

Land Redistribution

EC307 ECONOMIC DEVELOPMENT

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Lecture 6
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READINGS

Tables and figures in this lecture are taken from:

- Chapters 11 & 12 of Ray (1998)
- Burgess, R. (2004), *Mao's Legacy: Access to Land and Hunger in Modern China*. mimeo Department of Economics and STICERD, LSE.
- Banerjee, A., Gertler, P., and Ghatak, M. (2002). Empowerment and Efficiency: Tenancy Reform in West Bengal. *Journal of Political Economy*, 110(2):239–80.
- **Class based on** Besley, T. and Burgess, R. (2000). Land Reform, Poverty Reduction, and Growth: Evidence from India. *The Quarterly Journal of Economics*, 115(2):389–430.

MOTIVATION

Finding effective means to tackle poverty is crucial to the defining mission of development economics

But which forms of *intervention* can be effective?

Should we just rely on growth promoting policies to reduce poverty?

land reform – prominent in 60s & 70s as mechanism for achieving “*redistribution with growth*” ? (Chenery et. al.)

Limited rigorous quantitative analysis of effectiveness

Link between *land scarcity* and *hunger*

Key platform for political parties in low income countries – motivation for land reform – “*land to the tiller*” programmes

Mao's Legacy: Access to Land and Hunger in Modern China

Mao's rallying call: landlords and rich peasants own 70% to 80% of land but constitute less than 10% of population

Mao came to power on the back of radical land reforms supported by poor peasants and agricultural laborers who make up most of the population

Feudal power relationships in agriculture destroyed

idea of paper's first part:

use household data to look at how land is allocated to households in a rich and a poor province in 1990

land owned by village governments is allocated to households on the basis of their demographic composition which is a proxy for nutritional need.

Key Finding

universal and egalitarian access to land – Mao's legacy – distinguishes China from most other low income countries

Politically stability – observed both in poor and rich province 12 years after onset of market reforms

idea of paper's second part:

Study the pathways through which access to land can affect hunger and exploit non-market allocation to trace these out in household data

Land – generates income and, if food markets are incomplete, serves as a source of cheaper calories relative to the market

Paper show's that this latter *own-price effect* is empirically important but diminishes with market development

These results indicate that Mao's legacy of universal and egalitarian access to land represents a *key means of avoiding hunger*

- helps us to understand how China has managed to escape the high levels of hunger which typify low income countries
- events in China cannot be replicated elsewhere
but
- paper suggests that providing *access to land* may be central to current attempts to tackle hunger in the modern world

SET-UP

Representative household data from State Statistical Bureau

Table 1 Looks at 2 provinces which have rapidly diverged since onset of rural reforms in 1978 and 1990

- Jiangsu rich and diversified
- Sichuan poor and heavily dependent on agriculture

We would like to know whether land allocation system differs in these two settings

Under Household Responsibility System (HRS) adopted from 1978, village governments are *de jure* owners of land and autonomously decide how it is allocated to households

- Re-allocation of land is decentralised

Village land zoned by quality and then village meetings convened to decide allocation

- Bargaining process* Each household has multiple plots spread across zones
- households enter into 15 year contracts to farm land
 - village government retains right to adjust allocations

To examine the factors that determine how much land a household receives we look at regressions of the form:

$$A_h = \alpha + \sum_{j=1}^J \gamma_j n_j + \lambda n_{c>2} + \delta z + u$$

- A_h land holding of household h
- n_j demographic classes – no. in age-group band j in household
- γ_j marginal area of land allocated due to individual of type j
- $n_{c>2}$ dummy for household with more than two children
- z village dummy

Table 2 includes village fixed effects so we are looking at allocations within villages

Universal access to land: virtually all household in both Sichuan and Jiangsu receive some land to farm

Land transfer to household (A_h) resembles a demogrant – determined by demographic composition of the household which is proxy of nutritional need

- Allocations to children 0-4, 5-9 and 10-14 constitute about 0.23, 0.55-0.6 and 0.75-0.88 of transfers to farm adults, elderly and non-agricultural adult 15-55 also receive lower allocations of 0.8-0.9 in terms of land *Equivalence Scale*
- Non-productive household members are taken into account in allocation rule
- Negative coefficient for $n_{c>2}$

Equivalence Scales based on land and calorie demand line up – allocation rule appears to be based on consumption needs of households

