Special Topics: Conflicts and Institutions

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Nunn & Qian (2012)

Many observers argue that humanitarian and especially food aid could fuel and support civil wars.
This paper estimates the causal impact of food aid on conflicts in the recipient countries.
The empirical problems to overcome are reverse causality and omitted variables

- reversed causality: countries at war receive/attract food and humanitarian assistance
- omitted variables:
  - both civil wars and food aid are more likely to be observed in periods of political instability and economic crisis (upward bias)
  - donors might concentrate their aid on countries with low risk of civil conflict (downward bias)

Nunn & Qian (2012)

In order to identify the effect of food aid, an IV strategy is adopted
Instrument:

- Fluctuations in US wheat production interacted by
- the existence of a long-term relation between the US and the recipient country

Wheat fluctuations are likely to depend only on US weather conditions.

Some evidence

Food aid and humanitarian aid need to be transported across territories that the recipient country government often has little control over.
Armed factions can set up road blocks and "tax" aid agencies for safe passage.
Examples:

- In Somalia in the early 1990s: as much as eighty percent of food aid shipments were either looted, stolen or used as protection money. Stolen aid was then traded for arms in neighboring Ethiopia
- In Uruzgan (Afghanistan), aid organizations gave over one-third of their food aid to the Taliban.
- In Sri Lanka, up to 25 percent of the total value of aid was paid to the Tamil Tigers by Dutch aid workers.
- In the former Yugoslavia, the UNHCR gave thirty percent of the total value of aid to Serbian and Croatian forces to pass the respective road blocks in order to reach Bosnia.

Some evidence

Governments that receive aid often target it to specific populations, excluding opposition groups

- In Zimbabwe in 2003, residents being forced to display ZANU-PF membership cards before being given government food aid.
- In eastern Zaire, the leaders of the Hema ethnic group permitted the arrival of international aid organizations only if they agreed to give nothing to their enemies, the Lendu.

Dataset

- Panel of 134 non-OECD countries for the years 1972-2006
- Conflict is defined as the use of armed force between two parties that results in at least 25 battle deaths in a year.
- Incidence of conflict, is constructed using data from the UCDP/PRIO Armed Conflict Dataset
- The measure of U.S. food aid is the amount of wheat aid, measured in thousands of metric tons (MT), shipped to a recipient country in a year from the United States.
- The data are from the Food and Agriculture Organization's (FAO) FAOSTAT database.
- Data on U.S. wheat production, which is used to construct the instrument, is reported by the U.S. Department of Agriculture (USDA).

Empirical strategy.

The model

$$C_{irt} = \beta F_{irt} + X_{irt}\Gamma + \varphi_{rt} + \delta_i + \varepsilon_{irt}$$

where

C_{irt} is a dummy which takes 1 if country i in region r experienced a conflict at time t

F_{irt} is the quantity of US food aid that country i receives at time t

X_{irt} are country time-varying controls

φ_{rt} are region-specific time effects (or region-by-time fixed effects) - regions are South Asia, East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, and Sub-Saharan Africa

δ_i are country fixed effects

ε_{irt} usually defined error term.

Instruments

Two sources of variation:

- First, time variation in U.S. food aid shipments arising from changes in U.S. wheat production.
  - When U.S. production is high, USDA price support policies generate an accumulation of reserves, which increases the amount of food aid shipped to recipient countries in the subsequent year.
- Second, cross-sectional variation from a country's tendency to receive food aid from the U.S.
  - Measured by the fraction of years between 1972 and 2006 that a country is a recipient of U.S. food aid. Regular aid recipients experienced greater increases in food aid shipments following U.S. production booms.

The instrument for U.S. food aid is therefore the interaction between lagged U.S. production (exogenous) and the tendency for a country to receive any U.S. food aid (exogenous conditionally to controls)

First stage

$$F_{irt} = \alpha P_{t-1} \bar{D}_{ir} + X_{irt}\Pi + \varphi_{rt} + \delta_i + \mu_{irt}$$

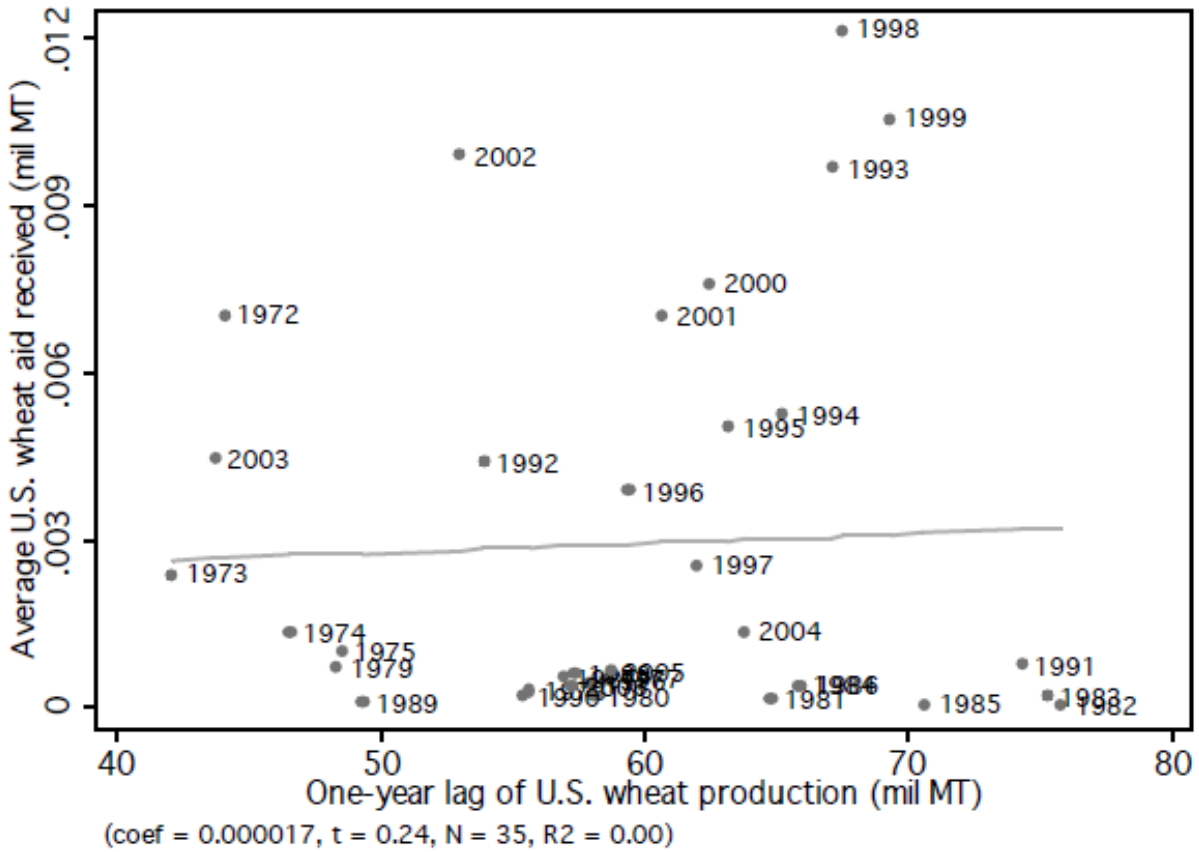
where

- P_{t-1} is lagged US production
- $\bar{D}_{ir} = \frac{1}{35} \sum_{t=1972}^{2006} D_{irt}$ and D_{irt} is a dummy which takes 1 if country i received any US food aids in year t between 1972 and 2006

