

# **Can property rights reforms help development? The case of land certification in Mexico**

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## I. Research questions

- **Literature on property rights:** Security of tenure can improve land allocation across uses and users, and increase investment and productivity
- **Large certification and titling programs:** Mexico, Ethiopia,
- Switch from **use-based** ownership to **certificate-based** ownership
  - **Use-based:** Behavior (land use, labor allocation) → Rights
  - **Certificate-based:** Rights → Behavior (land use, labor allocation):
  - **How different is behavior under the two?**

## **Four specific questions on certification**

1. **Labor allocation:** Does it lead to increased outmigration from rural communities?
2. **Heterogeneity:** If so, who leaves and who stays?
3. **Land use:** Does it lead to a change in cultivated area? To land consolidation in larger farms?
4. **Efficiency:** Does it lead to more efficient land use in relation to comparative advantage?

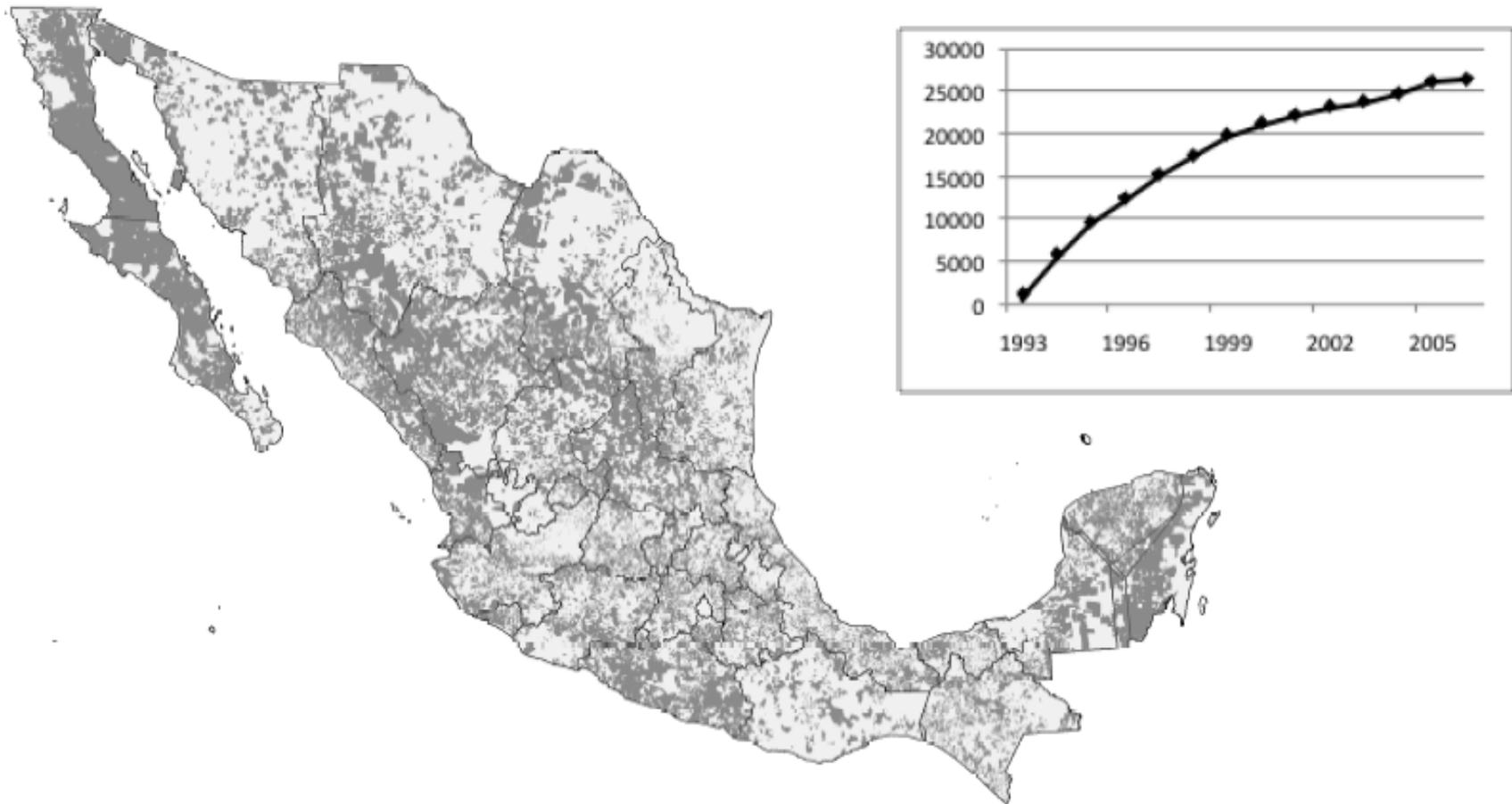
## II. History: The first land reform

- **1917-1992 land reform:** Redistributes land to smallholder farmers organized in agrarian communities (ejidos)
  - **Land rights:** **Usufruct** of small plots for farming and **common property** for forests and pastures. No titles
  - **“Use-it-or-lose-it” condition:** If rights-holder did not cultivate land himself with family labor, land reallocated to others by an external commission (but not to industrial development)
  - **No land transactions** allowed: cannot sell, lease, or sharecrop
- **Huge reform:** Over 50% of Mexican territory was allocated to 3.5 million farm households.

