	(6) Log(% Collateralized)
Affected×Post(10^{-2})	0.802***	4.754	−9.000***	1.346***	−4.825	1.192
	(0.309)	(4.817)	(2.977)	(0.413)	(4.389)	(2.776)
Affected(10^{-2})	−0.561***	−5.299	0.143	−0.209	1.042	−3.577*
	(0.190)	(3.429)	(2.229)	(0.341)	(3.208)	(2.141)
Post(10^{-2})	−1.450*	−9.860	13.621**	−1.018***	6.666*	−8.202***
	(0.878)	(13.794)	(5.869)	(0.389)	(3.449)	(2.417)
District × Quarter fixed-effects	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Loan-type fixed-effects	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
R^2	0.955	0.649	0.359	0.911	0.672	0.393
Observations	3, 463	3, 452	3, 423	4, 155	4, 152	3, 945

Effects more pervasive in loan types impaired by shelling (2/2)

Third Shelling Event		
(7)	(8)	(9)
Log(Interest rate)	Log(Amount)	Log(% Collateralized)
0.497**	−2.949	5.603**
(0.197)	(3.607)	(2.559)
−0.332**	−2.725	−4.820**
(0.153)	(2.580)	(2.021)
−1.840***	−1.040	−14.948***
(0.243)	(3.462)	(2.354)
Y	*Y*	*Y*
Y	*Y*	*Y*
0.957	0.728	0.243
6, 612	6, 609	4, 692

Change in risk preferences?...

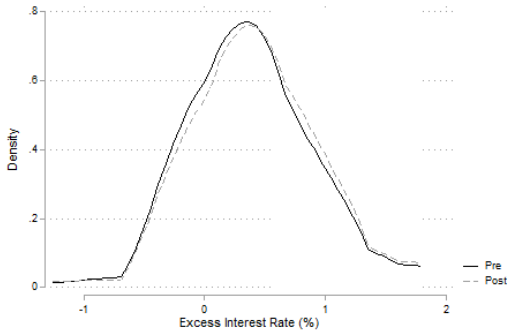
$$Certainty\ Premium = v(X|b)_c - v(X|b)_u \tag{4}$$

- Ex-ante, We would expect shelling to increase the certainty premium as loan officers would prioritize safe loans over risky ones.
- At present, unable to assess changes in risk aversion keeping beliefs constant.

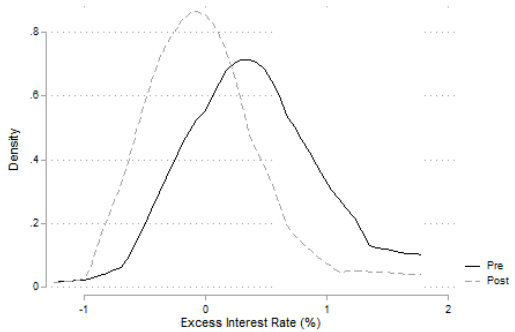
	Safe loans	Risky loans	Safe - Risky
	(1)	(2)	(3)
Post	0.110***	−0.104	0.214**
	(0.036)	(0.082)	(0.089)
District × Month fixed-effects	Y	Y	Y
R^2	0.041	0.070	0.037
Observations	1,726	1,726	1,726

... or change in beliefs?

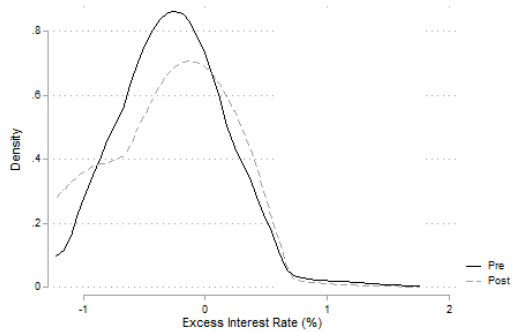
- Manifests as changes in probability of future expectations of loan default or impairment of loan value.
  - This occurs due to better learning about the environment in which the branch administration operates. As a result, the branch administration may increase interest rates to account for any expected losses on their loan portfolio (credit risk).
  - As before, we are unable to assess changes keeping risk aversion constant.



