Mutual insurance and land security in rural Ghana

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Motivation

- Much of agricultural land in rural Ghana is untitled.

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Potential explanation:

- Interaction between land formality and informal institutions (mutual insurance + communal land management).

Research question

How does land formalization (titling) affect mutual insurance and land reallocations in
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   - Reciprocal transfers (monetary or in-kind) among community members.
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   - Customary laws → collective land management
     - prescribe land reallocations.
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2. Dual institutional environment in Ghana's land tenure:
   - Customary laws → collective land management
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   - Statutory laws → individual land rights
     - grant access to formal land markets.
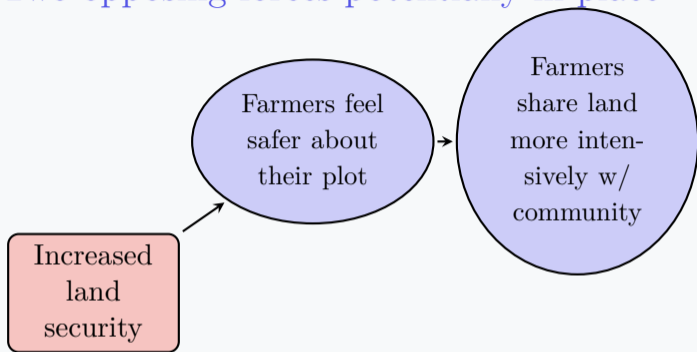   - act as a means for self insurance.

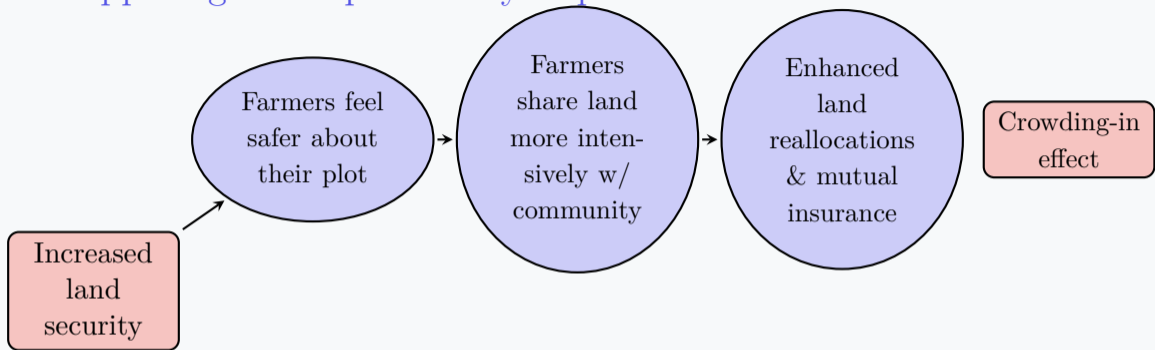# Two opposing forces potentially in place