Note: the first stage (and also the reduced form) looks like to a DiD specification, where the effect of US production shocks is estimated by comparing trends in food aid between countries regularly receiving aids from the US and countries that do not.

DiD interpretation

Figure 3: Average U.S. Wheat Aid and Lagged U.S. Wheat Production – Irregular Recipients: $\overline{D}_{ir} < 0.29$



DiD interpretation

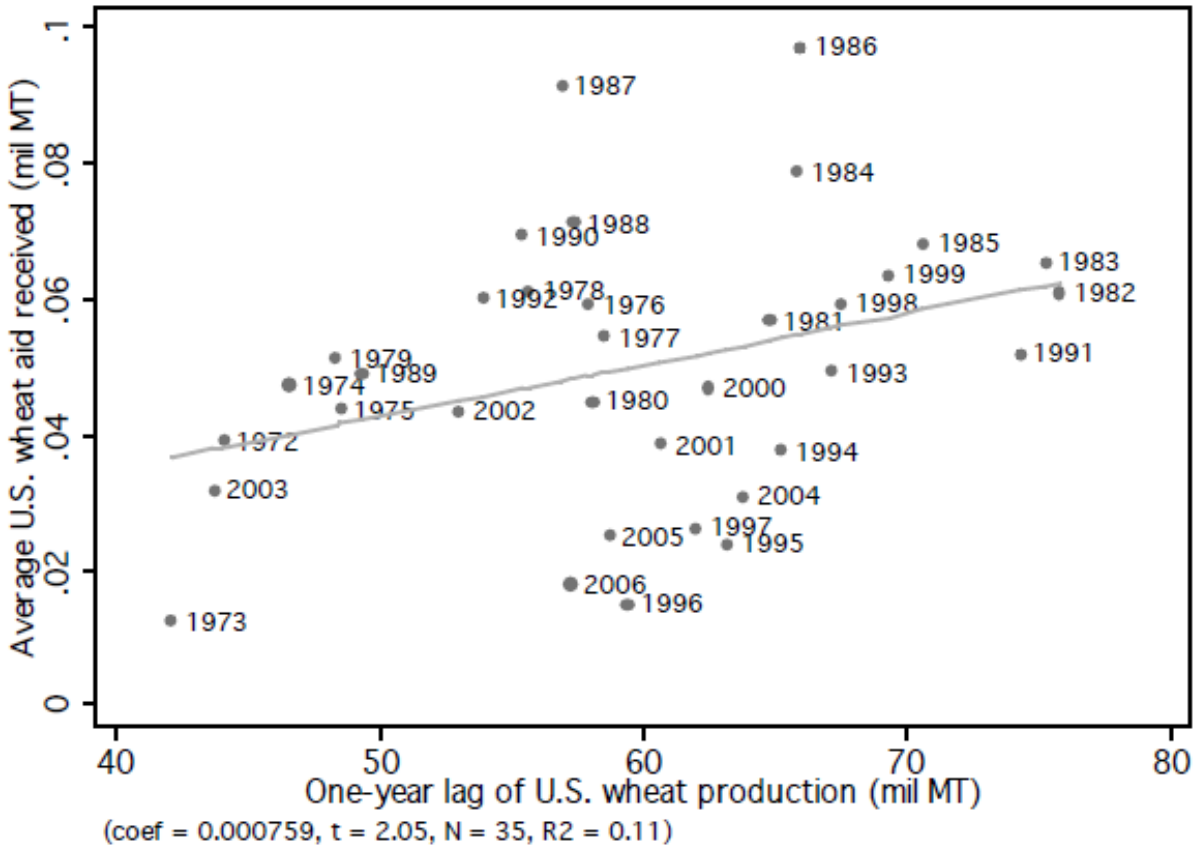


Figure 5: Average U.S. Wheat Aid and Lagged U.S. Wheat Production – Regular Recipients: $\overline{D}_{ir} \geq 0.29$

Exclusion condition

Is the instrument really excludable?

- US weather may be correlated with recipient countries weather $\Longrightarrow$recipient country's weather conditions are controlled for
- US production shocks could impact on international prices
- are US friends less prone to civil wars?
- the US use surplus production to food aid: any externality from neighboring aid recipients?

Exclusion condition

Excludability would be violated if U.S. wheat production impacted foreign conflict by affecting the world price of wheat.
This is not a serious problem because:

- the region-year fixed effects flexibly control for all year-to-year region specific price changes. Additional controls that capture country-specific differential responses to global price changes.
- data suggest that U.S. price stabilization policies, which include the government's accumulation of reserves, were effective in breaking the link between U.S. production shocks and price changes. The correlation coefficient is -0.07 with a p-value of 0.70.

Exclusion condition

Another concern is that region-specific shifts in U.S. foreign policy could be

- correlated with food aid
- directly influence conflicts.

Most of these policy shifts should be absorbed by the region-year fixed effects. However, to be cautious, additional controls are also included.

Exclusion condition

Regular recipients of U.S. food aid may be systematically different from irregular recipients.

1. regular recipients may be more likely to also receive U.S. military aid or other forms of U.S. economic aid. If these differences vary systematically over time and across countries, then country and region-year fixed effects will not be enough.
    1. solution: controlling for year fixed effects interacted with:
        1. the average annual amount of per capita U.S. military aid received by a country during the sample period
        2. the average annual per capita amount of other forms of U.S. economic aid (net of food aid).
2. It is also possible that the impact of adverse weather shocks on conflict are weaker if a country regularly receives U.S. food aid.
    1. solution: including interactions of each of the twelve monthly temperature variables and twelve monthly precipitation variables with $\bar{D}_{ir}$

Results

- A 1,000 MT increase in U.S. wheat aid increases the incidence of conflict by 0.47 percentage-points
- The impact on overall conflict is driven by an increase in intra-state conflicts and not by inter-state conflicts.
- The sample mean of the incidence of civil conflict is 17.6 percentage-points (i.e., 0.176) and of U.S. wheat aid is 27.6 thousand MT. Therefore, for a country at the mean level of U.S. wheat aid a ten percent increase (i.e., 2.76 thousand MT) in U.S. food aid is associated with a 1.11 percentage-point increase in the incidence of civil conflict, which is approximately six percent of the mean.

