Property Rights

EC307 Economic Development

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Lecture 5

created on July 4, 2011

READINGS

Tables and figures in this lecture are taken from:

Chapters 11 & 12 of Ray (1998)

Acemoglu, D., Johnson, S., and Robinson, J. (2001). The Colonial Origins of Comparative Development: An Empirical Investigation. *The American Economic Review*, 91:1369-1401.

Banerjee, A., Gertler, P., and Ghatak, M. (2002). Empowerment and Efficiency: Tenancy Reform in West Bengal. *Journal of Political Economy*, 110(2):239–80.

Lin, J. (1992). Rural Reforms and Agricultural Growth in China. *The American Economic Review*, 82(1):34–51.

- **Class based on**

  Nunn, N. (2008). The Long Term Effects of Africa's Slave Trades. *Quarterly Journal of Economics*, Vol. 123, No. 1, February. pp. 139-176.

♣ `Further Reading:` Besley, T. and M. Ghatak (2007). Property Rights. Forthcoming chapter in the *Handbook of Development Economics*.

INTRODUCTION

Institutions are the rules of the game that shape human interactions – ***Douglas North***

- **Property rights** – an key institution which serves as a means of reducing uncertainty by establishing a stable structure for human interactions.

Property rights
↓
Investment incentives
↓
Growth

- **Problem:** institutional environment *endogenous* and *evolves slowly* over time. Think in terms of cross-country, cross-region and micro household level data.
- **Challenge** of isolating exogenous variation in property rights

Property Rights and Investment

3 distinct channels discussed in the theoretical literature.
E.g., property rights over land.

1. **Risk of Expropriation:** makes property rights insecure and its like a random tax on returns on investment.

(i) *level effect:* overall reduction in investment

(ii) *composition effect:* lower investment in assets which are vulnerable to expropriation

Property Rights and Investment

2. **Gains from Trade:** realised and encourage investment when property right are secure.

- Secure property rights leads to an market in land which efficiently allocates land to the its best use. Especially true when there are complementarities in the production process.
- Insecure property rights stop people from realise existing gains from trade and depress investment.

Property Rights and Investment

3. **Collateral and Credit Markets**

Assumptions:
1. property (land) rights ↑ collateral value of land
2. agents are impoverished and need credit to invest

If improved property (land) rights increase access to collateral, they can encourage investment by:

(i) reducing risk premium and the cost of borrowing thus encouraging investment in competitive credit market

(ii) reducing the agency cost in credit markets with imperfections, i.e., overcome credit rationing etc.

Colonial Origins of Comparative Development

In places where Europeans could not settle due to high mortality, they were more likely to set up extractive institutions.

$$\log y_i = \mu + \alpha R_i + X_i'\gamma + \varepsilon_i \qquad \text{(OLS)}$$

where

- y_i is income per capita in country i,
- R_i is the protection against expropriation measure and a proxy for current institutions measured on a scale of 1 to 10 (10 indicating the lowest risk of expropriation)
- X_i is vector of other co-variates, and
- ε_i is a random error term.

Cross-sectional data and thus no t subscript.

Endogenity and Instrumental Variable

$R_i \rightleftarrows y_i$

(institutional measure) (income per capita)

- the effect remains if regional dummies and measures of geography such as latitude included

  Problems:

  (1) richer countries may be able to afford better institutions
  (2) may be many omitted determinants of income differences which are correlated with institutions

- **Solution:** Find instruments for institutions. It needs to be an important factor in accounting for institutional variation we observe but should not exert direct effect on economic performance.
- Philip Curtin's data on mortality rates faced by settlers, i.e., soldiers, bishops and sailors in the 17th, 18th and 19th centuries. (in annualized deaths per thousand)

INSTRUMENT

- M_i (settler mortality) as **instrument** for R_i (institutions)

(potential) settler mortality

↓

settlements

↓

early institutions

↓

current institutions

↓

current performance

INSTRUMENT

- Find 2SLS estimates which are larger than OLS estimates
- IV procedure depends on assumption that settler mortality in the past has no direct effect on economic performance
- Authors find result is robust to including variables for colonial origin, legal origin, religion, disease, geography

$\rightsquigarrow$ institutions matter!