- Allocation rule tracks nutritional need more exactly than per capita rule

Table 2

- allocation rules extremely similar across Jiangsu and Sichuan
- persistence of egalitarian norm in environment of rapidly developing markets

Opinion surveys suggest that egalitarian rules popular with farmers - Kung

- Cadre dummy insignificant
- limited ability to affect allocation by having more kids

Table 1: Sample Characteristics, Rural Sectors, 1990

	Sichuan	Jiangsu
Rural PCE (yuan)	569	953
Rural industry/rural output (%)	26.9	60.4
Location	Central inland	East coastal
Climate	Subtropical	Subtropical
Main food crop	Rice	Rice
Household size	4.35	4.15
Sample size {counties}	{54}	{34}
[villages]	[538]	[336]
<household> (persons)	<5380> (23416)	<3364> (13920)

Source: SSB Rural Household Surveys. China Statistical Yearbook (1991).

Table 2: Land Allocation and Nutritional Need
Dep. Var: Household Cultivable Land (hectares)

	Rural Sichuan		Rural Jiangsu	
	(1)	(2)	(3)	(4)
Intercept	0.060 (6.64)	0.060 (6.64)	0.083 (7.09)	0.083 (7.09)
Cadre dummy		0.007 (1.31)		-0.009 (0.89)
0-4N	0.016 (5.07)	0.016 (5.09)	0.021 (3.62)	0.021 (3.61)
5-9N	0.041 (13.33)	0.041 (13.31)	0.050 (9.73)	0.050 (9.72)
10-14N	0.062 (20.76)	0.062 (20.66)	0.069 (12.92)	0.069 (12.90)
15-54N Farm	0.070 (31.17)	0.070 (30.98)	0.092 (25.71)	0.092 (25.68)
15-54N Off-farm	0.056 (20.72)	0.056 (20.35)	0.054 (15.66)	0.054 (15.68)
55+N	0.064 (23.03)	0.064 (22.96)	0.076 (15.06)	0.076 (15.06)
Dummy for >2 children	-0.022 (2.24)	-0.022 (2.22)	-0.024 (2.21)	-0.023 (2.21)
Sample size	5379	5379	3354	3354
Adj. R ²	0.8170	0.8172	0.7358	0.7358

Notes: All regressions are reported with robust (Huber) standard errors. Absolute t statistics in parenthesis. N indicates that demographics are expressed in terms of numbers of people in the different age groups. Adults (15-55) are divided according to whether they list their primary employment as being on or off-farm. Regressions also contain dummies for 537 villages (clusters) in Sichuan and 336 villages (clusters) in Jiangsu.

Table 3: Calorie Availability by Per Capita Expenditure (PCE) Decile: China and India

PCE decile	Per capita calorie availability			Per capita cultivable land		Per capita expenditure means	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	RS	RJ	RM	RS	RJ	RS	RJ
1	1772	2046	1429	0.066	0.083	284	347
2	2024	2245	na	0.068	0.091	354	473
3	2170	2450	na	0.073	0.092	400	555
4	2301	2479	na	0.072	0.091	442	633
5	2393	2513	na	0.078	0.090	485	714
6	2480	2612	na	0.074	0.095	532	804
7	2624	2675	na	0.077	0.094	586	920
8	2683	2787	na	0.082	0.097	654	1081
9	2834	2784	na	0.079	0.097	769	1321
10	3140	3057	3167	0.081	0.087	1156	2556
All	2442	2565	2120	0.075	0.092	566	941

Notes: Calorie availability for rural Sichuan (RS) and rural Jiangsu (RJ) is computed from SSB Rural Household Surveys, 1990. The source of the calorie figures for rural Maharashtra (RM) is Subramanian and Deaton (1993); na means not available. Per capita land refers to the mean per capita land holding for households in the relevant decile or deciles. Land is measured in hectares. PCE is measured in 1990 yuan. The computations are based on 5379 households for Sichuan and 3354 households for Jiangsu.

Table 4: Welfare Indicators in China and India, 1990

	CHINA	INDIA
GNP per Capita	410	370
Daily calorie supply	2630	2238
Children 0-5 below -2 s.d. weight for age	17.4	63.9
Children 0-5 below -2 s.d. height for age	31.4	62.1
Infant mortality rate	31	97

Source: World Bank (1993), United Nations (1993), World Health Organisation (1997).

ACCESS TO LAND AND HUNGER

How does access to land affect hunger?