Increased
land
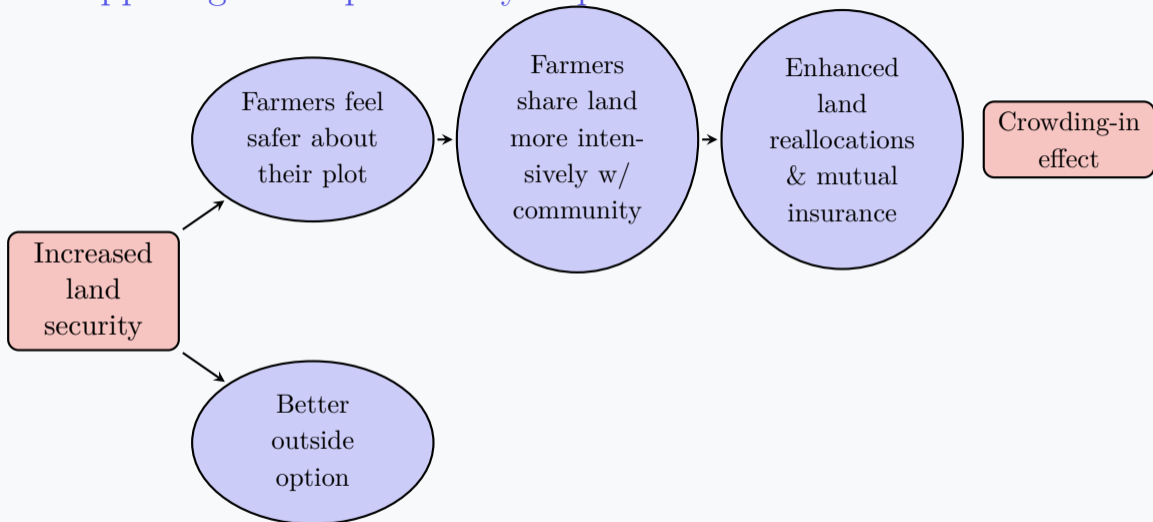security
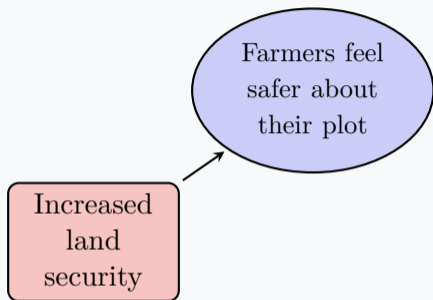
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Farmers feel safer about their plot
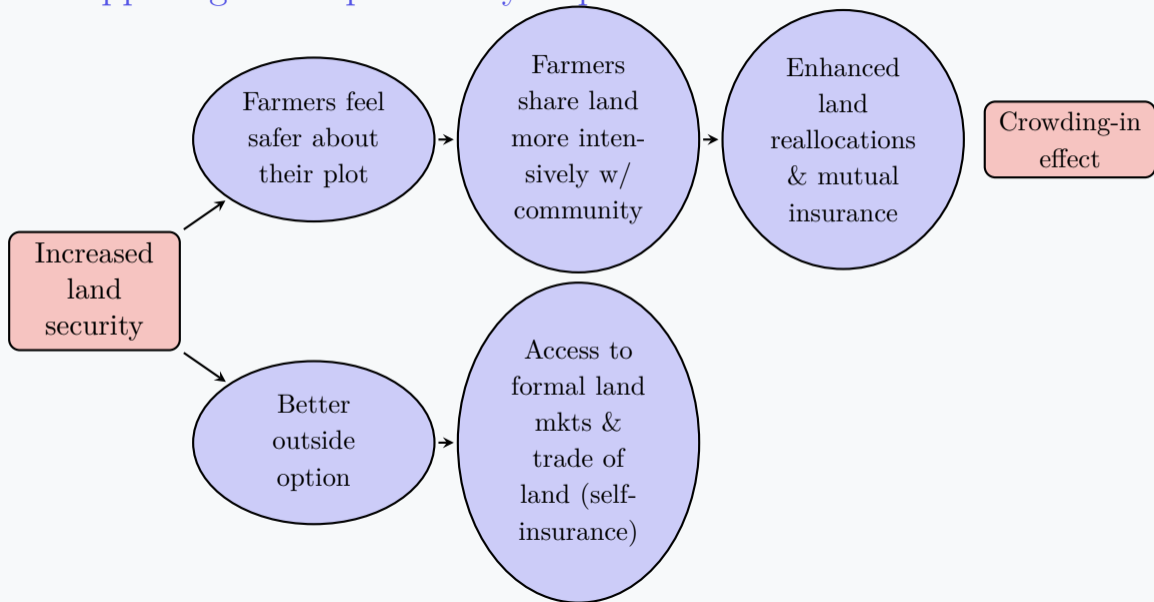
Increased land security