Results

Table 2: The Effect of Food Aid on Conflict

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Parsimonious Specifications				Baseline Specification		
Dependent Variable (Panels A, B and C):	Any Conflict	Any Conflict	Any Conflict	Any Conflict	Any Conflict	Intra State	Inter State
	A. OLS Estimates						
U.S. Wheat Aid (1000 MT)	-0.00009	-0.00009	-0.00013	-0.00015	-0.00014	-0.00005	-0.00013
	(0.00016)	(0.00016)	(0.00016)	(0.00016)	(0.00015)	(0.00015)	(0.00004)
R-squared	0.521	0.523	0.538	0.543	0.549	0.526	0.383
	B. Reduced Form Estimates (x 1000)**						
Lag U.S. Wheat Production (1000 MT) x Avg Prob of Any U.S. Food Aid	0.00924	0.00945	0.00895	0.01067	0.01106	0.01004	-0.00079
	(0.00256)	(0.00255)	(0.00265)	(0.00314)	(0.00301)	(0.00296)	(0.00087)
R-squared	0.523	0.525	0.540	0.546	0.551	0.529	0.379
	C. 2SLS Estimates						
U.S. Wheat Aid (1000 MT)	0.00399	0.00403	0.00391	0.00474	0.00465	0.00411	-0.00032
	(0.00143)	(0.00135)	(0.00134)	(0.00159)	(0.00156)	(0.00160)	(0.00036)
LIML point estimate	0.00373	0.00385	0.00364	0.00475	0.00453	0.00411	-0.00032
p-value	0.000	0.001	0.003	0.000	0.000	0.001	0.427
CLR 95% Interval [Lower bound,	[0.00197,	[0.00205,	[0.00187,	[0.00246,	[0.00241,	[0.00216,	[-0.00130,
Upper bound]	0.00730]	0.00758]	0.00731]	0.01080]	0.00962]	0.00871]	0.000536]
	D. First Stage Estimates						
Dependent Variable (Panel D):	U.S. Wheat Aid (1000 MT)						
Lag U.S. Wheat Production (1000 MT) x Avg Prob of Any U.S. Food Aid	0.00248	0.00245	0.00246	0.00224	0.00244	0.00244	0.00244
	(0.00074)	(0.00072)	(0.00073)	(0.00066)	(0.00082)	(0.00082)	(0.00082)
First Stage *F*-Statistic	20.11	19.61	13.84	15.94	15.94	15.94	15.94
Controls (for all panels):							
Country FE	Y	Y	Y	Y	Y	Y	Y
Region-Year FE	Y	Y	Y	Y	Y	Y	Y
Monthly Recipient Temperature and Precipitation	N	Y	Y	Y	Y	Y	Y
Avg Recipient Cereal Imports x Year FE	N	N	Y	Y	Y	Y	Y
Avg Recipient Cereal Production x Year FE	N	N	Y	Y	Y	Y	Y
Avg U.S. Military Aid x Year FE	N	N	N	Y	Y	Y	Y
Avg U.S. Economic Aid (Net of Food Aid) x Year FE	N	N	N	Y	Y	Y	Y
Recipient Weather Variables x Avg Prob of Any U.S. Food Aid	N	N	N	N	Y	Y	Y
Observations (for all panels)	4240	4240	4240	4240	4240	4240	4240

Notes: An observation is a country and a year. The sample includes 134 non-OECD countries for the years 1972-2006.The controls included are indicated in the table by Y (yes) or N (no). Standard errors are clustered at the country level. **In panel B, the point estimates and standard errors are multiplied by 1000 for presentation purposes. In Panel C, we also report the LIML estimates, *p*-vaues, and Conditional Likelikhood Ratio (CLR) 95% confidence intervals. In panel D, we also report first-stage Cragg-Donald *F*-statistics. The Stock-Yogo critical values (with a 5% significance level) are 8.96 and 16.38 for 15 and 10% maximum bias in size, respectively.

Falsification test

- To check that first-stage estimates are not confounded by spurious positive trends between U.S. wheat production and food aid, the instrument is used to predict past food aid rather than future food aid.
- Two alternative specifications, where the dependent variable is aid one and two years before the year of the production shock. No relationship emerge.

Falsification test

Table 3: The Effect of U.S. Wheat Production on Past Wheat Aid and Recipient Cereal Production

	Dependent Variable:			
	U.S. Wheat Aid (1000 MT)	U.S. Wheat Aid (1000 MT), Period *t*-2	U.S. Wheat Aid (1000 MT), Period *t*-3	Recipient Cereal Production (1000 MT)
	(1)	(2)	(3)	(4)
Lag U.S. Wheat Production (1000 MT) x Avg Prob of Any U.S. Food Aid	0.00244	-0.00036	-0.00057	-0.0610
	(0.00082)	(0.00076)	(0.00095)	(0.0809)
Observations	4240	3972	3838	4240
R-squared	0.528	0.546	0.556	0.955

Notes: OLS estimates are reported. The unit of observation is a country in a year. The sample includes 134 non-OECD countries for the years 1972-2006. All regressions include the full set of baseline controls - see Table 2 columns (5)-(7) for a full list. Coefficients are reported, with standard errors clustered at the country level.

Mechanisms

Onset.

Onset of civil conflict, defined as the first year of a conflict episode or, equivalently, a conflict that occurs in a year following a year with no conflict.

- Collier and Hoeffler (2004) specification: remove observations that are periods of continued conflict; the sample only includes periods of no conflict and periods of conflict onset.
  - positive, but statistically insignificant impact of U.S. food aid
- Fearon and Laitin (2003) specification: include all observations and control for the incidence of civil conflict in the previous period, which captures the mechanical relationship between the onset of civil conflict and the presence of conflict in the previous period.
  - estimate that is nearly identical to the previous one, but is much more precisely estimated and statistically significant.

Duration

Duration is defined as the probability that a conflict ends in period t after having continued for T years.

- U.S. food aid increases the duration of civil conflict, i.e. it reduces the probability that a civil conflict ends.
- The magnitude of the estimates (marginal effects evaluated at means) suggests that a 1,000 MT increase in food aid shipments decreases the probability of the civil conflict ending in a year by between 0.48 and 0.61 percentage-points, a large effect given that the sample mean for the probability that a civil conflict ends is 0.188.