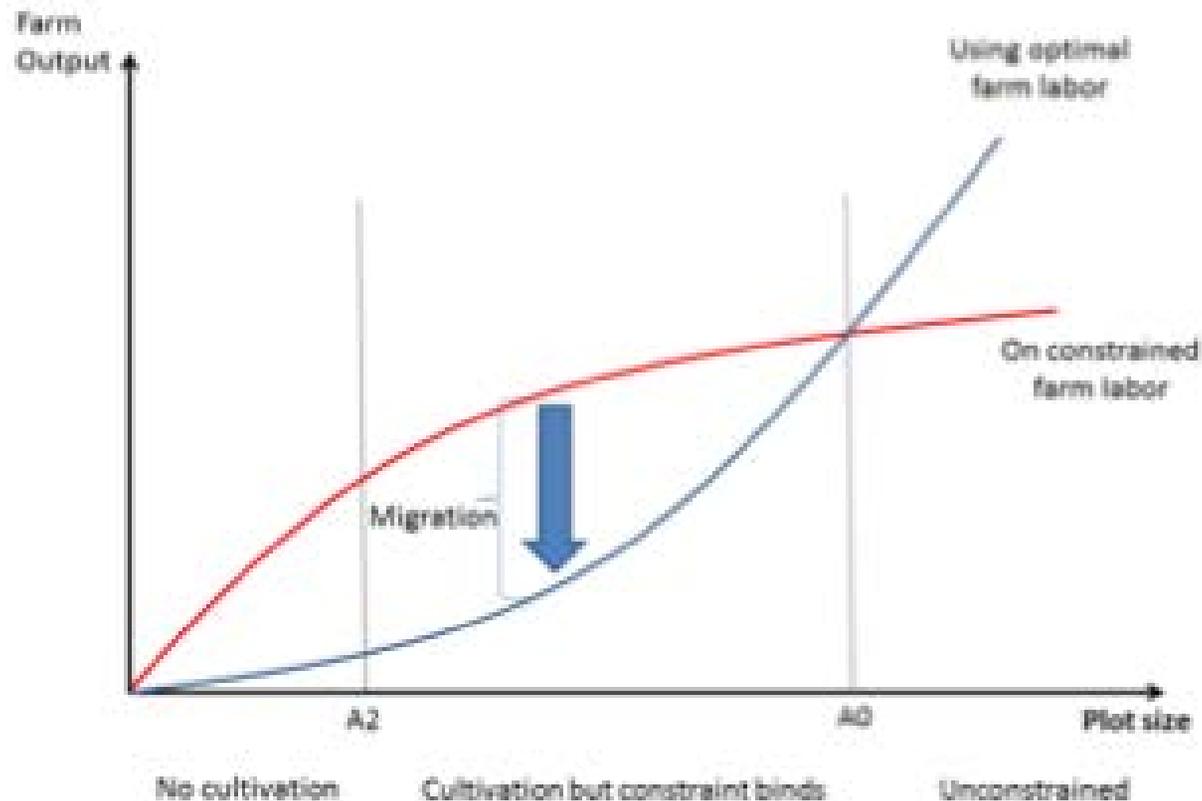
## History: The second land reform

- **1992 land reform:** change property rights from use-based to title-based
- **Certification program (Procede):** Gives certificates of ownership for land plot, and shares of common property resources
- **Intervention at the ejido level:** All land disputes must be resolved, and proposed allocation of the land agreed by all
- **Certificates allow:**
  - **Land transactions:** Selling within the community, leasing, sharecropping
  - **Freedom to allocate labor:** Can leave land fallow, hire wage labor
  - But no sales to outsiders; not useable as collateral on loans

## PROCEDE rollout: Land certified between 1993 and 2006



### III. Theory: Predicted impact of certification



Program allows household to move from constrained to optimal land use

With use constraint: decreasing returns to scale

Without use constraint: increasing returns to scale → **Migration and consolidation**

#### **IV. Data: Use several sources of secondary data**

1. **Household panel data** to analyze *household-level* migration 1997-2000 - 7,600 households in 127 ejidos.
2. **Population Census** 1990-2000 to analyze *locality level* migration - 18,000 localities matched to ejidos.
3. **Ejido Census** 1991-2007 qualitative appraisal on *ejido-level* extent of migration - 19,700 ejidos.
4. **INEGI satellite land use** panel data 1993, 2003, and 2007 for *ejido-level* land use changes (crops, pastures, forests)
5. **Farm subsidies**: annual data for 45 million farmers to analyze *ejido-level land consolidation*

## V. Analysis: Identification strategy to measure impact

- Use rollout as **identification strategy**: Late certified ejidos serve as **counterfactual** for early certified ejidos
- Ejido panel regression with fixed effects

