Missing Sticks: Property Institutions and Income Dissipation in Indian Country

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Introduction

- We study the effect of property rights and institutions for economic growth and development.
- Application: Estimate the effect of missing property rights on Indian reservations on Indian income.

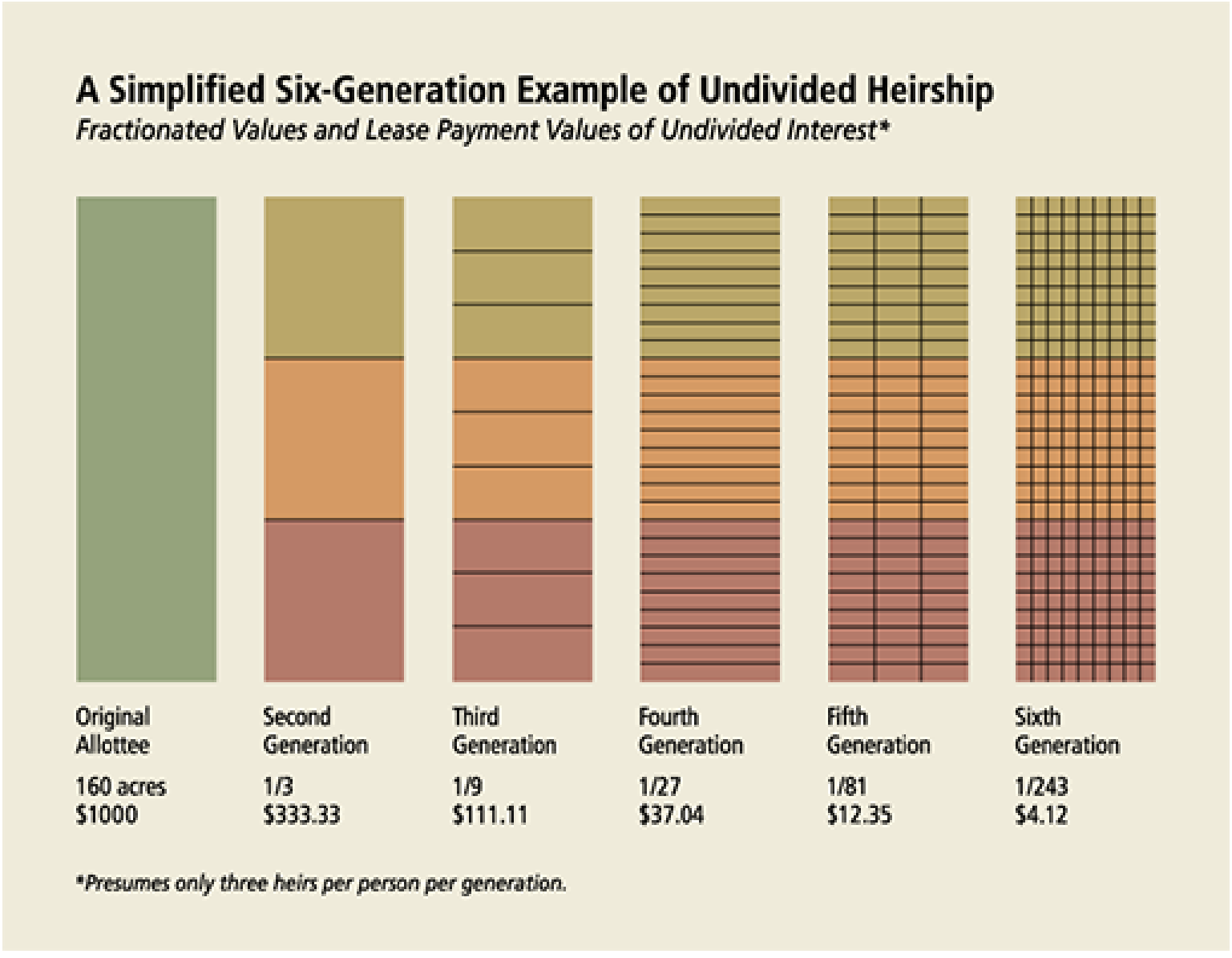
Institutions: Land Ownership Rights

- Indians do not control the legal titles to their land parcels
  - Titles to land parcels are held in federal trust with Indians as beneficiaries
  - Indian owners cannot unilaterally perform ordinary real estate transactions (sell, mortgage, lease, etc.)
  - It is the Bureau of Indian Affairs (BIA) policy not to approve any Indian land sales, thus no alienation of ownership claims is possible

Institutions cont.