Mechanisms

Table 6: The Effect of Food Aid on Conflict Onset and Duration

	Dependent variable:				
	Civil war onset		Civil war offset		
	Collier and Hoefler (2004)	Fearon and Laitin (2003)	Logistic Discrete Time Hazard Model		
	(1)	(2)	(3)	(4)	(5)
U.S. Wheat Aid (1,000 MT)	0.00231	0.00183	-0.00483	-0.00614	-0.00501
	(0.00148)	(0.00080)	(0.00199)	(0.00203)	(0.00213)
Controls:					
Lagged civil conflict incidence	N	Y	n/a	n/a	n/a
Third-order poly of duration	n/a	n/a	Y	Y	Y
Time-invariant controls	n/a	n/a	N	Y	Y
Region fixed effects	n/a	n/a	N	N	Y
Observations	3,509	4,210	560	558	707

Notes: In all specifications, U.S. Wheat Aid in year t is instrumented by U.S. wheat production in year t-1 x the probability of receiving any U.S. food aid between 1972 and 2006. In columns (1) and (2), the dependent variable is an indicator that equals one for the onset of a civil war. Both specifications include the full set of baseline covariates. See columns (5)-(7) of Table 2 for a list of these variables. In column (1), observations that are periods of continued conflict are omitted from the sample. The regression in column (2) includes a one-year lag in the incidence of civil conflict as an additional control variable and uses the full sample. Columns (3)-(5) estimate a discrete time hazard model for the incidence of civil war offset. In this setting, survival is continued conflict. The coefficients reported are marginal effects evaluated at means. The control function approach is used to generate IV estimates for the hazard models.

Mechanisms

Size of conflict.

- data from the Correlates of War (COW) Database: only include conflicts with 1,000 or more combat-related deaths in a year.
- data from UDCP/PRIO, include conflicts with at least 25 deaths

Results:

- positive impact of food aid on all conflicts and intra-state conflicts, and no impact on interstate conflicts
- magnitudes of the positive impacts of food aid are significantly smaller in large conflicts

Mechanisms

Table 7: The Effect of Food Aid on Small- and Large-Scale Conflicts

	Dependent Variable: Incidence of Conflict					
	> 25 Combat Deaths (UCDP/PRIO)			> 1,000 Combat Deaths (COW)		
	Any	Intra State	Inter State	Any	Intra State	Inter State
	(1)	(2)	(3)	(4)	(5)	(6)
U.S. Wheat Aid (1,000 MT)	0.00453	0.00411	-0.00032	0.00252	0.00221	0.00001
	(0.00174)	(0.00160)	(0.00036)	(0.00112)	(0.00112)	(0.00047)
Standardized beta coefficient	1.275	1.254	-0.228	0.809	0.735	0.009
Observations	4240	4240	4240	4240	4240	4240

Notes: 2SLS estimates are reported. The sample includes 134 non-OECD countries for the years 1972-2006. U.S. Wheat Aid in year *t* is instrumented by U.S. wheat production in year *t*-1 x the average probability of receiving any U.S. food aid during 1972-2006. All regressions include the full set of baseline controls - see Table 2 columns (5)-(7) for a complete list. Coefficients are reported with standard errors clustered at the country level.

Mechanisms

Crowding out

- A possible alternative explanation for the positive effect of U.S. food aid on conflicts is that U.S. aid crowds out other types of aid (other donor countries or multilateral agencies may respond to an increase in U.S. food aid by reducing their own aid provisions)
- If the reduction in food aid is large enough, then an increase in U.S. food aid could actually cause total foreign aid to decline.
- Solution: re-estimating the model but with other forms of aid provision as dependent variables.

Results:

- U.S. wheat aid has no impact on the provision of wheat aid and cereal aid from non-U.S. donor countries
- U.S. food aid has no effect on economic and military aid and that there is
- There is no evidence that U.S. wheat aid crowds out recipient countries' domestic food production.

Table 8: The Effect of Food Aid on Other Aid and Recipient Country Wheat Production

	Dependent Variable:									
	World wheat aid (1000 MT)	World cereal aid (1000 MT)	Non-U.S. wheat aid (1000 MT)	Non-U.S. cereal aid (1000 MT)	U.S. military aid (1000 real USD)	U.S. economic aid excl. food aid (1000 real USD)	Non-U.S. net ODA (1000 real USD)	Non-U.S. net ODA 2 (1000 real USD)	Recipient wheat production (1000 MT)	Recipient cereals production (1000 MT)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Mean of Dep. Variable	40.29	60.94	12.66	18.01	39776	59326	430108	408165	2048.3	8608.7
U.S. Wheat Aid (1000 MT)	1.129	1.261	0.129	0.091	152.7	-251.8	752.2	1163	-13.63	-24.98
(Mean = 27.63)	(0.131)	(0.288)	(0.131)	(0.198)	(1258.0)	(672.2)	(1571.0)	(1390)	(13.22)	(33.63)
Observations	4240	4240	4240	4240	4240	4240	4240	4240	4240	4240

Notes: 2SLS estimates are reported. The sample includes 134 non-OECD countries for the years 1972-2006. U.S. Wheat Aid in year *t* is instrumented by U.S. wheat production in year *t*-1 x the probability of receiving any U.S. food aid during 1972-2006. All regressions control for the full set of baseline controls - see Table 2 columns (5)-(7) for a full list. Coefficients are reported with standard errors clustered at the country level.

Heterogeneous Effects

Table 9: The Heterogeneous Effects of Food Aid on Conflict

	Dependent Variable: Incidence of Civil Conflict								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
U.S. Wheat Aid (1000 MT)	0.00411	0.00514	0.00277	0.00427	0.00404	0.00628	0.00445	0.00507	0.00372
	(0.00160)	(0.00290)	(0.00161)	(0.00280)	(0.00241)	(0.00257)	(0.00186)	(0.00181)	(0.00283)
U.S. Wheat Aid x Indicator for:									
Low Income		-0.00272							0.00153
		(0.00321)							(0.00406)
Democratic (High Polity)			0.00085						0.00026
			(0.00239)						(0.00135)
Civilian Government				-0.00140					-0.00102
				(0.00323)					(0.00143)
Low Polarization					-0.00056				-0.00106
					(0.00321)				(0.00241)
Low Ethnic Fractionalization						-0.00480			-0.00208
						(0.00285)			(0.00196)
High Road Density							-0.00322		-0.00275
							(0.00234)		(0.00132)
Cold War Years								-0.00220	-0.00048
								(0.00155)	(0.00155)
Observations	4240	4085	3664	4240	2917	3358	3437	4240	2499
U.S. Wheat Aid + (U.S. Wheat Aid x Indicator)		0.00242	0.00362	0.00287	0.00348	0.00148	0.00123	0.00287	0.00097**
p-value		0.115	0.079	0.043	0.112	0.087	0.504	0.017	0.750