$\hookleftarrow$ drawbacks

(i) institutions treated like black box
$\Rightarrow$ results have limited direct policy relevance

(ii) not clear why conditions which caused high historical settler mortality might (e.g. mangrove swamps full of mosquitoes) might not still exert an effect on growth

(ii) Evolution of and indigenous institutions with the colonial institutions

Figure 1

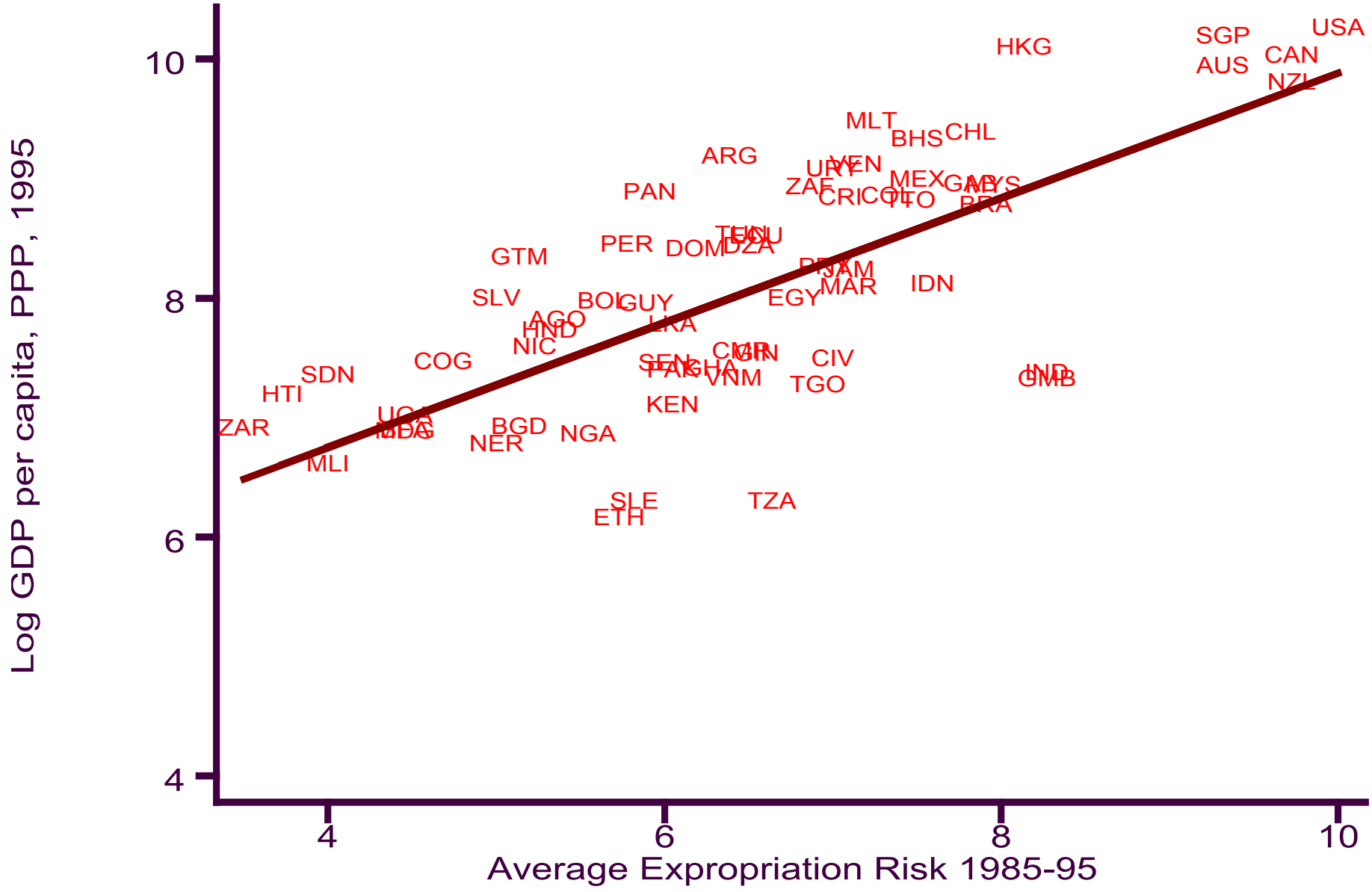
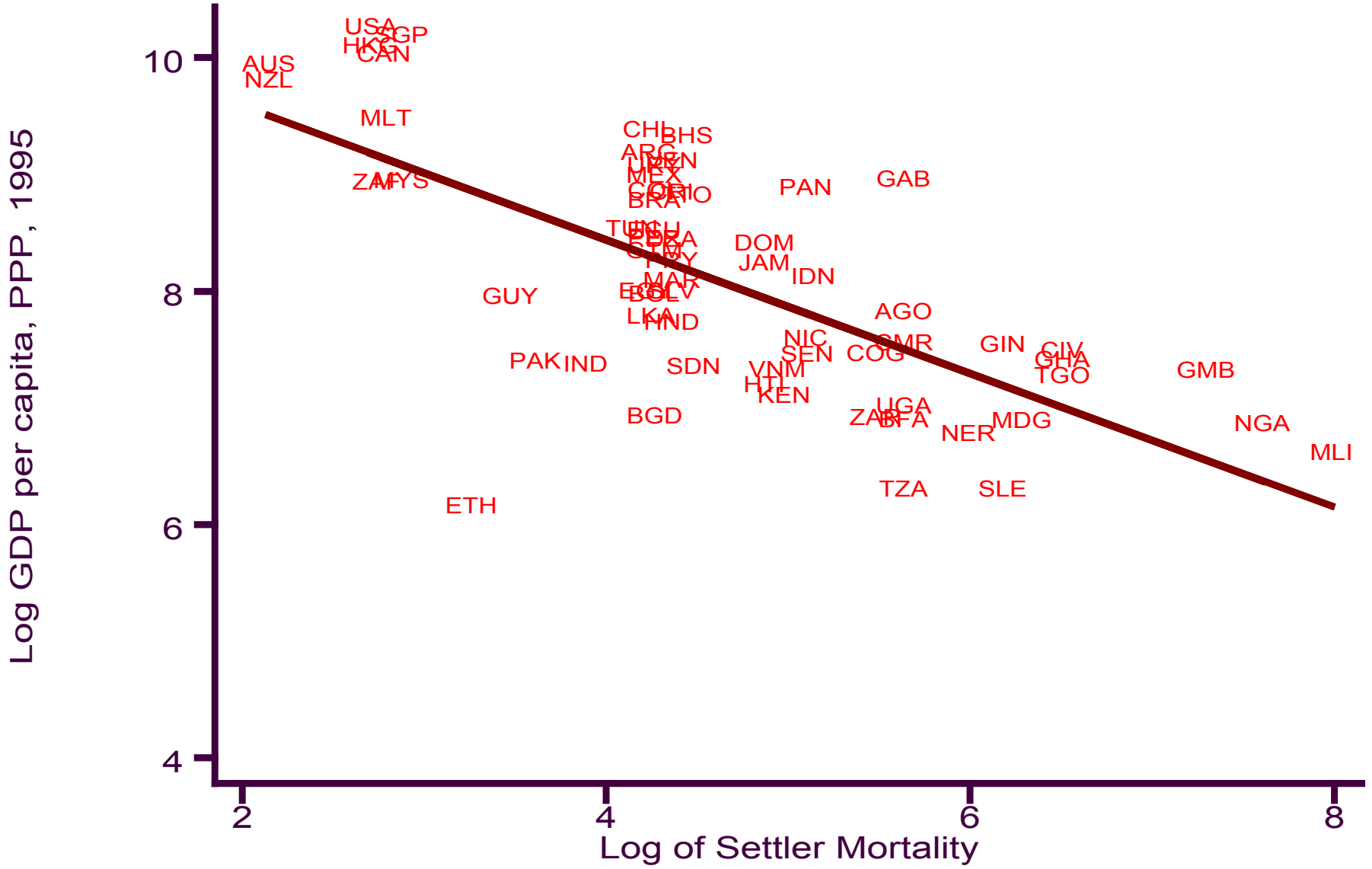