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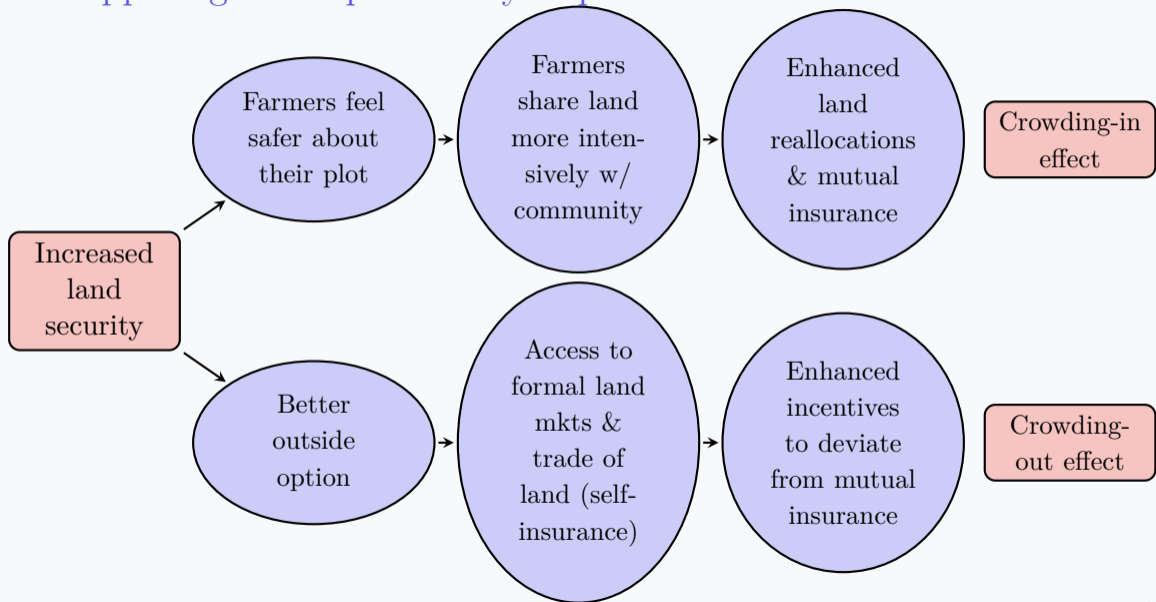# Two opposing forces potentially in place

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In a nutshell: Empirical analysis

Data: Ghana Socioeconomic Panel Survey (EGC and ISSER)

- Two waves: 2009 and 2014
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Suggestive evidence:
- Mutual insurance:
    1. Villagers exchange loans w/ each other, asking <u>no</u> guarantee.
    2. Consumption "<u>received as gift</u>" is a non-negligible fraction of monthly consumption.

- Collective land management:
    1. Land conveyances take place <u>within the community</u> (extended family, neighbors, friends, village).
    2. Land conveyances are mostly <u>informal</u> (inherited; allocated free; very few purchases)

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Findings: increases in land formality are associated with

1. declines in the number of disputes due to multiple claims over land (improved land security)

2. increases in intensity of land-reallocations within communities

3. increases in community-level agricultural productivity and consumption

4. improvements in risk-sharing within the community

In a nutshell: Quantitative village economy

- Two ex-ante homogeneous and risk averse households.

- Cooperation upon mutual insurance w/ land reallocation.

- Time is discrete and households are infinitely lived.

- Crop output in each period: $y_{i,t} = \phi_t \cdot \theta_{i,t} \cdot z_{i,t}^\alpha$

    - Idiosyncratic and aggregate productivity Markov-shocks θ and ϕ.

    - Fixed land supply in every period: $z_1 + z_2 = 1$.

    - Inherent land allocation at $t = 0$: $z_{1,0} = z_{2,0} = 0.5$.

- Limited commitment:
    - in every period and state, each hh has the option to deviate from the contract and resort to self-insurance.

Land and risk sharing allocation with limited commitment

The village chief maximizes the weighted sum of utilities for both households over (i) consumption and (ii) land allocations

$$V_t^{\text{LRS}}(x_t) = \max_{\{c_{i,t}, z_{i,t+1}\}} \sum_{i=1}^2 \lambda_{i,0}^{\text{LRS}} \left(u(c_{i,t}) + \beta E_\theta V_{i,t+1}^{\text{LRS}}(x_{t+1}|x^t) \right)$$

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$$\sum_i c_{i,t} \leq \sum_i \phi_t \theta_{i,t} z_{i,t}^\alpha$$