Notes: 2SLS estimates are reported. The baseline sample in column (1) includes 134 non-OECD countries for the years 1972-2006. The sample size in columns (2)-(9) varies according to data availability. U.S. Wheat Aid in year *t* and the interaction of wheat aid and the indicator variable are instrumented with U.S. wheat production in year *t-1* x the probability of receiving any U.S. food aid during 1972-2006, and the triple interaction of the indicator x U.S. wheat production in year *t-1* x the probability of receiving any U.S. food aid during 1972-2006. The regressions also include the relevant double interaction terms. All regressions control for the full set of baseline controls - see Table 2 columns (5)-(7) for the full list. Coefficients are reported with standard errors clustered at the country level. The joint estimate for U.S. wheat aid + U.S. wheat aid x indicator varaible, and their p-values, are reported in the final row of the table. **In column (9), the joint estimate refers to the estimate for U.S. wheat aid + U.S. wheat aid x high road density.

Conclusions

- On average, food aid promotes civil conflict.
- An increase in U.S. food aid increases the incidence, onset and duration of armed civil conflicts in recipient countries.
- These results are not a result of U.S. food aid crowding out aid from other countries.
- Food aid has a more adverse effect on small-scale armed conflicts and in countries with a less developed transportation network
- These findings support qualitative accounts of food aid either being stolen during transport or being taken from target populations by small armed groups that use the resources to fund conflict.

Lee and Schultz (2010)

- Colonial institutions matter for subsequent economic development (Acemoglu et al, 2001).
- Which institutions are better? the French or the British?
- Most believe that British institutions, generally more liberal than the French ones, are more conducive of economic development.
- Is it true? What if Britons were smarter than French in choosing what territories to colonize? In other words, would British colonies have performed better also in the absence of the British rule?
- This paper exploits a natural experiment, namely the division of Cameroon, a former German colony, in two parts, one British and one French after the German defeat in WW I.
- The peculiarity of Cameroon is that its institutions and history before and after the Frech-British period (1916-1960) are common across the two parts.

Cameroon history

- Cameroon has been unified by Germans in the late XIX century.
- It is a composition of ecological zones, ethnicities, religions, languages between the British and the French spheres of influence.
- In 1916 Germans surrendered and France and Britain shared the control over the country until the independence of 1960.
- France controlled the western part, the largest, and Britain the eastern, much smaller but more densely populated part.
- The border between these zones do not correspond to any preexisting cultural or political boundaries. The colonial border cut across existing ethnic and religious boundaries.
- The artificiality of the boundary motivated by: the British desired to "round out" the territory of Nigeria; French troops performed better; the British desired to compensate the French for past territorial gains elsewhere.

French and British rule

The two colonial powers imposed very different institutions

- The British part was largely integrated and administratively dependent from Nigeria. French part had an autonomous administration
- British administration was indirect, allowing native chiefs to perform most executive and judicial functions (a way to economize on money and manpower). French policy, by contrast, was focused on the closer integration of the colonies with the metropole.
- Both British and French Cameroon had two-track legal systems. Europeans and évolués were subject to the laws of the mother country, while "natives" were subject to local customary law. To the former, a system based on French civil law in East Cameroon and on British common low in the West.

French and British rule

- The Germans had imposed a labor tax on the native population. The British abolished the system and in its place recruited workers by offering good wages. The French, by contrast, kept the labor tax and workers were unpaid and badly treated
- Both British and French encouraged missionary activity: Protestantism in the West and Catholicism in the East
- The British economic policy was laissez-faire, which in the Cameroonian case shaded into neglect. Instead the French invested over $500 million between 1947 and 1959: in the 1950s imports increased 700%, exports 250%, and the population of Doula 200%

Remark

The comparison between West and East Cameroon is not just a comparison between a British colony and a French one but a comparison between a relatively poor and neglected British colony and an average to well-off French one.

Note: After the independence, the government's favoritism towards the Francophone area biases against the finding British institutions to have superior outcomes. Any historical advantage the British zone received is thus pre-colonial.

Data

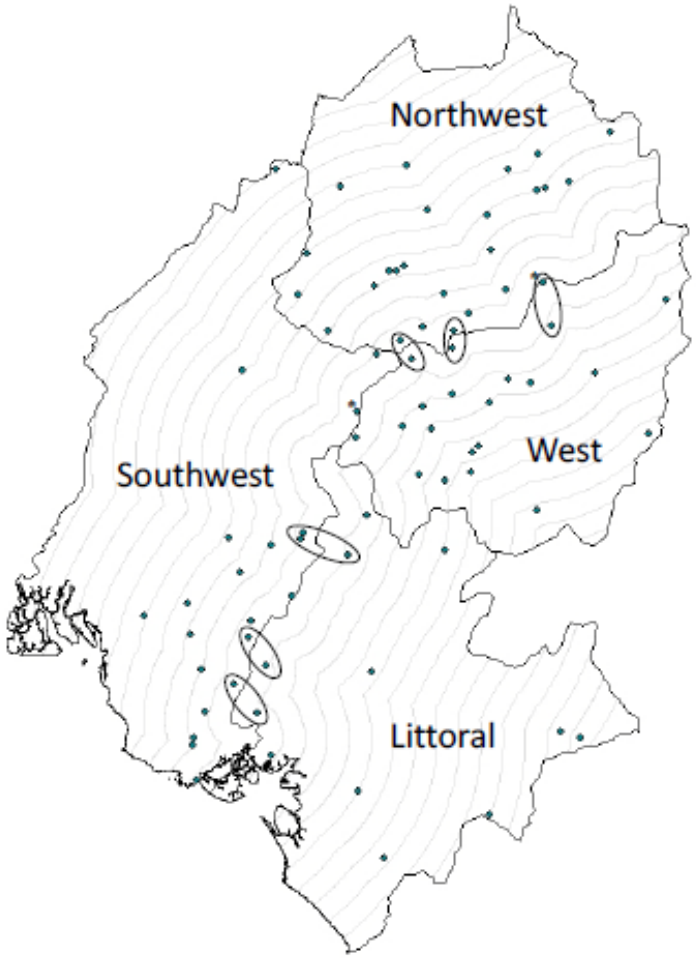
- 2004 DHS
- final sample included 10,656 women and 5,280 men, selected from 10,462 households, which are in turn sampled from within 467 clusters
- cluster location known by GPS coordinates, but with a random error (to protect privacy)