Previous studies of land reform have looked at effects on poverty (Besley- Burgess 2000) and productivity (Banerjee, Gertler and Ghatak, 2001)

This paper looks at the links between access to land and calorie consumption

Agricultural household model – households make joint decisions over consumption, production and labor input

perfect markets – consumption decisions do not affect production decisions, production is independent of household preferences and income home produced and purchased calories are perfect substitutes

Result 1: Under *perfect markets* land only has an effect on calorie consumption via its effect on income.

$$\frac{\partial x_c}{\partial \bar{A}} = \underbrace{\frac{\partial x_c}{\partial y^*}}_+ \cdot \underbrace{\frac{\partial y^*}{\partial \bar{A}}}_+$$

- x_c demand for calories
- \bar{A} household's land holding
- y^* household's income

When one or more market is incomplete then recursiveness breaks down

- consumption variables determine production (e.g., due to transaction costs or thin markets)

Price band between the buying and selling price of calorie widens with poorer infrastructure, less competitive marketing system (e.g. procurement), poorer information flow, greater price risk

Expect price band to be wide in transition country like China but to diminish with market development

\tilde{p}_c "shadow price" of calories equilibrates demand and supply

Own price advantage – households with more land face lower prices for the calories they consume than households with less land

Result 2: In *incomplete food market* settings access to land can affect calorie demand through two distinct mechanisms.

- (i) via an *income effect* (this is the whole effect in the perfect markets case).
- (ii) via an *own price effect*

$$\frac{\partial x_c}{\partial \bar{A}} = \underbrace{\frac{\partial x_c}{\partial y^*} \cdot \frac{\partial y^*}{\partial \bar{A}}}_+ + \underbrace{\frac{\partial x_c}{\partial \tilde{p}_c} \cdot \frac{\partial \tilde{p}_c}{\partial \bar{A}}}_+$$

Result 3: In incomplete food market settings the own price effect of having access to land is unambiguously positive. Increasing access to land lowers the shadow price of calories and increases demand for calories.

– Cross-price Effects positive

Result 4: With an incomplete food market and controlling for the income effect we would expect increasing access to land, which lowers the shadow calorie price, to have a negative impact on non-food consumption and a positive impact on food consumption.

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TESTABLE HYPOTHESIS

Result 5: Controlling for the income effect we would expect increasing access to land, by lowering the shadow price of food, to have

- i. a negative impact on purchased calorie consumption and
- ii. a positive effect on own produced calorie consumption.

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EMPIRICAL TEST

$$\ln\left(\frac{x_c}{n}\right) = \alpha + \beta \ln\left(\frac{x}{n}\right) + \zeta \ln\left(\frac{A}{n}\right) + \eta \ln(n) + \sum_{j=1}^{J-1} \gamma_j \left(\frac{n_j}{n}\right) + \sum_{k=1}^{K-1} \gamma_k \left(\frac{n_k}{n}\right) + \delta z$$

x_c calorie consumption

x total consumption

A land

n household size

n_j demographic classes

n_k number of adults engaged in primary, secondary and tertiary employment

z village dummies

using log variables allows us to calculate elasticities

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We want to look at effect of access to land (A/n) on calorie consumption (x_c/n)

Exploit non-market allocation of land in China allow us to separate out income and land effects

- typically not possible in market economies where jointly determined

Specification builds directly on standard calorie demand equation from Subramanian and Deaton (1996)

- Control for overall effect income (including that coming through land) by including total per capita expenditure variable (x/n)
- Then interpret coefficient on land (A/n) as picking up own price effect

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FINDINGS

- Finding 1** Income exerts a positive and significant effect on calorie consumption
 - see columns (1) and (4) of Table 5
 - confirmation of Subramanian and Deaton (1996) finding
- Finding 2** Controlling for income still see large effect of land
 - evidence of own price effect and that we are in imperfect food market setting
 - see columns (2) and (5) of Table 5 – in line with Result (2) confirmed
- Finding 3** In line with Result 3 we find this effect to be positive and significant and persist when we instrument for income
 - see columns (3) and (6) in Table 5

FINDINGS

- Finding 4** Own price effect larger in poorer less developed province
- Finding 5:** Own price effect large relative to income effect
 - see Table 6 robustness – cross-price effects
- Finding 6:** In line with Result 4 we find that increasing access to land has a positive effect on food consumption and a negative effect on non-food consumption
 - see columns (1)-(2) and (5)-(6) in Table 7