- BIA probates the estates of deceased Indians
  - Originally Indian wills were not recognized and wills remain outside the cultural norms of Indians
- In the absence of a will, heirs typically obtain an equal fraction of the deceased's land interests.
  - Leads to Indian land fractionation
- Land ownership is shared as "tenants in common"
  - Indian co-owners share percentages of the whole parcel, not identifiable (physical) sections of land

Fractionation Illustrated



Data

- Trust Asset and Accounting Management System (TAAMS)
  - Cross-section of all trust land areas (reservations) in April 2010
  - Anonymized system reference number for ownership id
  - Agricultural lease income
- "Current" state of the Federal Indian Trust
  - 270,000 Indian owners with 4.6 million Indian ownership records
  - An average of $\sim$ 17 ownership records per Indian owner

Hypotheses

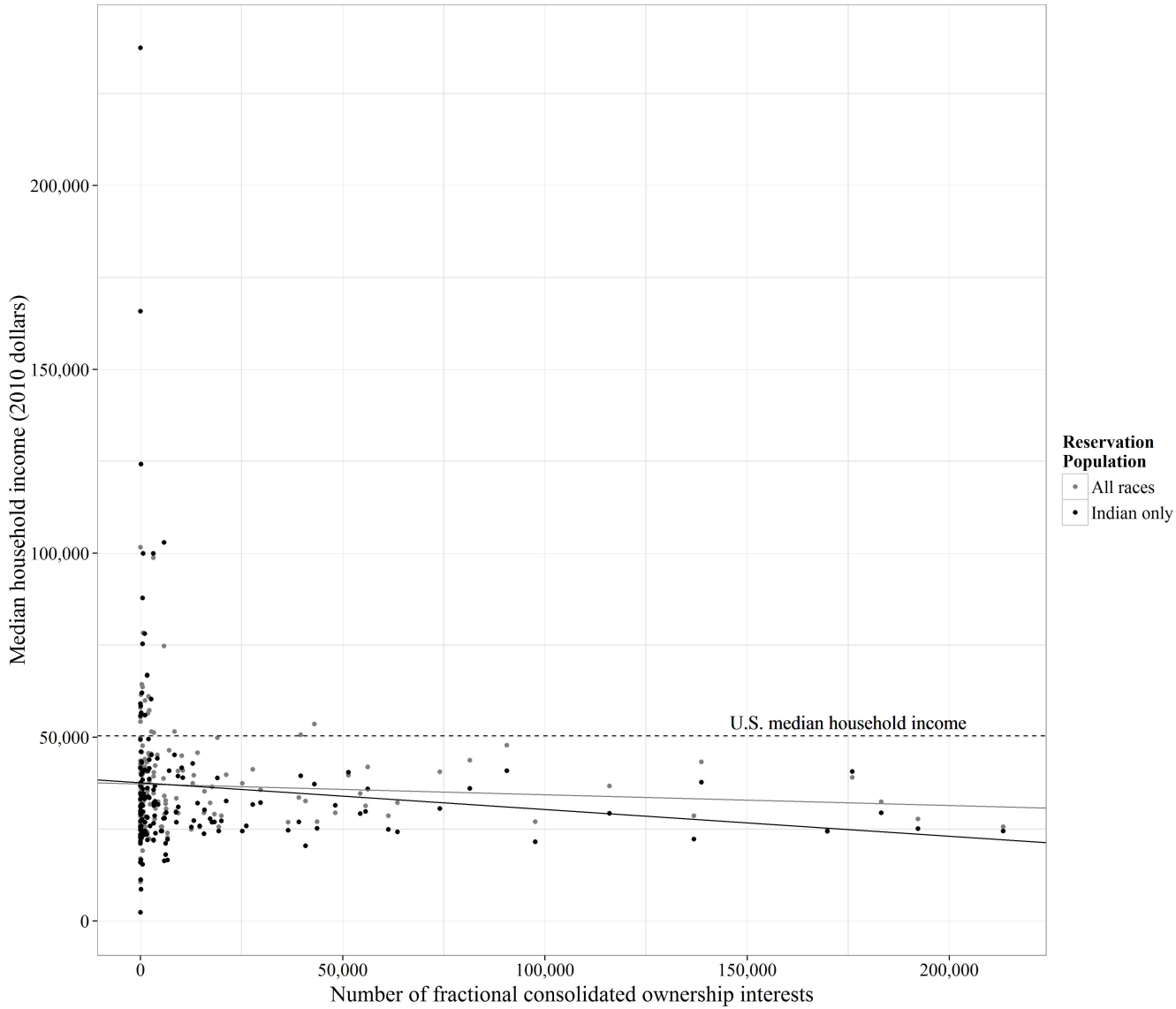
- Fractionation increases transaction costs/bargaining costs as to how to use the land
- Implication: Reservations that contain land with higher levels of fractionation will have lower levels of income because of the costs and difficulties of coming to an agreement for how to use the land