Identification Strategy

- Regression discontinuity design
  - clusters located on either side and close to the border should be similar in many respects, such as climate, endowment of natural resources, land fertility, but also traditions, language and culture, as the border did not followed any pre-existent boundary.
  - therefore comparing the clusters of either side should provide unbiased estimates of the differential effect of the British rule compared to the French rule.
- Focus to four provinces: the two British provinces (Northwest and Southwest) and the two French provinces that share most of the intercolonial boundary (West and Littoral). The sample includes clusters that are no more 100km from the border on the British side and no more than 160km from the border on the French side.
- Rural and urban clusters are analyzed separately

Across the border

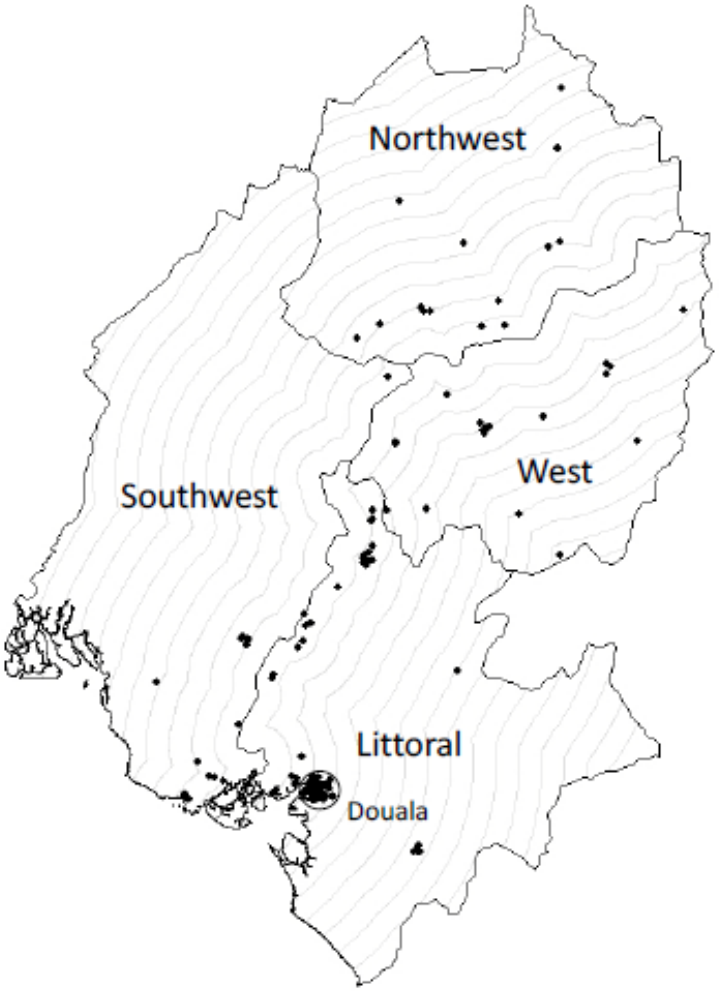
Figure 3. The Locations of Rural Clusters



Note: Grey lines indicate 10km bands from the intercolonial border. Ovals indicate "nearest neighbor" pairs. Asterisks (*) indicate clusters that were displaced across the border.

Across the border

Figure 4. The Locations of Urban Clusters



Note: Grey lines indicate 10km bands from the intercolonial border.

Empirical issue 1

- The border is very long. Even though conditions do not change on either side of the border at any particular point, conditions vary quite dramatically along the length of the border. Moreover, at a given distance from the border, there can be substantial heterogeneity in outcomes
  - Solution 1: comparisons of near neighbors along the border (clusters close the boundary, but also close to one another). But large reduction in the sample size
  - Solution 2: inclusion in the regression models of many controls.

Empirical issue 2

- Cluster locations have been randomly displaced by as much as 5km, for rural clusters, or 2km, for urban clusters. Because these errors are random and equally likely on both sides of the border, the measurement error does not bias the comparison. Similarly, when we estimate the linear effect of distance to the border, the measurement error is relatively small.
  - The attenuation bias introduced by measurement error depends on the ratio between the variance of the noise and the total variance of the poorly measured variable (e.g., Greene 1997, 435-440). If the location of the cluster is uniformly distributed in a circle of radius 5km, then the variance in the distance measure due to the jitter is about 4.2. By comparison, the distance measure in our sample has a total variance of 820.

Model

Three different techniques to estimate the effect of the discontinuity:

1. a regression with distance from the border on the French and British sides as independent variables and a dummy variable for British side, which is a direct estimate of the discontinuity;
2. a regression using points within a fixed distance from the border;
3. in the case of rural clusters, simple bivariate comparisons (e.g., comparisons of means) using only pairs of near neighbors on either side of the border

The canonical RD design

$$Y_i = f(x_i) + \beta D_i + \gamma X_i + \varepsilon_i$$

where

Y_i is the outcome variable

$f(x_i)$ is a polynomial of the underling variable (in our case distance from the border)

D_i is a dummy which takes 1 if i is to the left (resp. right) of the discontinuity and 0 otherwise

X_i are additional individual controls

Note 1: to guarantee comparability across the discontinuity it is necessary to look at observations close to the discontinuity (set a narrow window)

Note 2: high internal validity but low external validity, i.e. are results generalizable?

Dependent Variables

- index of possessions (wealth)
- improved water facilities (typical local public good whose availability depends very much on local institutions: in Cameroon, communities must commit labor and money to water projects in order to obtain funds from the central government)
- education level and literacy (whether one is able to read) - only for males.

Results - Rural/Wealth

Table 1. Rural Household Wealth: Paired Comparisons of Near Neighbors

Cluster pair	British wealth	French wealth	Difference
407 vs. 347	0.23	-0.40	0.63**
151 vs. 353	-0.61	-0.30	-0.31 +
464 & 372 vs. 403	-0.073	-0.40	0.33 +
146 vs. 152	-0.27	-0.64	0.37*
346 vs. 26	-0.72	-0.85	0.14
406 vs. 465	-0.77	-0.52	-0.24**
		Mean difference	0.15**