First Event



Second Event



Third Event

Weighting function used for testing the effect of learning

$$w_{it}(k,\lambda) = \frac{(age_{it} - k)^{\lambda}}{\sum_{k=1}^{30}(age_{it} - k)^{\lambda}} \tag{3}$$

- The weighting function mimics the one used in Malmendier & Nagel - QJE, 2011.
- We weight the incidence of shelling using the kernel above to obtain a continuous measure of shelling.
- For days when shelling occurs, the dummy is 1 where as when there is no such occurrence, the dummy is 0.01. This avoids the issue of zeros in the denominator.

$$Weighted\ Shelling_{it}(\lambda) = \sum_{k=1}^{30} w_{it}(k,\lambda)\ Shelling_{t-k} \tag{6}$$

Past shelling impacts loan interest rate

	Log(Interest Rate)				
	(1) $\lambda = 1$	(2) $\lambda = 1.5$	(3) $\lambda = 2$	(4) $\lambda = 2.5$	(5) $\lambda = 3$
Affected × Weighted Shelling(10^{-2})	1.677***	1.680***	1.682***	1.683***	1.684***
	(0.644)	(0.644)	(0.644)	(0.644)	(0.644)
Affected(10^{-2})	−0.343***	−0.343***	−0.343***	−0.343***	−0.343***
	(0.053)	(0.053)	(0.053)	(0.053)	(0.053)
Weighted Shelling(10^{-2})	0.042	0.022	0.002	−0.018	−0.038
	(0.474)	(0.476)	(0.477)	(0.478)	(0.479)
District × Quarter fixed-effects	Y	Y	Y	Y	Y
Loan-type fixed-effects	Y	Y	Y	Y	Y
R^2	0.953	0.953	0.953	0.953	0.953
Observations	77,170	77,170	77,170	77,170	77,170

Falsification: Loan terms along the Line of control (*de-facto border*) (1/2)

	First Shelling Event			Second Shelling Event		
	(1) Interest rate	(2) Limit granted	(3) Log(% Collateralized)	(4) Interest rate	(5) Limit granted	(6) Log(% Collateralized)
Affected×Post	0.317**	8.015	0.246	−0.091	−5.389	1.205
	(0.148)	(5.250)	(3.250)	(0.209)	(4.847)	(3.467)
Affected	−0.341***	−16.587***	5.898**	0.121	−4.235	1.663
	(0.113)	(3.937)	(2.395)	(0.173)	(3.603)	(2.379)
Post	0.168	−21.350	−6.454	−1.894***	8.959*	0.533
	(0.612)	(28.971)	(6.060)	(0.215)	(4.910)	(3.584)
District × Quarter fixed-effects	Y	Y	Y	Y	Y	Y
Loan-type fixed-effects	Y	Y	Y	Y	Y	Y
R^2	0.996	0.666	0.118	0.992	0.661	0.128
Observations	3, 119	3, 117	2, 102	3, 555	3, 552	1, 818

Falsification: Loan terms along the Line of control (*de-facto border*) (2/2)

Third Shelling Event		
(7) Interest rate	(8) Limit granted	(9) Log(% Collateralized)
0.208	0.440	4.123
(0.201)	(3.525)	(2.898)
−0.659***	−8.023***	−4.472**
(0.163)	(3.018)	(2.094)
−2.957***	17.818***	−2.760
(0.225)	(3.330)	(2.935)
Y	*Y*	*Y*
Y	*Y*	*Y*
0.982	0.648	0.181
6, 867	6, 865	2, 280

Robustness: Results for close contest constituencies

	Second Shelling Event			Third Shelling Event		
	(1) Log(Interest rate)	(2) Log(Amount)	(3) Log(% Collateralized)	(4) Log(Interest rate)	(5) Log(Amount)	(6) Log(% Collateralized)
Close Contest×Post(10^{-2})	−1.183***	−9.259	−0.990	0.074	5.256	1.352
	(0.427)	(6.298)	(5.223)	(0.216)	(5.246)	(5.298)
Close Contest(10^{-2})	1.087***	−4.111	3.253	−0.048	−3.094	6.821
	(0.327)	(4.409)	(3.028)	(0.179)	(4.261)	(4.184)
Post(10^{-2})	−1.602***	19.141***	−0.888	−2.234***	−2.607	−5.835
	(0.383)	(5.381)	(3.958)	(0.211)	(4.286)	(4.262)
District×Quarter fixed-effects	Y	Y	Y	Y	Y	Y
Loan-type fixed-effects	Y	Y	Y	Y	Y	Y
R^2	0.971	0.585	0.358	0.983	0.545	0.231
Observations	2,513	2,512	1,393	3,978	3,978	1,607

Conclusion & main takeaways

1. Political turmoil affects borrowers due to the supply side decisions of loan officers who offer worse loan terms.
2. Initial overreaction followed by reversion. The final outcome is persistent and worse off for the borrower.
3. Banks exhibit behaviour opposite of what would be expected of them to kick start or sustain economic activity in politically troubled areas.
4. Next steps:
   - As the state government owns a majority stake in the bank, we need to understand whether political developments may influence outcomes.
   - Further research on to what extent *changes in beliefs* and *changes in preferences* by themselves drive the results.