- Finding 7:** In line with Result 5 we find that increasing access to land has
 - i. a positive effect on own produced calorie consumption and
 - ii. a negative effect on purchased calorie consumption
 - see columns (3)-(4) and (7)-(8) in Table 7
- Results point to coefficient on land picking up own price effect
- In China important pathway through which access to land affects calorie consumption – land does not appear to be picking up omitted wealth or political influence effects

Table 6: Decomposition of Land Effect on Calorie Availability

Province	Total Effect (A) x (B) + (C)	(A)	(B)	Income Effect (A) x (B)	Own-Price Effect (C)
	$\frac{d\ln PCCAL}{d\ln PCLAND}$	$\frac{\partial \ln PCCAL}{\partial \ln PCE}$	$\frac{\partial \ln PCE}{\partial \ln PCLAND}$		$\frac{\partial \ln PCCAL}{\partial \ln PCLAND}$ (PCE constant)
	(1)	(2)	(3)	(4)	(5)
Sichuan	0.18	0.31	0.16	0.05	0.13
Jiangsu	0.12	0.20	0.16	0.03	0.09

Column (2) is from columns (1) and (4) of Table 5. Column is from a regression of log per capita land on log per capita expenditure which contains the same controls as Table 5. Column (5) is from columns (2) and (5) of Table 5.

Table 5: Access to Land and Nutritional Status: Basic Results

	Rural Sichuan			Rural Jiangsu		
	log per capita calories	log per capita calories	log per capita calories	log per capita calories	log per capita calories	log per capita calories
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	IV	OLS	OLS	IV
log per capita land		0.131 (12.09)	0.148 (11.61)		0.092 (6.45)	0.098 (6.10)
log per capita expenditure	0.311 (27.48)	0.298 (27.30)		0.198 (20.31)	0.189 (19.48)	
instrumented log per cap exp			0.231 (14.88)			0.153 (8.96)
log household size	-0.119 (13.10)	-0.100 (11.31)		-0.195 (14.80)	-0.184 (14.20)	
Adj. R ²	0.741	0.757	0.648	0.619	0.630	0.562
no. obs.	5379	5379	5379	3354	3354	3354

Absolute t statistics in parenthesis based on robust (Huber) standard errors clustered at the village level. Regressions also contain controls for the occupational status and demographic composition of households and dummies for 537 villages (clusters) in Sichuan and 336 villages (clusters) in Jiangsu.

Table 7: Access to Land and Consumption: Robustness Checks

	Rural Sichuan				Rural Jiangsu			
	log per capita food exp	log per capita non-food exp	log per capita own prod grain cal	log per capita purch grain cal	log per capita food exp	log per capita non-food exp	log per capita own prod grain cal	log per capita purch grain cal
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
log per capita land	0.075 (6.50)	-0.084 (5.14)	0.285 (10.67)	-0.264 (2.55)	0.087 (5.84)	-0.060 (3.18)	0.328 (9.69)	-0.887 (5.55)
log per capita expenditure	0.549 (32.83)	1.560 (104.37)	0.141 (9.33)	0.524 (7.63)	0.443 (20.23)	1.447 (65.52)	0.066 (3.49)	0.292 (2.80)
log hh size	-0.108 (8.65)	0.133 (10.10)	-0.041 (2.58)	-0.309 (4.03)	-0.200 (12.36)	0.178 (9.20)	-0.165 (5.95)	-0.502 (3.43)
Adj. R ²	0.830	0.883	0.718	0.525	0.750	0.912	0.683	0.424
no. obs.	5359	5359	5343	4224	3339	3339	3324	1919

Notes: Absolute t statistics in parenthesis based on robust (Huber) standard errors clustered at the village level. Regressions also contain controls for the occupational status and demographic composition of households and dummies for 537 villages (clusters) in Sichuan and 336 villages (clusters) in Jiangsu.

