Property rights and conflicts: theory and evidence from the Highland of Ethiopia

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Introduction (I)

- A growing body of literature studies the causal channel linking insecure property rights and economic outcomes (e.g. Besley et al., 2012, Acemoglu et al., 2014, de Janvry et al, 2015)

- Property rights $\Rightarrow$ Investment, education, migration, access to credit...

$\Rightarrow$ This paper investigates the link between insecure property rights and land conflicts using household level data in Ethiopia.

Why land conflict ?

- Land conflicts are a very frequent type of social conflict and violence in the developing world.
- Kenya, 2008: "Kenya National Dialogue and Reconciliation" process identified land reform as key to peace and reconciliation.
- Localized conflicts can severely affect welfare and economic development.
- Small scale violence can escalate into large-scale disputes, social unrest, and political movements.

This Paper (I)

Overview:

- This paper investigates the link between insecure property rights and local conflicts.
  - *First*, we develop a simple theoretical framework of land conflict.
  - *Second*, we empirically assess the *causal* relationship between tenure security and conflict using micro-level data in Ethiopia.
  - Our identification strategy: (i) a natural experiment of a large and randomly assigned land certification program implemented by the World Bank in the Highlands of Ethiopia and (ii) exogenous variation in climatic factors.

This Paper (II)

Main Results

- We first show that having tenure security reduces the occurrence of conflict by 5% for the average household.
- A one-standard-deviation in rainfall increases the likelihood of conflict by around 13 percent.
- Tenure security dampens the effect of water scarcity on conflict.
- Factors increasing the marginal value of land magnifies the impact of water scarcity on conflict (without altering the effect of tenure security).

Literature (I)

Literature linking improved property rights and economic outcomes:

- Tenure security can increase investment incentives (Besley 1995, Fenske 2011),
- can also increase the use of land as collateral in accessing credit (Besley et al. 2012).
- Acemoglu et al. (2014) show that in Sierra Leone powerful chiefs control access to land: a whole series of development outcomes (educational attainment, child health among others) are significantly lower.
- de Janvry et al. (2015): land certification induces migration.

Literature (II)

Our results also add new empirical evidence on the channel linking weather anomalies and conflict

- See for example Miguel et al., 2004, Harari and La ferrara, 2014, Couttenier and Soubeyran, 2014 or Berman and Couttenier, 2015.
- We show here that tenure security reduces the vulnerability of households to water scarcity and conflict over land.

Theoretical Framework: Environment

- Two agents $N = \{1, 2\}$ share a total amount of land of size L.
- x_1: the land share of agent 1, x_2: share of agent 2, with $x_1 + x_2 = 1$.
- $l_1 = x_1 L$: land size of agent 1 and $l_2 = x_2 L$: land size of agent 2.
- Water falls uniformly over the land. Denote by w the amount of water available per unit of land: each agent has access to an amount of water $l_i w$.

Theoretical Framework: Environment

- Payoff: $b_i(l_i w)$, $b_i(.)$ increasing and concave.
- v_i: marginal value of land for each agent, i.e. $\frac{\partial b_i}{\partial l_i} = v_i$.
- The utility of an agent i: $u_i = b_i(l_i w) + t_i$ where t_i is a monetary transfer.

Theoretical Framework: The Game

Simple bargaining game:

- We assume $v_1 < v_2$.
- Agent 1 makes an offer $\overline{p}$ to agent 2 for the piece of land.
- Agent 2 can either accept or refuse this offer.
- If agent 2 refuses the offer, he can either seize the land by force or start a (Nash) bargaining procedure.
- Cost to seize the land by force: c, uniformly distributed over $[0, \theta]$ and is private information of agent 2.
- θ reflects the strength of property rights.

Theoretical Framework: The Equilibrium

In the unique Perfect Bayesian Nash equilibrium,

- Agent 1 offers $\overline{p} = \min\{p^{\max}, p^*\}$:
  - $p^{\max} = \frac{\theta}{2}$ maximizes the expected payoff of agent 1 when making the initial offer, $(1 - \mathbb{P}\{c \leq p\})(p - v_1) - (\mathbb{P}\{c \leq p\})\, v_1$.
  - $p^* = \frac{\alpha_1}{\alpha_1+\alpha_2} v_2 + \frac{\alpha_2}{\alpha_1+\alpha_2} v_1$ is the result of the bargaining procedure.
- Agent 2 accepts the initial offer if $\overline{p} \leq c$ and seize the land by force if $\overline{p} > c$.

From theory to evidence

- We should observe that more secure property rights (i.e. higher θ) diminish the probability of observing a conflict.
- A decrease in the amount of water available to both agents increases the probability of conflict through an increase of the marginal value of land.
- If agent 1 has more land at her disposition we should observe a drop in the probability of conflict.
- Any factor increasing the marginal value of land will also increase the probability of conflict in dire times

Data and Empirical Results (I)

Data (I)

Background: Ethiopia:

- Ethiopia historically plagued by lack of tenure security.
- Until 1975 complex system of ownerships (communal, private, church, state).
- Land owned by absentee landlords; arbitrary evictions posed serious threats to tenant farmers.
- 1975 land reform $\Rightarrow$ rights to state and usufruct rights to farmers.
- 1998 land certification program $\Rightarrow$ the program entry is random and phased in over a period of time.

