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Foreign Aid Allocation and Conflict in Sub-Saharan Africa: A Spatial Analytical Approach

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Foreign Aid Allocation and Conflict in Sub-Saharan Africa: A Spatial Analytical Approach

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Background

- Violence is destructive, especially in developing countries.
  - Abrupt law and order for economic activities.
  - Destroy infrastructure.
  - Run out resources that could have been used for production.
- Armed conflict is among the worst: contested incompatibility with government involved and with the use of armed forces.
- An important concern for poverty eradication and economic development.

Research Question

- Does foreign aid have an effect on armed conflict in the recipient countries in Sub-Saharan Africa?
- The answer to this question has very important policy implications.

Literature

- Most of the literature focuses on aid and conflict at country level.
    - Collier and Hoeffler (2002), Collier and Hoeffler (2007), De Ree and Nillesen (2009), Nielsen et al. (2011).
    - But, most aid projects are local activities.
- Other literature focuses on specific aid projects.
    - Findley et al. (2011), Strandow et al. (2016).
    - But, what is the average effect?
- Most of the above literature focuses on conflict onset probability and conflict continuation probability.
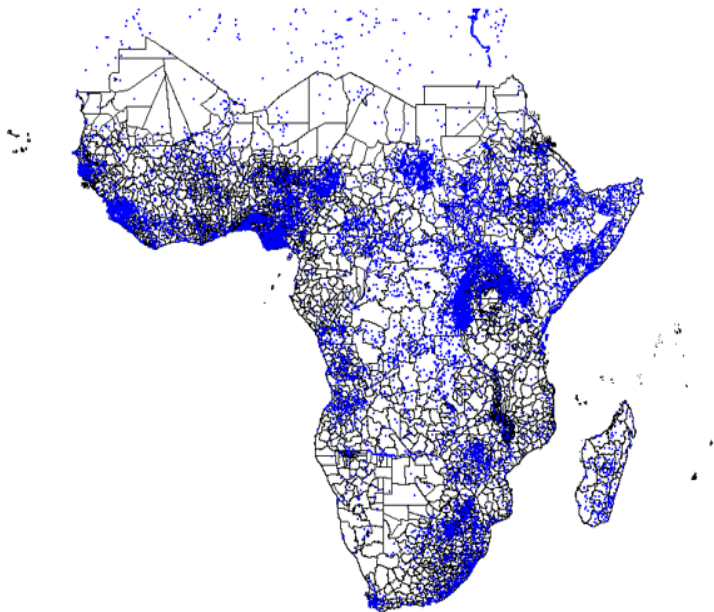   - But, what about the severity?

This Project

- Local level: ADM2, the second administrative division, equivalent to the U.S. county.
- Average effect.
- Conflict occurrences and fatalities.
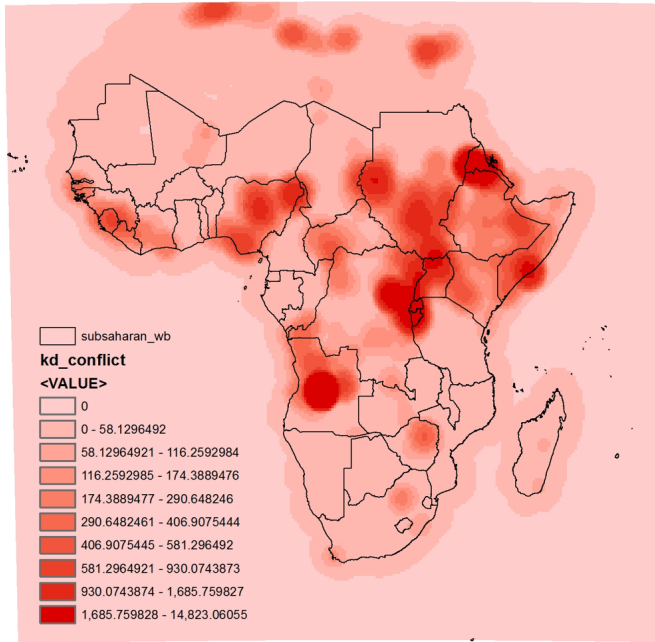- By time precision and conflict types.
- Non-linear effect.