Figure 2



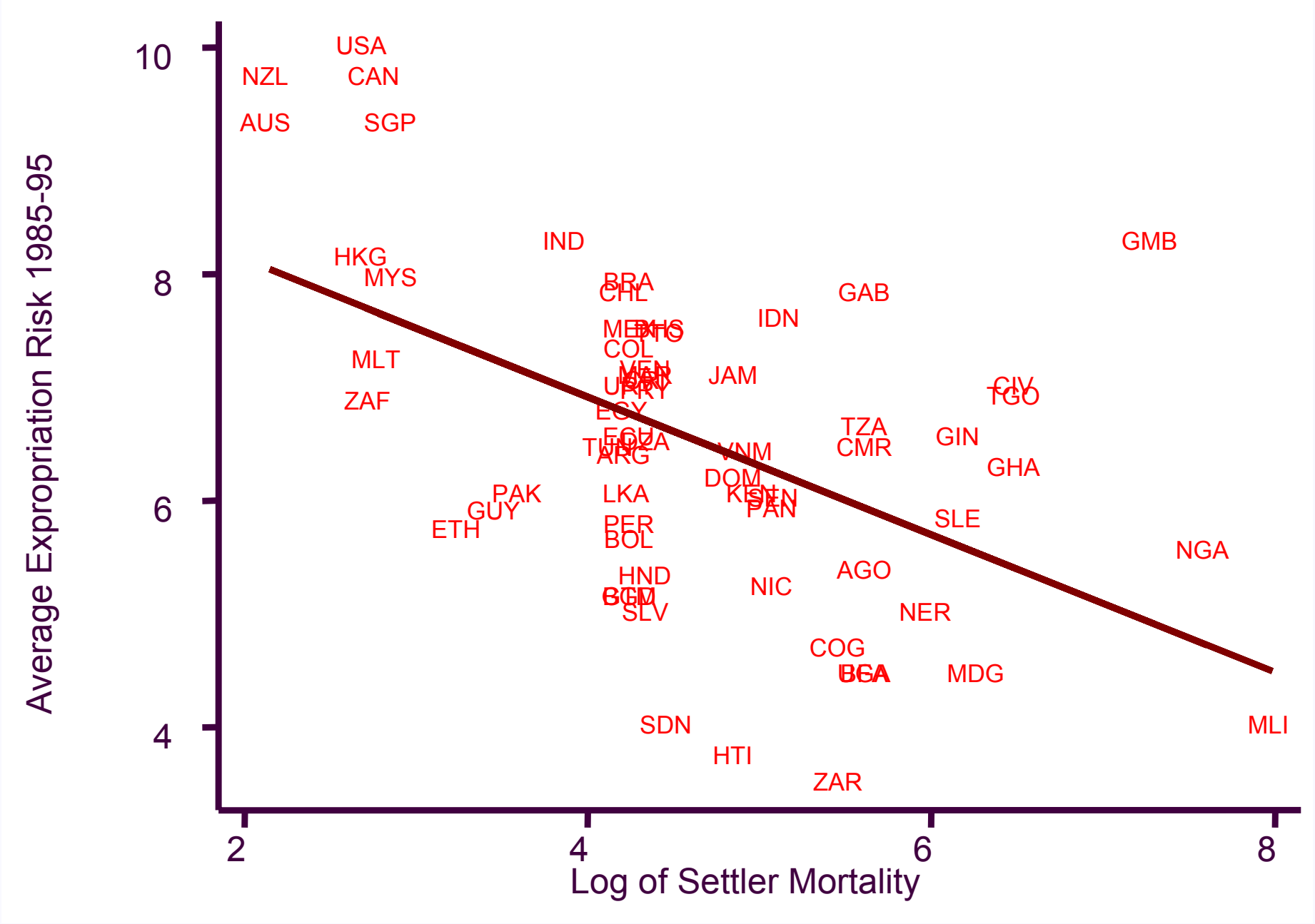


Table 2
OLS Regressions

	Whole World (1)	Base Sample (2)	Whole World (3)	Whole World (4)	Base Sample (5)	Base Sample (6)	Whole World (7)	Base Sample (8)
	Dependent Variable is log GDP per capita in 1995						Dep. Var. is log output per worker in 1988	
Average Protection Against Expropriation Risk, 1985-1995	0.54 (0.04)	0.52 (0.06)	0.47 (0.06)	0.43 (0.05)	0.47 (0.06)	0.41 (0.06)	0.45 (0.04)	0.46 (0.06)
Latitude			0.89 (0.49)	0.37 (0.51)	1.60 (0.70)	0.92 (0.63)		
Asia Dummy				-0.62 (0.19)		-0.60 (0.23)		
Africa Dummy				-1.00 (0.15)		-0.90 (0.17)		
"Other" Continent Dummy				-0.25 (0.20)		-0.04 (0.32)		
R-Squared	0.62	0.54	0.63	0.73	0.56	0.69	0.55	0.49
N	110	64	110	110	64	64	108	61

Dependent Variable: columns 1-8, log GDP per capita (PPP basis) in 1995, current prices, (from the World Bank's World Development Indicators 1999); columns 9-10, log output per worker in 1988 from Hall and Jones (1999). Average protection against expropriation risk is measured on a scale from 0 to 10, where a higher score means more protection against expropriation, averaged over 1985 to 1995, from Political Risk Services. Standard errors are in parentheses. In regressions including dummies for the anti-expropriation index, the dummy for the first quartile --i.e., with highest risk of expropriation-- is the omitted category. In regressions with continent dummies, the dummy for America is omitted. See Appendix Table A1 for more detailed variable definitions and sources.
