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LSE
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"Property Rights and
Investment Incentives:
Theory and Evidence from Ghana"

Context: Land Rights in Africa

- **Transition** from traditional to formal land rights in Africa
  - **Traditional** land rights are *communal*
    - Key role of customary authority (e.g. tribal chief)
      - grants claims
      - regulates transfers
      - may regulates land investments
    - Extreme case: Only *usufruct* rights
  - **Formal** land rights are *individualistic*
    - Private ability to transfer rights

- Land rights **formalization**
  - Population growth
  - Large-scale land titling programs

- Poor economic performance
  - Mainly agricultural economy
  - Independence in 1957
  - Adjustment program in 1983

Source:
http://www.planwallpaper.com/ghana

Context: Two Villages of Ghana

Wassa

- West
- Cocoa production
- Most of the land is owned

=> Investment: planting trees

Source: http://www.turingfoundation.org/ctry_ghana_uk.html

Anloga

- Southeast (coastal area)
- Shallots on very small plots of land
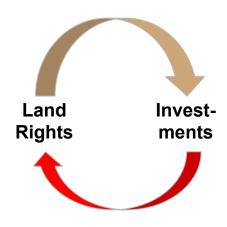- Most land is rented

=> Investment: land improvements

Source: http://buzztrick.com/buzz/2014/02/22/shallot-farming-anloga

Research Question and Hypotheses

- **What is the link between property rights and investment?**

- Expected: A positive link between land rights and investment decisions:

  - **H1: Freedom from expropriation** (Demsetz, 1967; Alchian & Demsetz, 1973)
    - *Model 1: Security model*
    - But expropriations are not common in Ghana, property rights are quite stable

  - **H2: Link through the credit market** (Feder, 1988)
    - *Model 2: Collateral-based model*

  - **H3: Enhanced possibilities for gains from trade**
    - *Model 3: Gains-from-trade model*

Land Rights **Invest-ments**

Land rights depend in part on investments (Locke, 1690; Bruce, 1988; Atwood, 1990)

Theory: General Model

$$\max_{k_t} \{W(k_t, R_{t+1})\} \equiv V(k_t, R_{t+1}) - c(k_t, R_{t+1}). \qquad (1)$$

$$\frac{\partial k_t}{\partial R_{t+1}} = -\frac{W_{12}(k_t, R_{t+1})}{W_{11}(k_t, R_{t+1})}, \qquad (2)$$

Where:

- $V(k_t, R_{t+1})$ is the return function for time t+1
  - k_t = capital invested on a given field
  - R_{t+1} = property rights at t+1
- $c(k_t, R_{t+1})$ is the cost of investment

Data

- **Survey Data**
  - Wassa: 217 households operating **1,074 fields**
  - Anloga: 117 households operating **494 fields**

- **Dependent Variables: Investments**
  - Tree planting in Wassa
  - Land improvements in Anloga

- **Independent Variables: Number of Transfer rights**
  - rights to sell
  - rent
  - gift
  - mortgage
  - pledge
  - bequeath
    - With approval of lineage
    - Without approval

- **Controls**
  - Household characteristics
    - Sex
    - Age
    - Size
  - Measures of wealth
    - Durables
    - Livestock
    - House size
  - Field characteristics:
    - Soil quality
    - Area
    - Mode of acquisition
    - Previous improvements
    - Distance from house

12 categorical variables (Counts)

Descriptive Statistics

	Anloga (N = 494)	Wassa (N = 1,074)
Rights:		
Sell	.78	.71
Rent	.95	.94
Mortgage	.83	.98
Pledge	.89	.95
Bequeath	.79	.97
Gift	.75	.94
Number of rights with approval	.77	4.41
Number of rights without approval	4.22	1.07
Mode of acquisition:		
Field inherited	.95	.09
Field purchased	.03	.22
Field allocated	.00	.38
Field appropriated	. . .	.20
Field gifted	.02	.11
Existing improvements:		
Drainage	.48	. . .
Tree crops	.04	.08
Continuous manuring	.73	. . .
Land excavation	.54	. . .
Irrigation	.65	. . .
Mulching	.25	. . .
Making shallot beds	.71	. . .
Number of past tree plantings	. . .	1.08
Field area (hectares)	.07	3.56
Distance from house (kilometers)	1.15	1.86
New improvements:		
Drainage	.48	. . .
Continuous manuring	.93	. . .
Land excavation	.44	. . .
Irrigation	.51	. . .
Mulching	.35	. . .
Making shallot beds	.75	. . .
Planting trees	. . .	.66
Other:		
Ever litigated on field	.07	.09
No title deed	.89	.70
Number of years owned	22.50	17.96
Soil very fertile	. . .	.29
Soil fertile	. . .	.64
Soil poor	1.0	.07

NOTE.—Soil type variables refer to fraction of land in soil category.