CONCLUSIONS

- access to land not a salient political issue in high income countries but in low income countries where many households dependent on agriculture it is a big issue
- Link between lack of access to land and hunger
 - the motivation for Mao land reforms
 - effect of reforms felt in system of land allocation we observe in China in 1990

Mao's legacy: universal and egalitarian access to land

DISCUSSION

- This institutional feature sets China apart from other low income countries
- Institution has persisted during period of rapid market development
- The paper exploit *non-market allocation* to map out the different pathways through which *access to land* can affect *hunger*
- The paper found that *land* exerts an influence on *calorie consumption* both through the *income* it generates as well as by acting as a *cheaper source of calories*
- Own-price effect important relative to income effect – interesting policy implications

- 1 Problem of *market incompleteness* in food markets likely to be widespread in poor countries
- 2 where markets are underdeveloped, having access to land enables households to avoid hunger both by providing them with a source of income but also by providing them with a “cheaper” source of calories relative to the market.
- 3 *Market development* will make access to land less important for achieving sufficient calorie consumption – happening rapidly
- 4 Removal of procurement system or raising of procurement prices would be beneficial
- 5 Results help us to understand how China has managed to escape the high levels of hunger which typify low income countries (see Table 3 and 4)

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- 6 improving access to land via either land redistribution or improving the functioning land rental markets (which allow land rich and land scarce households to trade) could significantly contribute to the *Millennium Development Target* of halving the proportion of people suffering from hunger between 1990 and 2015
- 7 However political events in China unlikely to be replicated elsewhere
- 8 the Chinese example underlines the importance of providing access but has less clear-cut answers in terms of providing guidance on how access can be improved.

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Land Reform, Poverty Reduction, and Growth: Evidence from India

Background and Data:

India: It is an important example for the study of land reform – largest body of land reform legislation ever passed in the world
 Data considerations make it ideal for assessing impacts on poverty and growth:

1. under 1950 constitution – land reform is a state subject
2. many forms of different types of land reform attempted in different states
3. federal democracy – scope to understand political economy of policy determination
4. common institutions
5. common data collection methodologies – comparable poverty measures (NSS)
6. long time period covering numerous land reform episodes

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The paper uses panel data on 16 Indian states 1958-1992 to study impacts of the below given four types of land reform on *poverty* and *growth*

1. tenancy reforms
2. abolition of intermediaries
3. ceilings on land holdings
4. consolidation of land holdings

The paper uses legislative data (widely used in U.S. state level data). Land reforms were enacted in the name of reducing poverty

- real impact on the conditions of the poor, however, may be muted by unenthusiastic implementation (Bardhan, 1970).

Main contribution of the paper is to provide a broad based assessment of land reform experience in post-independence India.

METHOD

We use data from NSS rounds.
The empirical approach is to run panel data regressions of the form:

$$x_{st} = \alpha_s + \beta_t + \gamma y_{st} + \psi l_{st-4} + \epsilon_{st}$$

where x_{st} is some measure of poverty in state s at time t , α_s is a state fixed effect, β_t is a year dummy variable, y_{st} is a vector of variables that we treat as exogenous (detailed below), l_{st-4} is the stock of past land reforms four periods previously and ϵ_{st} is an error term which we model as AR(1) process where the degree of auto-correlation is state-specific, i.e., $\epsilon_{st} = \rho_s \epsilon_{st-1} + u_{st}$.

Estimation via generalized least squares will also allow for a heteroscedasticity in error structure, with each state having its own error variance.
We use three different poverty measures: (1) head-count measure, (2) poverty gap measure, (3) difference between rural and urban poverty
Econometric Concerns:

- l_{st} is endogenous and/or measured with error
- l_{st} is proxying for other omitted policies

In principal these can be dealt with using instrumental variables, but in practice instruments are hard to find. We use political variables as instruments (they pass tests of over-identifying restrictions and predict land reforms quite well)

State	Year	Title	Description	Class.
Andhra Pradesh	1950 (amended 1954)	(Telengana Area) Tenancy and Agricultural Lands Act	Tenants received protected tenancy status; tenants to have minimum term of lease; right of purchase of non-resumable lands; transfer of ownership to protected tenants in respect of non-resumable lands; as a result 13611 protected tenants declared owners.	1
	1952	Hyderabad Abolition of Cash Grants Act	Abolition of all the 975 jagirs in Telangana.	2
	1954	Inams Abolition Act (absorbed) enclaves	Abolition of inams (with few exceptions).	2
	1955	(Hyderabad Jagirdars) Act	Abolition of all the 975 jagirs in Talangana.	2
	1956	Inam (Abolition and Conversion into Ryotwari) Act	Acquisition of 11137 estates; abolition of 1.06 million minor inams.	2
	1956 (amended 1974)	Tenancy Act	Tenancy continues up to 2/3 of ceiling area; law does not provide for conferment of ownership right on tenants except through right to purchase; confers continuous right of resumption on landowners.	1
	1957	Inams Abolition Act	Abolition of inams (with few exceptions), struck down by the High Court in 1970.	2
Assam	1951	State Acquisition of Zamindari Act	Abolition of intermediary rights involving 0.67 million hectares.	2
	1954	Lushai Hills District (Acquisition of Chiefs Rights) Act	Same as above.	2
	1956 (amended 1976)	Fixation of Ceiling on Land Holdings Act	Self-explanatory.	3
	1960	Consolidation of Holdings Act	Introduction of compulsory consolidation.	4
	1971	Tenancy Act	Classifies tenants into occupancy and non-occupancy tenants; former has security of tenure, may acquire landlord's right of holding by paying 50 times the land revenue; subletting is disallowed.	1