Of the countries in our base sample, Hall and Jones do not report output per worker in the Bahamas, Ethiopia, and Vietnam.

Table 3
Determinants of Institutions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A	*Dependent Variable is Average Protection against Expropriation Risk in 1985-95*									
Constraint on Executive in 1900	0.32	0.26								
	(0.08)	(0.09)								
Democracy in 1900			0.24	0.21						
			(0.06)	(0.07)						
Constraint on Executive in First Year of Independence					0.25	0.22				
					(0.08)	(0.08)				
European Settlements in 1900							3.20	3.00		
							(0.61)	(0.78)		
Log European Settler Mortality									-0.61	-0.51
									(0.13)	(0.14)
Latitude		2.20		1.60		2.70		0.58		2.00
		(1.40)		(1.50)		(1.40)		(1.51)		(1.34)
R-Squared	0.2	0.23	0.24	0.25	0.19	0.24	0.3	0.3	0.27	0.3
Number of Observations	63	63	62	62	63	63	66	66	64	64
Panel B	*Dependent variable is Constraint on Executive in 1900*				*Dependent variable is Democracy in 1900*				*Dependent variable is European Settlements in 1900*	
European Settlements in 1900	5.50	5.40			8.60	8.10				
	(0.73)	(0.93)			(0.90)	(1.20)				
Log European Settler Mortality			-0.82	-0.65			-1.22	-0.88	-0.11	-0.07
			(0.17)	(0.18)			(0.24)	(0.25)	(0.02)	(0.02)
Latitude		0.33		3.60		1.60		7.60		0.87
		(1.80)		(1.70)		(2.30)		(2.40)		(0.19)
R-Squared	0.46	0.46	0.25	0.29	0.57	0.57	0.28	0.37	0.31	0.47
Number of Observations	70	70	75	75	67	67	68	68	73	73