Empirical Model - Instrument

- Estimating an equation for investment on field j, owned by farmer i at time t, with land rights (R_{ijt+1}), field characteristics (z_{it}), and household characteristics (x_{ijt}):

$$k_{ijt} = f(R_{ijt+1}, z_{it}, x_{ijt}). \tag{14}$$

- R_{ijt+1} could be endogenous, which leads us to this other equation:

$$R_{ijt+1} = g(k_{ijt}, z_{it}, x_{ijt}, R_{ijt}). \tag{15}$$

- R_{ijt} would make a good instrument for the land rights, but not directly observable. Proxys:
  - Whether there is a transfer deed for the field
  - Whether the household has ever litigated over its rights to the field
  - How the field was acquired
  - How many years the field has been owned

Empirical Model - Specifications

- Linear Probability Specification
  - Instead of logit or probit to allow for household fixed effects

$$y_{ijk} = \alpha_k \mathbf{z}_i + \beta_k R_{ij} + \gamma_k \mathbf{x}_{ij} + e_{ijk}, \tag{19}$$

- $\mathbf{y}_{ijk}$ = investment behavior of household i on plot j with capital k
- $\mathbf{z}_i$ = available measures of farmer differences (incl. village dummy variables)
- $\mathbf{x}_{ij}$ = plot-specific characteristics

- BUT Concern that measured rights might also be a proxy for omitted variables such as investment ability or knowledge. Risk of spurious link between land rights and investment.
  - => Household Fixed Effect

$$y_{ijk} = \alpha_{ki} + \beta_k R_{ij} + \gamma_k \mathbf{x}_{ij} + e_{ijk}, \tag{20}$$

- $\mathbf{a}_{ki}$ = fixed effect

Results for Wassa

TABLE 3

Wassa: Investments in Tree Planting ($N = 1,074$)

	Uninstrumented (1)	Instrumented (2)	Rights with Approval (3)	Rights without Approval (4)
Rights with approval	.03	.12		
	(1.93)	(1.93)		
Rights without approval	.02	.11		
	(1.56)	(1.68)		
Number of past tree plantings	.19	.14		
	(4.34)	(2.72)		
Average age	−.00	−.00	−.01	−.00
	(.40)	(.04)	(.26)	(.52)
Value of durables	.00	.00	−.00	−.00
	(1.80)	(2.21)	(.49)	(1.98)
Livestock value	−.00	−.00	−.00	.00
	(2.05)	(1.78)	(2.48)	(2.77)
Formal education of head	.01	−.01	.18	.00
	(.23)	(.47)	(1.68)	(.04)
Women	−.01	−.01	−.08	.04
	(.78)	(.21)	(2.66)	(1.58)
Men	.01	.02	−.02	.03
	(2.03)	(2.28)	(1.67)	(1.32)
Rooms	−.00	−.01	.08	−.03
	(.45)	(1.22)	(3.93)	(1.34)
Distance from house	.01	.01	−.05	.01
	(1.44)	(1.63)	(1.39)	(.35)

Results for Wassa

Soil very fertile	.07	.09	−.58	.41
	(1.38)	(1.52)	(2.43)	(1.87)
Soil fertile	−.07	.10	−.87	.51
	(1.43)	(1.68)	(4.02)	(2.53)
Field area	−.02	−.02	.00	−.00
	(12.55)	(12.01)	(.01)	(.06)
Field purchased			−.22	.60
			(.90)	(2.64)
Field allocated			−.13	.28
			(.61)	(1.47)
Field appropriated			.36	.28
			(1.57)	(1.31)
Field gifted			−.86	.98
			(3.49)	(4.29)
No title deed			.01	−.34
			(.34)	(2.25)
Number of years owned			−.01	.01
			(.75)	(.91)
Trees existing at time of acquisition			.08	−.18
			(.43)	(.97)
Ever litigated on field			−.11	.23
			(.56)	(1.25)
Test of overidentification restriction (p-value)		.90		
Village dummy variables	Yes	Yes	Yes	Yes
F-test on significance of instruments (p-value)			.00	.00
$\bar{R}^2$	.35	.33	.38	.39

NOTE.—Absolute values of t-statistics are in parentheses. The omitted classification in the mode of acquisition is inheritance and in soil type is poor.

Empirical Results - Summary

- Wassa

  - Tree planting in Wassa are significantly related to land rights.

- Anolga

  - Except continuous manuring and irrigation, the rights variables have a positive and significant effect on the probability of investing.

  - Size of the effect varies: one extra right making an investment between 1% and 9% more likely.

  - Rights granted with or without lineage does not make any difference.

- Results are robust to:

  - Attempts to control for farmer heterogeneity (fixed effects)

  - Instrumenting for land rights

Conclusion

Contributions

- Instrumentation: Reverse causation taken seriously!

- Main conclusions: Stable land rights are investment incentives.

Limitations

- Paper is based on *de jure* transfer rights. What about *de facto* practices?
- What about other types of rights, such as different types of ownership?
- Size effects are relatively small.
- What are the policy implications? What can the government do?
- Hierarchy of rights: Some matter more than others?