Reservation Level Empirical Model

$$IndianIncome_i = \alpha Fractionation_i + \delta X_i + \varepsilon_i$$

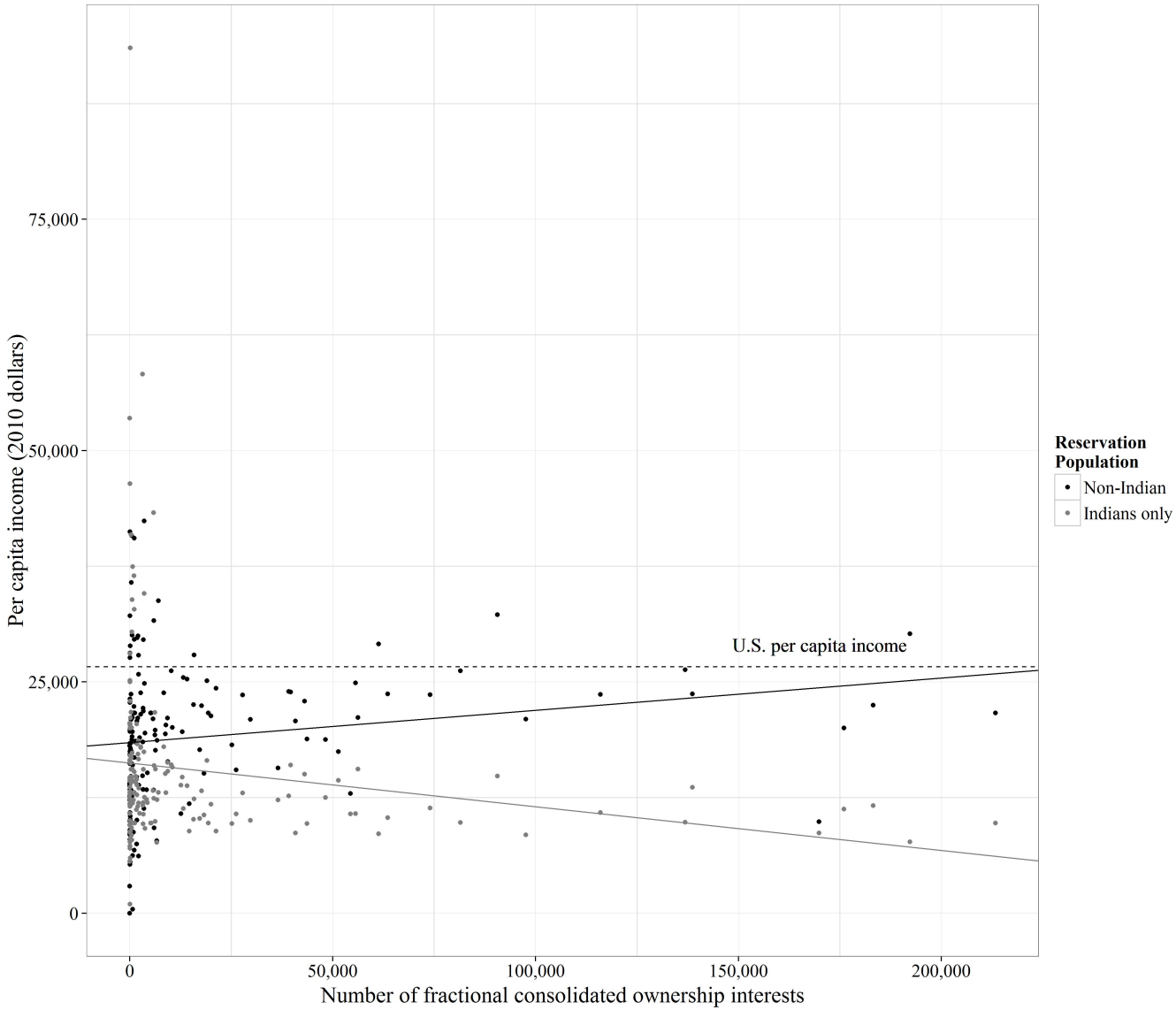
- Fractionation is measured as the number of (consolidated) ownership interests on a reservation
- Controls: surface acres, percent fee, percent Indian, percent completed high school