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Model	rural poverty gap	rural poverty gap	rural poverty gap	rural head count	urban poverty gap	poverty gap difference	poverty gap difference	headcount difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Model	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)
four year lagged cumulative land reform legislation	-0.281 (2.18)	-0.443 (3.21)			0.085 (1.05)	-0.534 (5.24)		
four year lagged cumulative tenancy reform legislation			-0.604 (2.52)	-1.378 (3.13)			-0.736 (3.27)	-1.916 (4.37)
four year lagged cumulative abolition of intermediaries legislation			-2.165 (4.08)	-4.354 (4.11)			-1.327 (2.59)	-3.364 (3.73)
four year lagged cumulative land ceiling legislation				0.089 (0.11)	0.734 (0.86)		0.230 (0.61)	0.888 (1.14)
four year lagged cumulative land consolidation legislation				0.456 (0.82)	-0.208 (0.19)		-0.210 (0.42)	-1.737 (1.62)
state effects	YES	YES	YES	YES	YES	YES	YES	YES
year effects	YES	YES	YES	YES	YES	YES	YES	YES
number observations	507	300	507	507	507	507	507	507

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Model	rural poverty gap	rural poverty gap	rural head count	urban poverty gap	poverty gap difference	head count difference
	(1)	(2)	(3)	(4)	(5)	(6)
Model	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)
four year lagged cumulative land reform legislation	-0.378 (3.78)			0.037 (0.042)	-0.539 (4.63)	-1.298 (5.04)
four year lagged cumulative tenancy reform legislation		-0.565 (2.32)	-0.897 (1.98)			
four year lagged cumulative abolition intermediaries legislation		-1.790 (2.81)	-3.14 (2.48)			
four year lagged cumulative land ceiling legislation		-0.352 (0.82)	-0.121 (0.14)			
four year lagged cumulative land consolidation legislation		0.164 (0.32)	-1.000 (1.02)			
population growth rate	-90.61 (1.14)	-97.99 (1.21)	-87.59 (0.50)	-74.32 (1.22)	74.81 (0.91)	-145.05 (0.90)
four year lagged per capita education expenditure	0.063 (2.04)	0.070 (2.24)	0.076 (1.10)	0.041 (1.73)	0.077 (2.18)	0.034 (0.42)
four year lagged per capita health expenditure	0.038 (0.88)	0.041 (0.91)	0.072 (0.76)	-0.003 (0.09)	0.042 (0.83)	0.218 (1.76)
four year lagged per capita other expenditure	0.020 (2.69)	0.017 (2.31)	0.026 (1.56)	0.012 (2.40)	0.009 (0.12)	-0.008 (0.40)
four year lagged per capita redistributive state taxes	-0.130 (2.70)	-0.142 (2.92)	-0.364 (3.25)	-0.045 (1.25)	-0.182 (3.53)	-0.422 (3.21)
four year lagged state taxes as a percentage of state domestic product	-49.59 (2.99)	-49.11 (2.94)	-87.33 (2.46)	-27.70 (2.23)	16.43 (0.97)	4.790 (0.13)
four year lagged agricultural yield	0.001 (0.05)	-0.003 (0.02)	-0.507 (1.19)	-0.006 (0.42)	0.031 (1.45)	-0.013 (0.30)
state effects	YES	YES	YES	YES	YES	YES
year effects	YES	YES	YES	YES	YES	YES
number of observations	436	436	436	436	436	436