Data and Empirical Results (II)

Data (II)

Background: Ethiopia:

- Sustainable Land Management Survey.
- Conducted by Addis Ababa University, Ethiopian Development Research Institute, University of Gothenburg.
- Years 2005 and 2007.
- Large farm-household panel survey.
- About 1700 households per year.
- Amhara National Regional state of Ethiopia.

Conflict Measure and Climate Variable:

- Conflict variable: disputes over land.
  - "Have you ever faced any conflicts or claims regarding the land you own?" "Yes/No".
- Annual mean rainfall from 1976 to 2006 at the household level (Ethiopian National Meteorological Services).
  - Spatial interpolation using latitude, longitude and elevation of each household.
  - Rainfall anomalies: deviations from long-term mean divided by its long-term standard deviation.

Identification Strategy:

It relies on

- the random assignment of land certification to farm-households at the village level,
- the random nature of rainfall anomalies,
- and the panel nature of our dataset by using farm-household and time fixed-effect.

Main Specification:

- The basic regression equation is:

$$Y^*_{i,t} = \beta_1 W_t + \beta_2 W_{t-1} + \beta_3 Tenure + \epsilon_{1,i,t} \quad (1)$$

where:

- Y_{it} is the propensity to experience land use conflicts
- W_t is the measure of rainfall anomalies in t
- W_{t-1} is the measure of rainfall anomalies in $t-1$.
- *Tenure* is a dummy indicating if the household has tenure security or not.
- ϵ_{it} is the error term.

Main Specification:

- We then investigate if household with land tenure security are less prone to conflict triggered by water scarcity,

$$Y^*_{i,t} = \beta_1 W_t + \beta_2 W_{t-1} + \beta_3 W_t \times Tenure + \beta_4 W_{t-1} \times Tenure + \quad (2)$$

$$\mu_i + \mu_t + \epsilon_{2,i,t} \quad (3)$$

- μ_i denotes household fixed effects.
- μ_t denotes year fixed effect.
- Interaction terms rainfall anomalies*tenure security.

Further interactions

- We investigate the theoretical predictions by including interaction effects
  - Land size (dummy $= 1$ if farm size $>$ sample mean).
  - Household size and livestock size (dummy $= 1$ if $>$ sample mean).
  - Access to credit.

Baseline estimates

- The results are robust and show the following pattern:
  - Tenure security decreases the risk to experience a conflict over land.
  - Water scarcity increase the risk to experience a conflict.
  - Tenure security dampens substantially the effect of water scarcity on conflict.

Data and Empirical Results (IX)

Results (II)

	(1) Conflict	(2) Conflict	(3) Conflict	(4) Conflict	(5) Conflict	(6) Conflict
Tenure Security	-.040^a	-0.043^a	-0.062^a			
	(0.014)	(0.014)	(0.014)			
Rainfall Anomalies$_t$		-0.032^c	-0.091^a	-0.123^a	-0.124^a	-0.138^a
		(0.019)	(0.024)	(0.035)	(0.035)	(0.042)
Rainfall Anomalies$_{t-1}$			-0.200^a		-0.139	-0.103
			(0.041)		(0.086)	(0.086)
Rainfall Anomalies$_t$ × Land Tenure						0.062
						(0.069)
Rainfall Anomalies$_{t-1}$ × Land Tenure						0.324^a
						(0.121)
Household Fixed Effect	no	no	no	yes	yes	yes
Year Fixed Effect	no	no	no	yes	yes	yes

Data and Empirical Results (X)

Results (III)

	(1) Conflict	(2) Conflict	(3) Conflict
Rainfall Anomalies$_t$ × Land Size	0.024		
	(0.040)		
Rainfall Anomalies$_{t-1}$ × Land Size	0.142^a		
	(0.048)		
Rainfall Anomalies$_t$ × Household Size		-0.109^c	
		(0.059)	
Rainfall Anomalies$_{t-1}$ × Household Size		0.025	
		(0.063)	
Rainfall Anomalies$_t$ × Livestock			-0.126^b
			(0.042)
Rainfall Anomalies$_{t-1}$ × Livestock			0.110
			(0.087)

Data and Empirical Results (XI)

Results (IV)

	(1) Conflict
Rainfall Anomalies$_t$	-0.127^b
	(0.043)
Rainfall Anomalies$_{t-1}$	-0.105^a
	(0.088)
Rainfall Anomalies$_t$ × Land Tenure	0.063
	(0.069)
Rainfall Anomalies$_{t-1}$ × Land Tenure	0.332^c
	(0.120)
Rainfall Anomalies$_t$ × Credit	-0.058
	(0.048)
Rainfall Anomalies$_{t-1}$ × Credit	0.004
	(0.052)
Household Fixed Effect	yes
Year Fixed Effect	yes

Conclusion

- We explore the impact of property rights on land conflict in Ethiopia.
- We find that well defined property rights decrease the likelihood of conflicts...
- ...and that rainfall anomalies increase the likelihood of conflicts.
- We highlight that land certification decreases the effect of water scarcity on conflicts.
- Finally, we show that actual water conditions have a stronger impact on the level of conflict when the marginal value of land is bigger.