All regressions are OLS, using our base sample. Standard errors are in parentheses. Regressions with constraint on executive in first year of independence also include years since independence as a regressor. Average protection against expropriation risk is on a scale from 0 to 10, where a higher score means more protection against expropriation of private investment by government, averaged over 1985 to 1995. Constraint on Executive in 1900 is on a scale, from 1 to 7, with a higher score indicating more constraints. Democracy in 1900 is on a scale from 0 to 10, with a higher score indicating more democracy. European settlements is percent of population that was European or of European descent in 1900.

See Appendix Table A1 for more detailed variable definitions and sources.

Table 4
IV Regressions of log GDP per capita

	Base Sample (1)	Base Sample (2)	Base Sample without neo-Europes (3)	Base Sample without neo-Europes (4)	Base Sample without Africa (5)	Base Sample without Africa (6)	Base Sample with Continent Dummies (7)	Base Sample with Continent Dummies (8)	Base Sample, dep. var. is log output per worker (9)
Panel A: Two Stage Least Squares									
Average Protection Against Expropriation Risk 1985-1995	0.94 (0.16)	1.00 (0.22)	1.28 (0.36)	1.21 (0.35)	0.58 (0.10)	0.58 (0.12)	0.98 (0.30)	1.10 (0.46)	0.98 (0.17)
Latitude		-0.65 (1.34)		0.94 (1.46)		0.04 (0.84)		-1.20 (1.8)	
Asia Dummy							-0.92 (0.40)	-1.10 (0.52)	
Africa Dummy							-0.46 (0.36)	-0.44 (0.42)	
"Other" Continent Dummy							-0.94 (0.85)	-0.99 (1.0)	
Panel B: First-Stage for Average Protection against Expropriation Risk in 1985-95									
Log European Settler Mortality	-0.61 (0.13)	-0.51 (0.14)	-0.39 (0.13)	-0.39 (0.14)	-1.20 (0.22)	-1.10 (0.24)	-0.43 (0.17)	-0.34 (0.18)	-0.63 (0.13)
Latitude		2.00 (1.34)		-0.11 (1.50)		0.99 (1.43)		2.00 (1.40)	
Asia Dummy							0.33 (0.49)	0.47 (0.50)	
Africa Dummy							-0.27 (0.41)	-0.26 (0.41)	
"Other" Continent Dummy							1.24 (0.84)	1.1 (0.84)	
R-Squared	0.27	0.30	0.13	0.13	0.47	0.47	0.30	0.33	0.28
Panel C: Ordinary Least Squares									
Average Protection Against Expropriation Risk 1985-1995	0.52 (0.06)	0.47 (0.06)	0.49 (0.08)	0.47 (0.07)	0.48 (0.07)	0.47 (0.07)	0.42 (0.06)	0.40 (0.06)	0.46 (0.06)
Number of Observations	64	64	60	60	37	37	64	64	61

The dependent variable in columns 1-8 is log GDP per capita in 1995, PPP basis. The dependent variable in column 9 is log output per worker, from Hall and Jones (1999). "Average Protection Against Expropriation Risk 1985-95" is measured on a scale from 0 to 10, where a higher score means more protection against risk of expropriation of investment by the government, from Political Risk Services. Panel A reports the two stage least squares estimates, instrumenting for protection against expropriation risk using log settler mortality; Panel B reports the corresponding first stage. Panel C reports the coefficient from an OLS regression of the dependent variable against average protection against expropriation risk. Standard errors are in parentheses. In regressions with continent dummies, the dummy for America is omitted. See Appendix Table A1 for more detailed variable descriptions and sources.