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Model	cumulative total land reform legislation	cumulative tenancy reform legislation	cumulative abolition of intermediaries legislation	cumulative land ceiling legislation	cumulative land consolidation legislation
	(1)	(2)	(3)	(4)	(5)
Model	OLS	OLS	OLS	OLS	OLS
four year lagged cumulative land reform legislation	0.406 (12.23)				
four year lagged cumulative tenancy reform legislation		0.693 (16.26)	-0.002 (0.16)	-0.009 (0.38)	0.021 (1.13)
four year lagged cumulative abolition of intermediaries legislation		0.041 (0.53)	0.664 (14.21)	0.109 (1.51)	-0.029 (1.06)
four year lagged cumulative land ceiling legislation			-0.131 (2.11)	-0.172 (0.65)	0.631 (15.60)
four year lagged cumulative land consolidation legislation					-0.045 (1.44)
four year lagged cumulative congress party share of seats		-0.460 (2.81)	-0.472 (4.78)	-0.098 (2.37)	-0.066 (1.85)
four year lagged hard left share of seats	2.837 (2.95)	0.476 (0.72)	0.149 (0.97)	1.437 (5.46)	-0.302 (0.73)
four year lagged soft left share of seats	-3.921 (3.09)	-2.363 (3.25)	-1.101 (2.60)	-1.990 (3.63)	-0.426 (1.06)
four year lagged hindu parties share of seats	0.270 (0.33)	-0.089 (0.19)	-0.045 (0.15)	0.556 (2.01)	-0.410 (2.08)
state effects	YES	YES	YES	YES	YES
year effects	YES	YES	YES	YES	YES
number of observations	474	474	474	474	474

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TABLE VI LAND REFORM AND POVERTY IN INDIA: INSTRUMENTATION										
model	rural poverty gap	rural head count	rural poverty gap	rural head count	poverty gap difference	rural poverty gap	rural head count	rural head count	rural poverty gap	rural head count
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
four year lagged cumulative land reform legislation	-0.732 (6.02)	-1.360 (5.68)			-0.438 (3.60)	-0.659 (4.09)	-1.192 (3.67)		-0.599 (3.18)	-1.263 (3.24)
four year lagged cumulative tenancy reform legislation			-0.998 (3.16)	-2.404 (3.67)				-4.595 (4.69)		
four year lagged cumulative abolition of intermediaries legislation			-2.271 (2.58)	-5.701 (3.64)				-7.408 (4.10)		
four year lagged cumulative land ceiling legislation			-1.372 (2.34)	0.432 (0.38)				-1.998 (1.89)		
four year lagged cumulative land consolidation legislation			1.624 (1.72)	1.969 (1.00)				-4.027 (1.45)		
over identification test p-value	0.93	0.98	0.99	0.98	0.99	0.93	0.98	0.98	0.92	0.96
state effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
year effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
number of observations	410	410	410	410	410	410	410	410	410	410

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TABLE VII LAND REFORM AND AGRICULTURAL WAGES		
model	real agricultural wages	real agricultural wages
	(1)	(2)
four year lagged cumulative land reform legislation	0.081 (2.71)	
four year lagged cumulative tenancy reform legislation		0.049 (0.88)
four year lagged cumulative abolition of intermediaries legislation		0.339 (2.61)
four year lagged cumulative land ceiling legislation		0.069 (0.09)
four year lagged cumulative consolidation of land holdings legislation		0.018 (0.13)
state effects	YES	YES
year effects	YES	YES
number of observations	441	441

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TABLE VIII LAND REFORM AND GROWTH IN INDIA					
Model	log of state income per capita	log of agricultural state income per capita	log of agricultural state income per capita	log of agricultural yield	log of agricultural yield
	(1)	(2)	(3)	(4)	(5)
one year lagged log of state income per capita	0.497 (12.53)				
one year lagged log of agricultural state income per capita		0.195 (4.17)	0.167 (3.29)		
four year lagged cumulative tenancy reforms	-0.002 (0.43)	-0.037 (4.54)	-0.033 (2.94)	-0.050 (6.55)	-0.038 (3.92)
four year lagged cumulative abolition of intermediaries	-0.005 (0.54)	0.005 (0.27)	-0.016 (0.76)	-0.002 (0.12)	-0.013 (0.49)
four year lagged cumulative land ceiling legislation	-0.002 (0.22)	0.019 (1.26)	0.012 (0.64)	0.015 (0.95)	0.015 (0.88)
four year lagged land consolidation legislation	-0.013 (1.29)	0.065 (3.31)	0.057 (2.12)	0.074 (3.87)	0.054 (2.15)
population growth rate			-2.567 (0.75)		4.166 (1.11)
four year lagged per capita education expenditures			0.003 (1.48)		0.003 (1.47)
four year lagged per capita health expenditures			-0.005 (1.97)		-0.002 (0.77)
four year lagged per capita other expenditures			-0.0004 (0.99)		-0.002 (0.40)
four year lagged per capita tax revenue from redistributive taxes			-0.004 (1.51)		-0.003 (1.05)
four year lagged state taxes as a percentage of state domestic product			0.474 (0.54)		0.278 (0.31)
four year lagged log of agricultural yield			0.010 (0.17)		-0.018 (0.32)
state effects	YES	YES	YES	YES	YES
year effects	YES	YES	YES	YES	YES
number of observations	484	484	433	488	433