Aid Projects
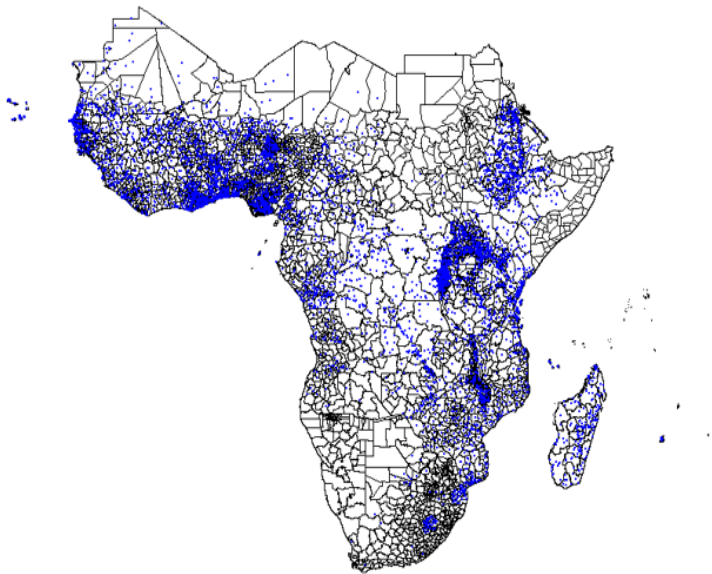
Conflict Events

Conflict Kernel Density: Weighted by Fatalities

Model Specification

$$conflict_{i,t} = \beta_0 + \beta_1 conflict_{i,t-1} + \beta_2 ln(1+aid_{i,t-1}) + X'_{i,t-1}\gamma + \delta_i + \delta_t + \varepsilon_{i,t}$$

- $conflict_{i,t}$: the number of conflict occurrences or fatalities in region i and time t.
- $aid_{i,t-1}$: aid to region i and time $t-1$.
- $X_{i,t-1}$: logged night lights as proxy for economic activities in region i at $t-1$; logged population in region i at $t-1$; natural resource rents as percentage of GDP at country level at $t-1$; ICRG scores for religious tensions, ethnic tensions and military in politics at country level at $t-1$.
- Logged aid at $t-2$ and $t-3$ are used as instrumental variables for aid at $t-1$.

Data Sources: 1997-2012

Data	Data Sources
Aid	AidData (2015)
Conflict	ACLED (2017)
Night lights	NOAA (2015)
Population	CIESIN and CIAT (2015)
Administrative boundary	GAAD (2015)
Natural Resource Rents	WDI (2017)
Religious tensions	ICRG (2013)
Ethnic tensions	ICRG (2013)
Military in Politics	ICRG (2013)

Data Summary Statistics

	N	Mean	Std. Dev.	Min	Max
Conflict Occurrence	76940	1.521	10.6252	0	665
Fatalities	76940	8.3752	362.1699	0	64672
Aid ($)	76919	6.85E+07	2.95E+08	0	9.47E+09
Lights	72409	1485.909	4270.281	0	84233
Population	80073	192782.8	329871.4	0	7955719
Lights per capita	72409	0.0287	0.1677	0	11.1728
Natural Resource Rents	962	13.9099	14.0389	0.0011	89.1661
Religious tensions	576	4.1663	1.3152	0	6
Ethnic tensions	576	3.2307	1.1478	0	5
Military in politics	576	2.4627	1.6964	0	6