Table 5
IV Regressions of log GDP per capita with Additional Controls

	Base Sample (1)	Base Sample (2)	British colonies only (3)	British colonies only (4)	Base Sample (5)	Base Sample (6)	Base Sample (7)	Base Sample (8)	Base Sample (9)
					Panel A: Two Stage Least Squares				
Average Protection Against Expropriation Risk, 1985-1995	1.10 (0.22)	1.16 (0.34)	1.07 (0.24)	1.00 (0.22)	1.10 (0.19)	1.20 (0.29)	0.92 (0.15)	1.00 (0.25)	1.10 (0.29)
Latitude		-0.75 (1.70)				-1.10 (1.56)		-0.94 (1.50)	-1.70 (1.6)
British Colonial Dummy	-0.78 (0.35)	-0.80 (0.39)							
French Colonial Dummy	-0.12 (0.35)	-0.06 (0.42)							0.02 (0.69)
French legal origin dummy					0.89 (0.32)	0.96 (0.39)			0.51 (0.69)
p-value for Religion Variables							[0.001]	[0.004]	[0.42]
					Panel B: First-Stage for Average Protection against Expropriation Risk in 1985-95				
Log European Settler Mortality	-0.53 (0.14)	-0.43 (0.16)	-0.59 (0.19)	-0.51 (0.14)	-0.54 (0.13)	-0.44 (0.14)	-0.58 (0.13)	-0.44 (0.15)	-0.48 (0.18)
Latitude		1.97 (1.40)				2.10 (1.30)		2.50 (1.50)	2.30 (1.60)
British Colonial Dummy	0.63 (0.37)	0.55 (0.37)							
French Colonial Dummy	0.05 (0.43)	-0.12 (0.44)							-0.25 (0.89)
French legal origin					-0.67 (0.33)	-0.7 (0.32)			-0.05 (0.91)
R-Squared	0.31	0.33	0.30	0.30	0.32	0.35	0.32	0.35	0.45
					Panel C: Ordinary Least Squares				
Average Protection Against Expropriation Risk, 1985-1995	0.53 (0.19)	0.47 (0.07)	0.61 (0.09)	0.47 (0.06)	0.56 (0.06)	0.56 (0.06)	0.53 (0.06)	0.47 (0.06)	0.47 (0.06)
Number of Observations	64	64	25	25	64	64	64	64	64

Panel A reports the two stage least squares estimates with log GDP per capita (PPP basis) in 1995 as dependent variable, and Panel B reports the corresponding first stage. The base case in columns 1 and 2 is all colonies that were neither French nor British. The religion variables are included in the first stage of columns 7 and 8 but not reported here (to save space). Panel C reports the OLS coefficient from regressing log GDP per capita on average protection against expropriation risk, with the other control variables indicated in that column (full results not reported to save space). Standard errors are in parentheses. The religion variables are percentage of population that are Catholics, Muslims, and "other" religions; Protestant is the base case. Our sample is all either French or British legal origin (as defined by La Porta et al 1999.)

Empowerment and Efficiency: Tenancy Reform in West Bengal

- In 1977 emergency - Left Front Government (a coalition of socialist and communist parties) comes to power in West Bengal (India) - focus on agrarian reform
- Two elements to new tenancy law:
  (1) The tenant was given choice of registration with the land-revenue bureaucracy. This was to establish the legal standing of a tenant, tenancy contracts being traditionally oral in most places.
  (2) A registered tenant could not be evicted provided they paid a legally stipulated share of 25% of output to the landlord.