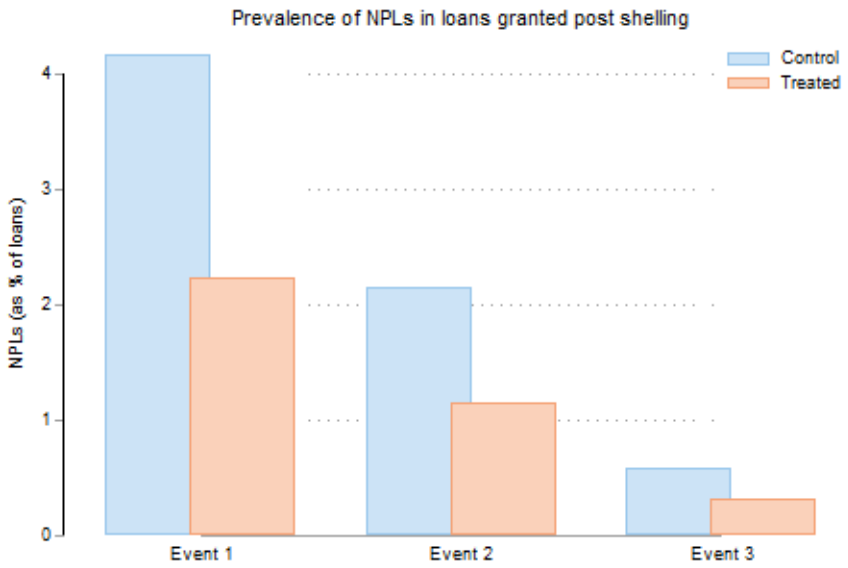
Appendix

Damage due to shelling

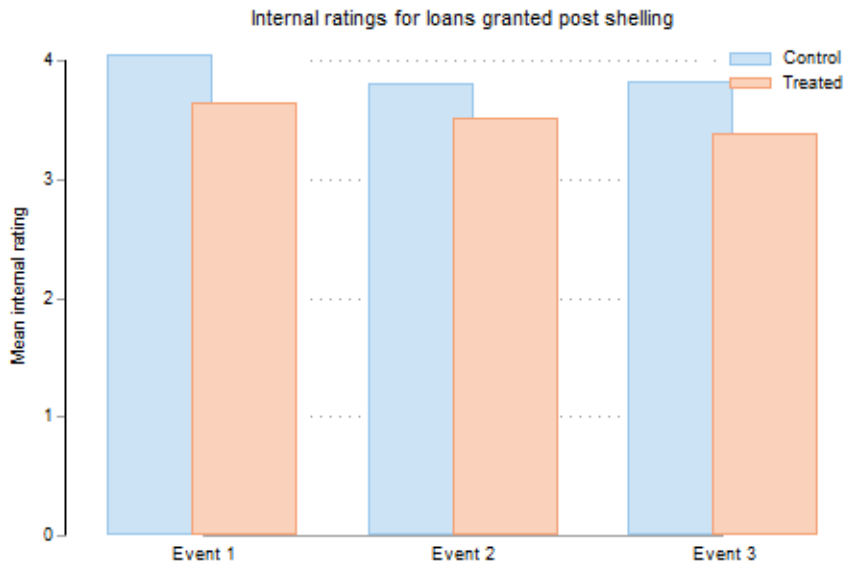
Real effects of shelling

	First Shelling Event		Second Shelling Event		Third Shelling Event	
	(1) Productive loan	(2) Loan with collateral	(3) Productive loan	(4) Loan with collateral	(5) Productive loan	(6) Loan with collateral
Affected×Post(10^{-2})	−0.022	−0.027	−0.041*	−0.020	−0.115***	−0.026*
	(0.028)	(0.026)	(0.022)	(0.022)	(0.014)	(0.014)
Affected(10^{-2})	0.210***	0.099***	0.199***	0.105***	0.137***	0.036**
	(0.020)	(0.018)	(0.016)	(0.016)	(0.014)	(0.014)
Post(10^{-2})	0.032	−0.056	0.004	−0.037**	−0.122***	−0.347***
	(0.081)	(0.082)	(0.015)	(0.017)	(0.008)	(0.009)
District × Quarter fixed-effects	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
R^2	0.106	0.021	0.077	0.018	0.092	0.158
Observations	6, 943	7, 808	10, 342	11, 522	74, 564	80, 513

Change in borrower pool



NPLs



Internal Rating