Reservation: Median Household Income



Note: The regression estimates are, Median HH income = 37,273*** - 0.0029(Interests)* + 2,197(Indians only) - 0.0044(Interests*Indian only).

Reservation: Per Capita Income



Note: The regression estimates are, Per capita income = 16,245*** - 0.0047(Interests)*** + 2,197(Non-Indian)* + 0.0082(Interests*Non-Indian)***.

Causal Effect?

- Instrument: Number of allotments approved by BIA (Dept. of Indian Affairs) between 1860 and 1934.
  - More allotments on a reservation means a larger population, thus fractionation is likely to progress faster.
- IV findings: Same sign and statistical significance as when estimating with OLS

Reservation IV Models

Table 4: Reservation income measures and fractionation, IV models

	All races	Indians only	Non-Indians	Indians only	Non-Indians	Indians only
	Median household income		Average household income		Per capita income	
	(1)	(2)	(3)	(4)	(5)	(6)
No. of fractional consolidated interests	−0.027	−0.098*	0.044	−0.073	0.028	−0.044*
	(0.024)	(0.053)	(0.046)	(0.049)	(0.020)	(0.023)
Surface acres	0.002	0.010	0.007	0.009	0.004	0.003
	(0.004)	(0.010)	(0.009)	(0.008)	(0.003)	(0.004)
Percent fee	−66.770*	−86.370	−33.550	−135.900**	13.800	−86.250***
	(38.980)	(62.850)	(56.900)	(59.160)	(22.860)	(28.720)
Percent Indian	−184.300***	−261.900***	−149.500**	−284.300***	−52.780*	−160.700***
	(42.130)	(78.790)	(70.190)	(92.020)	(28.380)	(54.560)
Percent completed HS or more	170.000*	−382.300	238.200	−65.580	102.800*	−103.700
	(97.940)	(293.100)	(201.900)	(197.000)	(60.640)	(129.900)
Constant	36,545.000***	85,437.000***	40,372.000**	71,670.000***	12,540.000**	36,509.000***
	(8,661.000)	(25,723.000)	(18,852.000)	(20,508.000)	(5,281.000)	(13,585.000)
N	163	161	156	159	161	162

Notes: The source of our income measures is the 2012 American Community Survey 5-year estimates and is adjusted to 2010 dollars. The instrument used in the two stage least squares specifications is the number of original allotments approved from 1860 to 1934. Allotment data comes from Department of the Interior annual reports. Robust standard errors are in parentheses. * denotes significance at the 10-percent level, ** denotes significance at the 5-percent level, and *** denotes significance at the 1-percent level.