** p<0.01, * p<0.05, + p<0.1

Results - Rural/Wealth

Table 2. Regression Analysis of Rural Household Wealth

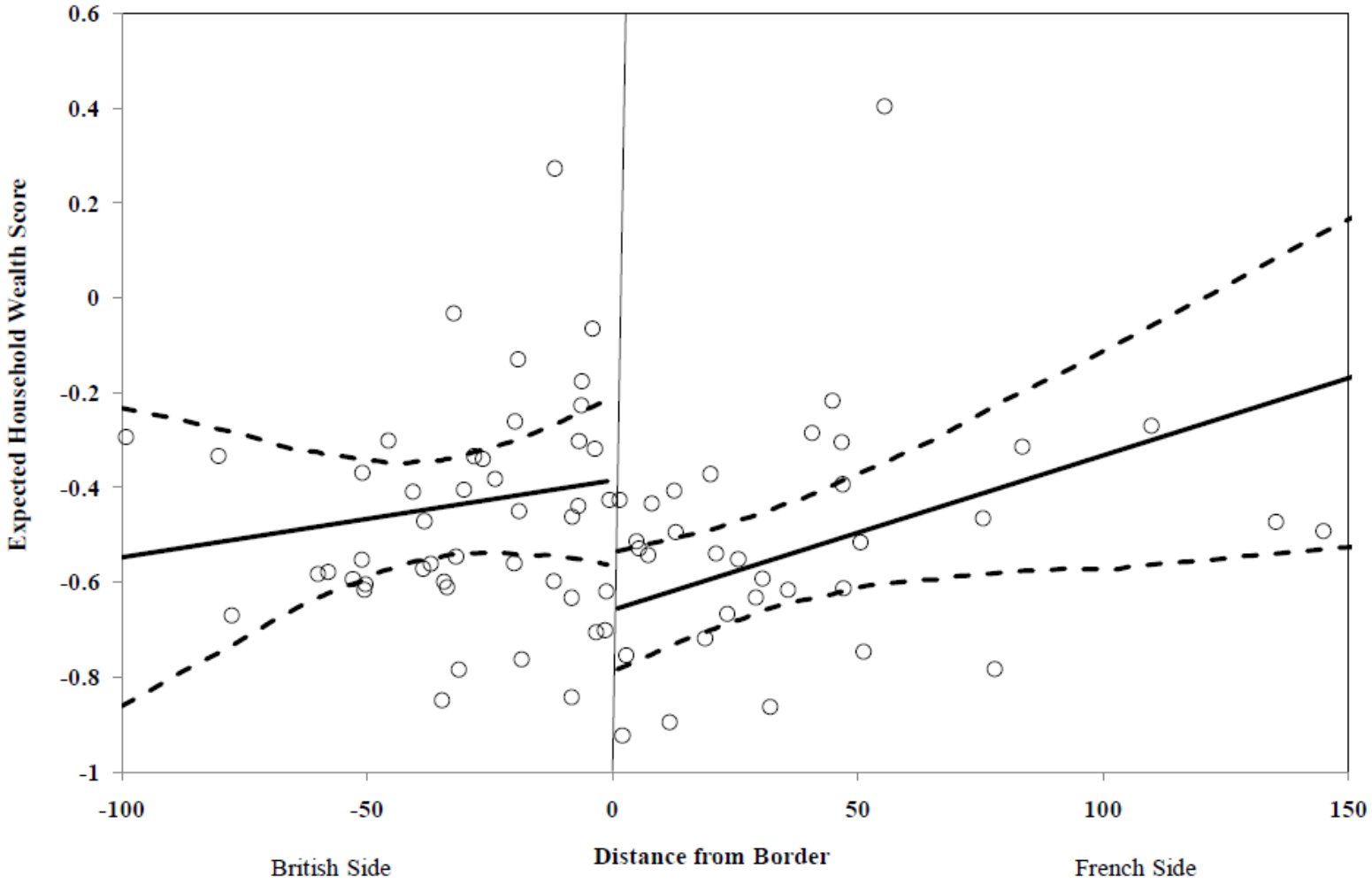
VARIABLES	(1) Discontinuity	(2) <10km from Border
British	0.241*	0.385**
	(0.116)	(0.0869)
Distance from border (British side)	-0.000455	
	(0.00228)	
Distance from border (French side)	0.00432*	
	(0.00164)	
Distance to city	-0.145+	-0.378*
	(0.0741)	(0.141)
Distance to coast	-0.0350	0.00970
	(0.0520)	(0.0431)
Distance to road	-0.0925**	-0.189**
	(0.0278)	(0.0475)
Altitude	2.25e-06	5.33e-05
	(8.66e-05)	(0.000129)
Male-headed household	0.0807**	0.149**
	(0.0245)	(0.0457)
Constant	-0.762**	-0.355
	(0.270)	(0.399)
Observations	1512	372
R-squared	0.393	0.446

Note: Controls for ecological zone, ethnicity, and religion included but not reported. Observations weighted by household weight. Standard errors corrected for clustering on survey clusters.

** p<0.01, * p<0.05, + p<0.1

Results - Rural/Wealth

Figure 5. The Estimated and Observed Discontinuity in Rural Household Wealth



Results - Urban/Wealth

Table 3. Regression Analysis of Urban Household Wealth

VARIABLES	(1) Discontinuity	(2) <10km from Border
British	-0.203	0.0348
	(0.221)	(0.132)
Distance from border (British side)	0.00999*	
	(0.00463)	
Distance from border (French side)	0.000419	
	(0.00316)	
Distance to city	-0.257**	-0.104
	(0.0465)	(0.188)
Distance to coast	-0.115+	-0.0498
	(0.0583)	(0.0691)
Distance to road	-0.0385	-0.126**
	(0.0419)	(0.0233)
Altitude	0.000347+	-0.000643*
	(0.000184)	(0.000231)
Male-headed household	0.170**	0.152
	(0.0504)	(0.0993)
Constant	0.376	0.497
	(0.440)	(0.520)
Observations	1242	252
R-squared	0.322	0.515

Note: Controls for ecological zone, ethnicity, and religion included but not reported. Observations weighted by household weight. Standard errors corrected for clustering on survey clusters.

** p<0.01, * p<0.05, + p<0.1

Results - Rural/Water

Table 4. Improved Water Source in Rural Clusters: Pair Comparisons of Near Neighbors

Cluster pair	% improved British	% improved French	Difference
407 vs. 347	60.00	26.47	33.53*
151 vs. 353	0.00	44.44	-44.44 **
464 & 372 vs. 403	100.00	54.55	45.45**
146 vs. 152	72.22	7.14	65.08**
346 vs. 26	46.88	7.14	39.74**
406 vs. 465	5.71	9.09	-3.38