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Limited commitment: participation constraint

$$E_t \Big[\sum_{t'=t}^{\infty} \beta^{t'-t} u(c_{i,t'}) \Big] \geq V_{i,t}^{\text{out}} \Big(\tilde{x} = (\underbrace{\psi \cdot 0.5 + (1-\psi) \cdot z_{i,t}}_{z_{i,t_{\text{dev}}}^{\text{out}}: \text{land size upon deviation}}), \theta_{i,t} \Big) \ \forall i, x^t$$

$\psi = 1$: Complete land rights
$\psi < 1$: Incomplete land rights

Outside option

Outside the contract:

- farmers make individual decisions about consumption, land transactions and associated production.
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$$V_{i,t_{dev}}^{out}(x_{i,t_{dev}}; \psi) = \max_{\{c_{i,t_{dev}}^{out}, z_{i,t_{dev}+1}^{out}\}} u(c_{i,t_{dev}}^{out}) + \beta E_\theta V_{i,t_{dev}+1}^{out}(x_{i,t_{dev}+1} | x^{i,t_{dev}})$$

subject to:

$$t = t_{dev} : \ c_{i,t}^{out} + q_{z,t} z_{i,t+1}^{out} \le \phi_t \theta_{i,t} \left(z_{i,t_{dev}}^{out} \right)^\alpha + q_{z,t} z_{i,t_{dev}}^{out}$$

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where $z_{i,t_{dev}}^{out} = \psi z_{i,0} + (1 - \psi) z_{i,t}^{LRS}$ and land price $q_{z,t}$ is s.t. market clearing $z_{1,t+1} + z_{2,t+1} = 1$ holds in eqm. ▸ Back

Structural estimation & results

- Increase in ψ affects heterogeneous farmers differently:

  As $\psi \uparrow$, θ_H's incentives to deviate decrease since $z_{H,t}^{in} > 0.5$.
  As $\psi \uparrow$, θ_L's incentives to deviate increase since $z_{L,t}^{in} < 0.5$
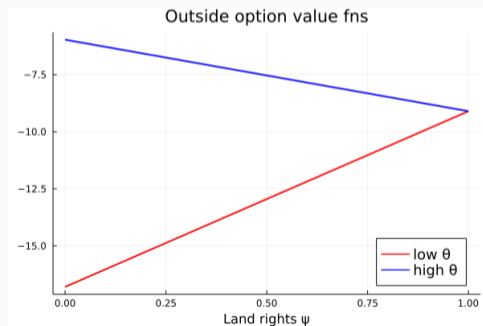

Figure: Changes in value of outside option

Non-linear effects of land security

1. Starting from low values of land rights, dynamics are in line with empirical findings
2. Threshold of land rights above which cooperation unravels

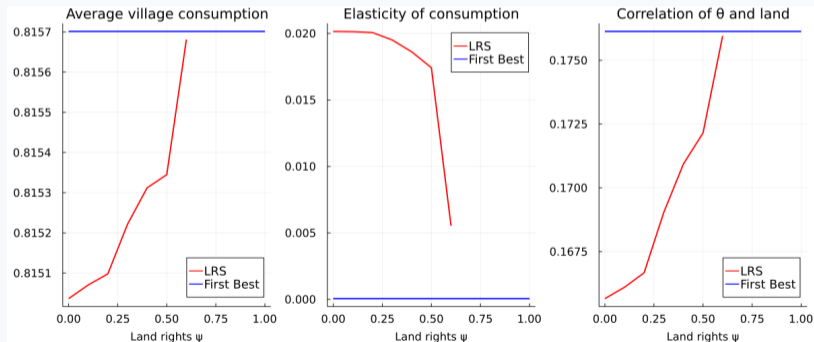$\rightarrow$ Non-linear effects of land security

Figure: Collapse of cooperation

Conclusion

- Land titling may well complement informal village institutions

- Identify the channel through which land security exerts a crowding-in/-out effect on mutual insurance networks

- Speak directly about the extent to which informal institutions compensate for market incompleteness due to weak land rights

- Provide a candidate explanation for strong persistence of informal institutions in rural areas

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Thank you!