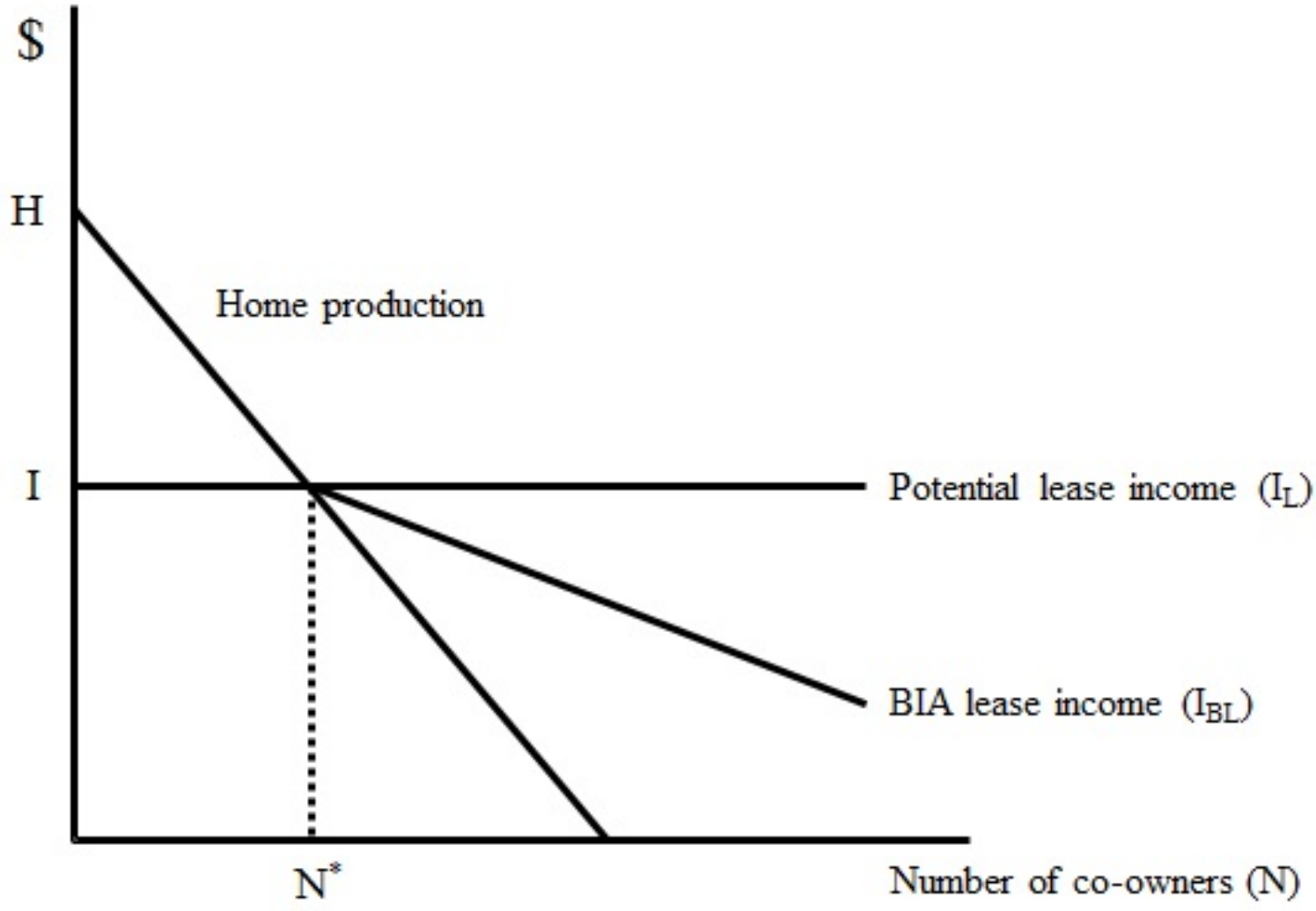
Institutions: Leasing Trust Land

- For trust property to be "employed", BIA requires a lease or permission from co-owners
- Leasing is conditional on BIA approval
  - Majority ownership required to initiate a privately directed lease, a costly activity and BIA approval process is slow
- BIA has responsibility to attempt to lease land which would "lie fallow" (when there is no Indian directed lease)

Principal Agent Issues

- **Principal:** Indians
- **Agent:** BIA
- BIA leases tracts and there is anecdotal evidence that BIA does not get maximal possible lease rates
  - Each owner has less of an incentive to monitor that the BIA obtains market rate for leasing, when there are more owners per acre of a given tract.