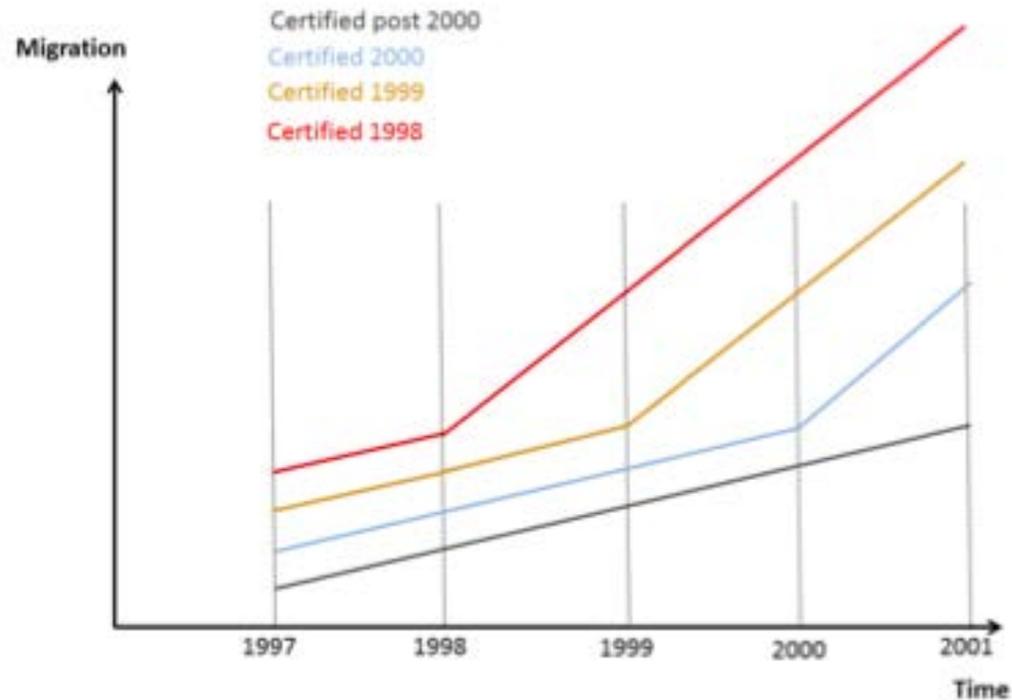
$$y_{ijt} = \delta \textit{Certified}_{jt} + \alpha_t + \gamma_j + \mathbf{x}'_{ijt}\beta + \varepsilon_{ijt}$$

$y_{ijt} = 1$  if household  $i$  in ejido  $j$  has migrant away in year  $t$

$\textit{Certified}_{jt} = 1$  if ejido  $j$  was certified by start of year  $t$

Parameter of interest is  $\delta$

## Analysis: Test of identification strategy as natural experiment



**Tests of parallel trends prior to certification:** no bias in rollout over time in terms of change in migration.

**Results** show all pre-certification parallel tests are satisfied.

→ **Can use non-treated communities as controls for treated**

## **VI. Results on migration**

### **Migration effect with household panel data (1997-2000)**

- Procede increases the probability that a household has a migrant by 30%
- Households migrate more if they had
  - Weaker property rights before reform (more defensive labor)
  - Better off-farm wage opportunities (pull effect)
  - Worse land quality (more labor misallocation)

### **Migration effect with locality Population Census data (1990 & 2000)**

- Procede exacerbates the decline in population by 4% against a background decline of 21% between 1990 and 2000

## **Migration effect with qualitative Ejido Census data**

- Procede increases the probability that “the majority of the young people emigrate from the ejido”

## **Heterogeneous migration effect by land productivity with LANDSAT data**

- The migration response is 6 times larger in lower productivity areas.
- In high productivity areas, only smaller farmers migrate
- In low productivity areas, both small and large farmers migrate

## VII. Results on land use

### Effect on area used for agriculture with LANDSAT data

- **No aggregate change** in area used for agriculture in spite of migration
- Decrease in **low productivity** areas compensated by increase in **high productivity** areas

### Effect on farm size with Farm Subsidies data

- Consolidation of land in **larger farms** (decline in number)

### Effect on land use with LANDSAT data

- Predict land use **suitability** in forest, pasture, and agriculture based on characteristics of the land in the private sector
  - Predictors include: distance to city, slope, rainfall, altitude
- Proceeds changes land use **in accordance with land suitability**

**VIII. Conclusions:** Shifting from use-based to rights-based property rights is likely to

- Create **efficiency** gains
  - Re-allocate large amounts of **labor** away from agriculture
  - Induce more **migration** from lower land quality environments
  - Induce more **migration** by smaller farmers in high productivity areas
  - Shift agriculture toward the better **lands**
  - Concentrate production in larger **farms** with returns to scale
  - Reorient **land use** toward private sector norms
- But can have **negative social spillover** effects: social political risks
  - Large **migration** may affect urban environments (timing)
  - **Political effect of ownership** shifts support to more liberal/pro-market political party (other paper)