Main Regression Results

VARIABLES	Occurrence (1)	Occurrence (2)	Occurrence (3)	Fatalities (4)	Fatalities (5)	Fatalities (6)
ln(aid)	-0.258***	-0.402***	-0.00748	-1.321***	-1.678***	-0.304**
	(-0.0728)	(-0.0986)	(-0.0194)	(-0.315)	(-0.386)	(-0.133)
Conflict	0.522***	0.512***	0.339**	-0.0697	-0.0697	-0.000784
	(-0.178)	(-0.181)	(-0.15)	(-0.0658)	(-0.0658)	(-0.0031)
ln(lights)	0.187***	0.225***	0.152***	0.557**	0.658**	0.123
	(-0.0488)	(-0.051)	(-0.048)	(-0.272)	(-0.285)	(-0.447)
ln(population)	-2.447*	-0.552	-0.561	-9.269***	-4.208*	-2.908
	(-1.33)	(-1.313)	(-1.102)	(-2.73)	(-2.544)	(-2.321)
Aid Propensity Score		21.32***			54.96***	
		(-4.709)			(-15.55)	
Observations	9,615	9,615	12,820	9,615	9,615	12,820
R-squared	0.132	0.106	0.13	-0.005	-0.022	0.008
Number of id	3,205	3,205	3,205	3,205	3,205	3,205
p-value of F	0	0	0	0	0	0
CD Wald F	504.738	349.635	-	515.039	352.846	-
KP rk Wald F	259.025	162.123	-	266.83	164.68	-
Stock-Yogo 10% value	19.93	19.93	-	19.93	19.93	-
Hansen test	0.3103	0.2964	-	0.8853	0.4307	-

Main Results Explanations

- Aid helps to increase the government's military power (or potential) to preserve peaceful status, in which aid deters conflict.
- Aid can help promote economic performance to reduce conflict.

Robustness Tests

- Positive conflict occurrences or fatalities.
- Conflict $<$ 95th percentile.
- Aid $<$ 95th percentile.
- Lights $>$ 0.
- Population $>$ 0.

Further Exploration: Time Precision

- Can be: day, week, or month.
- If a conflict event has "week" precision:
    - It actually lasted for weeks.
    - We are confident it did not last for months, but the limited information cannot tell it lasted for days.
- Aid seems to be particularly effective in reducing conflict occurrences or fatalities if the events have better precision (day or week).

Further Exploration: Conflict Types

- 9 types: Battle-No change of territory, Battle-Non-state actor overtakes territory, Battle-Government regains territory, Headquarters or base established, Strategic development, Riots/Protests, Violence against civilians, Non-violent transfer of territory, and Remote violence.

- Combine the first three into one type: Battle.

- Aid seems to be particularly effective in reducing conflict occurrences or fatalities if the events have types of Battle, Violence against civilians, and Remote violence.

Further Exploration: Non-Linearity of Income on Conflict

VARIABLES	Occurrence (1)	Occurrence (2)	Fatalities (3)	Fatalities (4)
ln(aid)	-0.255***	-0.013	-1.256***	-0.307**
	(-0.0728)	(-0.02)	(-0.32)	(-0.137)
Conflict	0.520***	0.339**	-0.0694	-0.000783
	(-0.178)	(-0.149)	(-0.0657)	(-0.0031)
ln(lights/population)	15.84***	8.475	34.63***	-6.986
	(-5.53)	(-5.187)	(-12.02)	(-12.21)
(ln(lights/population))2	-0.148**	-0.128**	-0.177	0.157
	(-0.0684)	(-0.0651)	(-0.155)	(-0.182)
Observations	9,612	12,816	9,612	12,816
R-squared	0.134	0.131	-0.002	0.008
Number of id	3,204	3,204	3,204	3,204
p-value of F	0	0	0	0
CD Wald F	545.703	-	549.147	-
KP rk Wald F	255.306	-	260.612	-
Stock-Yogo 10% value	19.93	-	19.93	-
Hansen test	0.3689	-	0.9156	-

Further Exploration: Non-Linearity of Income on Conflict

- Income on Conflict: Inverted U shaped curve. When income is very low, increasing income marginally tends to cause more fights for the limited resources, which hurts income. When income is sufficiently high, increasing income tends to reduce conflict.
- Sub-Saharan Africa is on the upward-sloping part.
- Aid can reduce conflict occurrences and fatalities, and alleviate the poverty-conflict trap.

Conclusion

- ▶ Aid tends to reduce both conflict occurrences and fatalities in the following period.
- ▶ Aid is particularly effective when conflict events with better precision, or when certain types of conflict events are under way.
- ▶ Aid can reduce conflict occurrences and fatalities, and alleviate the poverty-conflict trap in Sub-Saharan Africa.

Future Work

- More exploration on the conflict types.
- Spillover effects.
- Aid at different levels.
- More robustness tests.