Model of ag land leasing



Hypotheses

- Less fractionated land is less likely to be leased through BIA
- When tracts are leased though the BIA, tracts that are more fractionated will generate less lease income

Estimation Strategy

- Linear probability model

$$Pr(Lease = 1)_{ij} = \beta_0 + \beta_1 Fractionation_{ij} + \delta X_{ij} + \varepsilon_{st}$$

- Fractionation is measured as the number of owners of a given parcel
- Controls: parcel size and resource type (surface or both surface and subsurface)
- Agricultural lease income model

$$LeaseIncomePerAcre_{ij} = \beta_0 + \beta_1 Fractionation_{ij} + \delta X_{ij} + \varepsilon_{st}$$

Results Linear Probability Models

Table 7: Linear probability models

	Lease income? (Yes = 1)			
	(1)	(2)	(3)	(4)
Number of owners	0.0009***	0.0007***		
	(0.0000)	(0.0000)		
2-5 owners			0.1452***	0.1261***
			(0.0031)	(0.0031)
6-10 owners			0.2180***	0.2039***
			(0.0038)	(0.0036)
11-19 owners			0.2596***	0.2342***
			(0.0038)	(0.0037)
20 or more owners			0.2665***	0.2555***
			(0.0029)	(0.0032)
Surface only	0.1013***	−0.1392***	0.1114***	−0.1324***
	(0.0034)	(0.0039)	(0.0032)	(0.0037)
Subsurface only	−0.2452***	−0.4525***	−0.2518***	−0.4865***
	(0.0026)	(0.0030)	(0.0025)	(0.0030)
Parcel acreage	0.0007***	0.0005***	0.0006***	0.0004***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	0.2319***	−0.0091***	0.1159***	−0.0066***
	(0.0026)	(0.0030)	(0.0023)	(0.0023)
Fixed effects?	No	Yes	No	Yes
N	145,697	145,697	145,697	145,697
R^2	0.1212	0.3471	0.1777	0.3825

Notes: Robust standard errors are in parentheses. * denotes significance at the 10-percent level, ** denotes significance at the 5-percent level, and *** denotes significance at the 1-percent level.

Results Agricultural Income Models

Table 10: Agricultural leasing

	Lease income per acre			
	(1)	(2)	(3)	(4)
Number of owners	−0.0683***	−0.0175***		
	(0.0088)	(0.0043)		
2-5 owners			−9.2680*	−7.9940**
			(5.0350)	(3.4250)
6-10 owners			−20.2200***	−9.4430***
			(4.8680)	(3.2510)
11-19 owners			−14.9200***	−9.6260***
			(4.9310)	(3.3620)
20 or more owners			−20.1300***	−10.2100***
			(4.6280)	(3.1890)
Surface only	−30.0400***	0.2574	−29.9900***	0.3771
	(1.2430)	(0.4937)	(1.1980)	(0.5095)
Parcel acreage	−0.1432***	−0.0273***	−0.1394***	−0.0257***
	(0.0110)	(0.0026)	(0.0105)	(0.0024)
Constant	78.8400***	11.8900***	91.3900***	17.6300***
	(1.9640)	(2.3820)	(4.7900)	(2.9960)
Fixed effects?	No	Yes	No	Yes
N	18,789	18,789	18,789	18,789
R^2	0.0586	0.7172	0.0607	0.7177

Notes: Robust standard errors are in parentheses. * denotes significance at the 10-percent level, ** denotes significance at the 5-percent level, and *** denotes significance at the 1-percent level.

Findings

- Fractionation leads to lower Indian incomes on reservations.
  - We suggest that the underlying mechanism is that incomplete property rights increase the transaction costs for Indian landowners.
- BIA leasing of land is subject to principal agent issues
- We estimate that fractionation reduces the annual agricultural lease income by between $3,962 and $5,062 per parcel per year.
- Parcels with 20+ owners lease are twice as likely to be leased as those with 2-5 owners.

Thank you!