** p<0.01, * p<0.05, + p<0.1

Results - Rural/Water

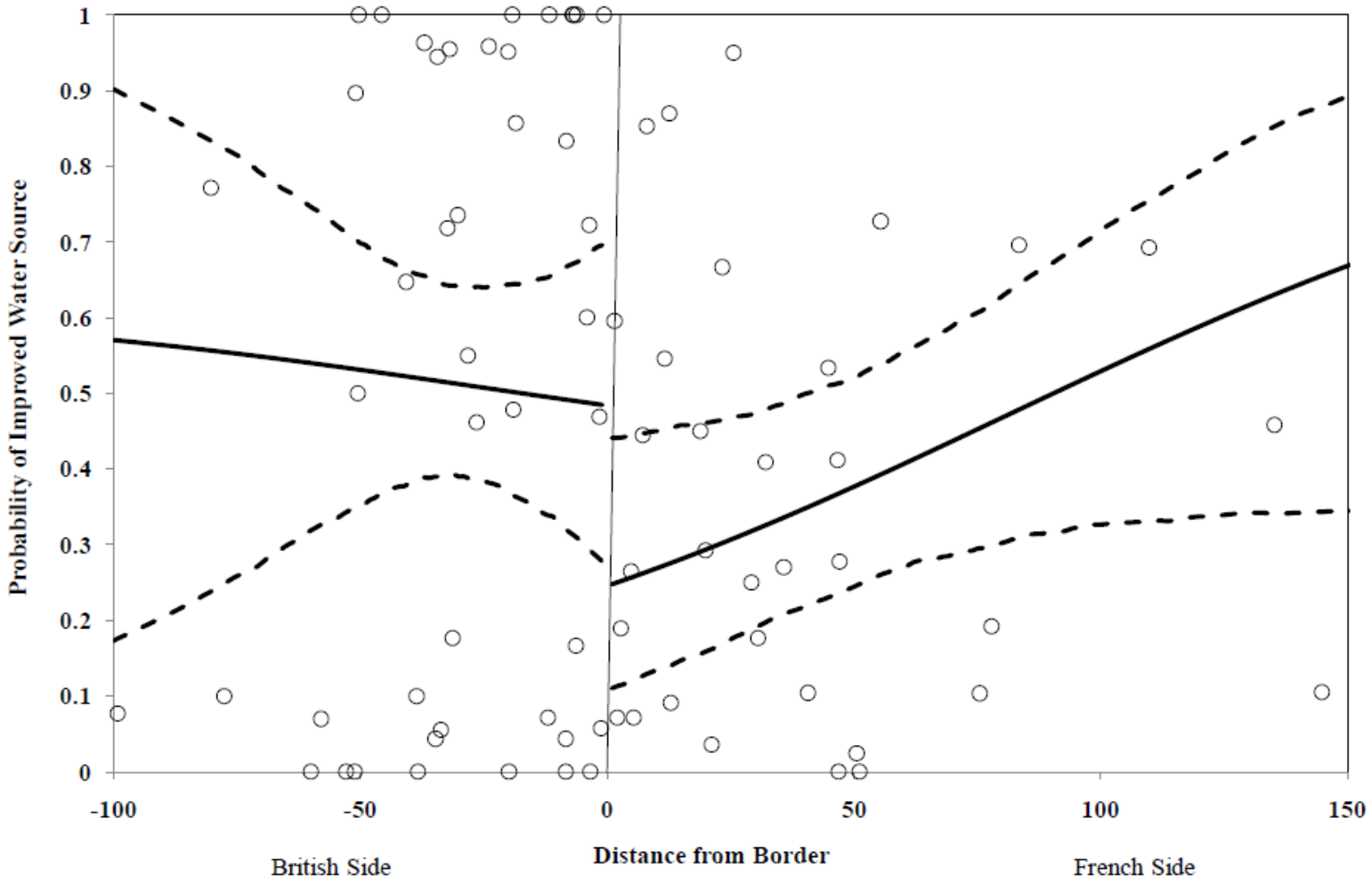
Table 5. Regression Analysis of Improved Water Source (Rural Clusters)

VARIABLES	(1) Discontinuity	(2) <10km from Border
British	0.761+	1.217**
	(0.400)	(0.464)
Distance from border (British side)	0.00524	
	(0.00795)	
Distance from border (French side)	0.00970*	
	(0.00392)	
Improved floor	0.202+	-0.202
	(0.111)	(0.190)
Distance to city	-0.152	-1.471+
	(0.224)	(0.796)
Distance to coast	0.269	1.375+
	(0.180)	(0.823)
Distance to road	-0.371**	-0.394*
	(0.103)	(0.195)
Distance to river	0.214*	0.0772
	(0.0960)	(0.408)
Altitude	0.000531+	0.000160
	(0.000312)	(0.000867)
Male-headed household	-0.000431	0.0707
	(0.103)	(0.140)
Constant	-1.001	4.858**
	(1.165)	(1.425)
Observations	1458	334
Percent correctly predicted	72.15	78.45
Frequency of modal outcome	55.21	50.90

Note: Controls for ecological zone, ethnicity, and religion included but not reported. Observations weighted by household weight. Standard errors corrected for clustering on survey clusters

Results - Rural/Water

Figure 6. The Estimated and Observed Discontinuity in Rural Water Improvements



Results - Urban/Water

Table 6. Regression Analysis of Improved Water Source (Urban Clusters)

VARIABLES	(1) Discontinuity	(2) <15km from Border
British	0.0605	-1.167+
	(0.362)	(0.697)
Distance from border (British side)	-0.00431	
	(0.00963)	
Distance from border (French side)	0.0200*	
	(0.00779)	
Improved floor	0.846**	0.688**
	(0.145)	(0.197)
Distance to city	-0.306**	-2.435*
	(0.116)	(1.088)
Distance to coast	-0.0159	0.0452
	(0.109)	(0.176)
Distance to road	-0.462	-3.584*
	(0.309)	(1.493)
Distance to river	0.0301	-0.125
	(0.0793)	(0.383)
Altitude	0.000181	0.00146
	(0.000451)	(0.00134)
Male-headed household	-0.126	-0.509**
	(0.101)	(0.171)
Constant	3.005+	25.24**
	(1.725)	(8.679)
Observations	1111	457
Percent correctly predicted	86.77	88.62
Frequency of modal outcome	84.43	80.53

Note: Controls for ecological zone, ethnicity, and religion included but not reported. Observations weighted by household weight. Standard errors corrected for clustering on survey

Results - Education

- There are no significant differences on either measure among male survey respondents between the zones.
- In multiple regression analysis, there were no significant discontinuities at the border, nor were there statistically significant differences among the sample within 10km of the border.
- In the model of literacy among rural men within 10km of the border, there was a significant positive coefficient on British side; however, this finding was not robust to the exclusion of ethnicity and religion variables, nor was it confirmed in the discontinuity analysis.

Conclusions

- Rural areas of West Cameroon perform consistently better than rural areas of East Cameroon with essentially similar preexisting conditions.
- The West has higher levels of household wealth, and better functioning local government institutions.
- Thus, there is limited confirmation of the hypothesis that British colonial institutions generate superior outcomes.
- The mechanism for British colonialism causes superior outcomes is not clear: is it because of the "soft" cultural effect or because the British institutions are less extractive?