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SUMMARY OF RESULTS

1. Poverty Reduction

- land reform associated with reductions in rural poverty with effects coming mainly through abolition of intermediaries and tenancy reform
- The results are robust to different poverty measures, inclusion of other policy variables and our instrumentation procedure

2. Agricultural Wages land reform also appears to raise agricultural wages

3. Output effects

- Tenancy reforms appear to lower output. Other reforms have no effect

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MAKING SENSE OF THE RESULTS

- The theoretical model focuses on two things:
- a model of agricultural contracting and
 - a model of labor supply by tenants.

MAKING SENSE OF THE RESULTS

- 3 groups:
- *landlords* who rent out land as well as farming some of the land themselves,
 - *tenants* who rent land, and
 - *landless laborers*
 - poor are made up predominantly of the latter two groups
 - tenants and landless laborers supply labor to the labor market where it is demanded by landlords who choose to be owner-cultivators.

Labor supply function:

$$l^*(x, w) = \operatorname{argmax}_l \{u + (x + \omega l) - \phi(l)\}.$$

Labor supply is decreasing in x = non-labor income = value of tenancy in for tenant – if land reforms increase x , then tenants would reduce labor supply to the market – tightening of labor market would lead to increased agricultural wages

Now consider agricultural contracting problem of landlord and tenant – output depends on effort, $R(e)$, tenants have to be monitored to put in effort on the land thus contract specifies effort level e – tenant caught shirking with probability p – payment schedule needed to induce effort level e at wage ω can be written as:

$$w(e, \omega) = v^{-1} \left(v(0, \omega) + \frac{e}{p} \right)$$

the contract must now specify a payment/effort pair consistent with this schedule.

The optimal effort that the landlord choose to induce is given by

$$e(p) = \operatorname{argmax}_e \{R(e) - w(e, \omega)\}$$

it is easy to verify that $e(p)$ is increasing. The tenant's equilibrium payoff is $V(p) = v(0, \omega) + \frac{e(p)(1-p)}{p}$, which is larger than the payoff from being a landless laborer.

It is straightforward to calculate the impact of changes in p on output and the tenant's payoff – an increase in p will increase net-output since $e(p)$ is increasing. The effect on the tenant's payoff is given by:

$$V'(p) = e'(p) \frac{1-p}{p} - e(p) \left(\frac{1}{p^2} \right)$$

the first term is positive – an increase in the eviction probability elicits higher effort and hence raises the tenant’s rent. The second effect works in the opposite direction – increasing p will decrease rent accruing to tenant at a given level of effort – hence expect overall payoff to be increasing in p

abolition of intermediaries – if we assume intermediary was receiving surplus $[R(e(p)) - e(p)]V(p)v_L$ then abolition will tend to increase tenants payoff if he has any bargaining power – expect reduction in poverty – no effect on effort or output unless p was different ex post – rent increases will increase agricultural wages as tenants withdraw labor supply to market

Tenancy reform – drop in p – increase in security of tenure has two effects

1. output falls because for all $p < 1$, $e(p)$ less than surplus maximizing level
2. tenants payoff increases (poverty decreases) because for a given effort level the rent of the tenant will tend to increase – reflects increase in bargaining power – hence expect drop in output and decrease in poverty

land reforms: Affect how agency problems are solved and hence can therefore generate both output and distributional effects

CONCLUSIONS

Central Findings

- land reform has contributed towards poverty reduction in India.
- This explains about 1 tenth of the actual poverty reduction in India over the period (around 8 million individuals).
- The results are robust to a number of concerns and also show up in wage data.
- Poverty has fallen even though output effects are absent.