Operation Barga

- Operation Barga: name given to the effort to implement this law

– village to village registration drive
  – the fraction of registered share-croppers went up from 23% in 1977 to 65% in 1990 making West Bengal the state in India with the highest proportion of registered sharecroppers by far
  – more than 8000 camps were conducted and around 0.67 million sharecroppers were registered

- West Bengal: land-scarce & dependent on agricultural
  – Sharecropping tenancy accounts for almost half the net cropped area in West Bengal
  – prior to the reform sharecropping contracts generally involved high share-rents (50% of output in most cases), insecure tenure and the leases were almost always informal

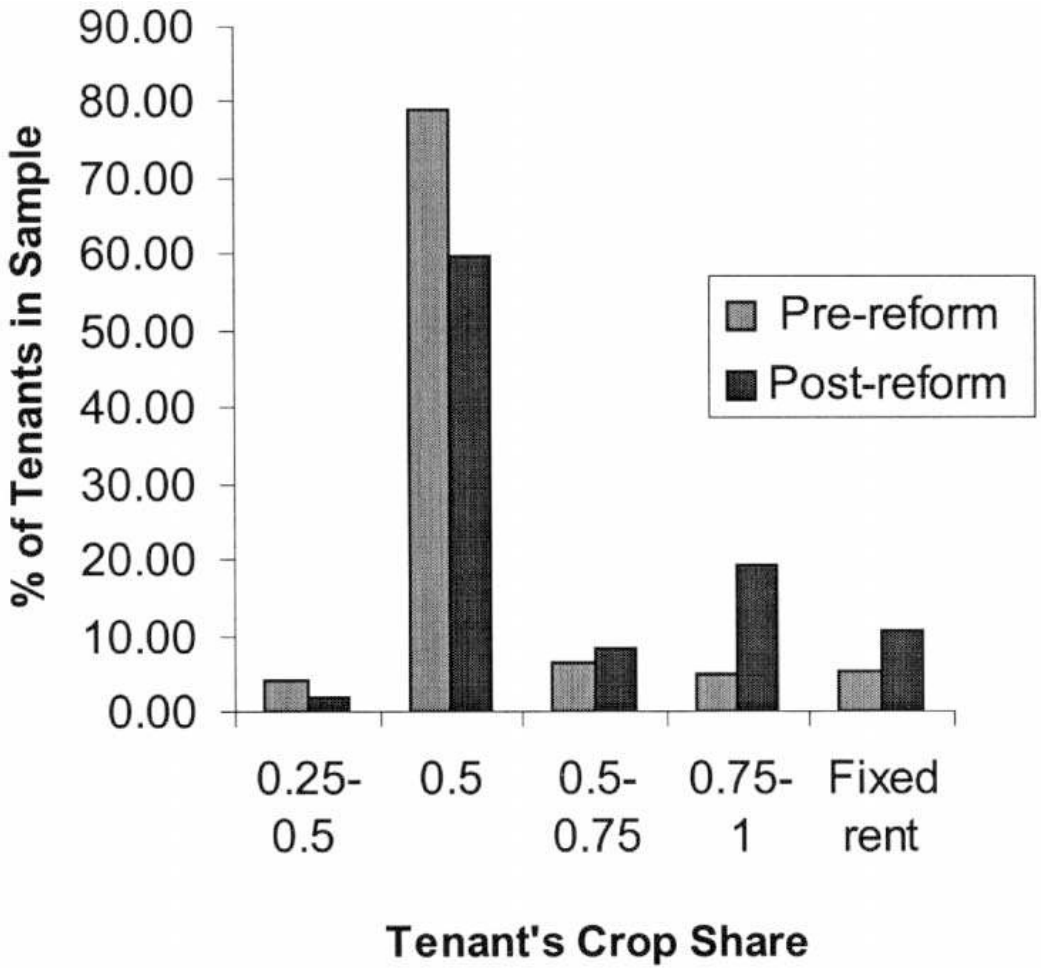


FIG. 3.—Crop share of tenants before and after the reform

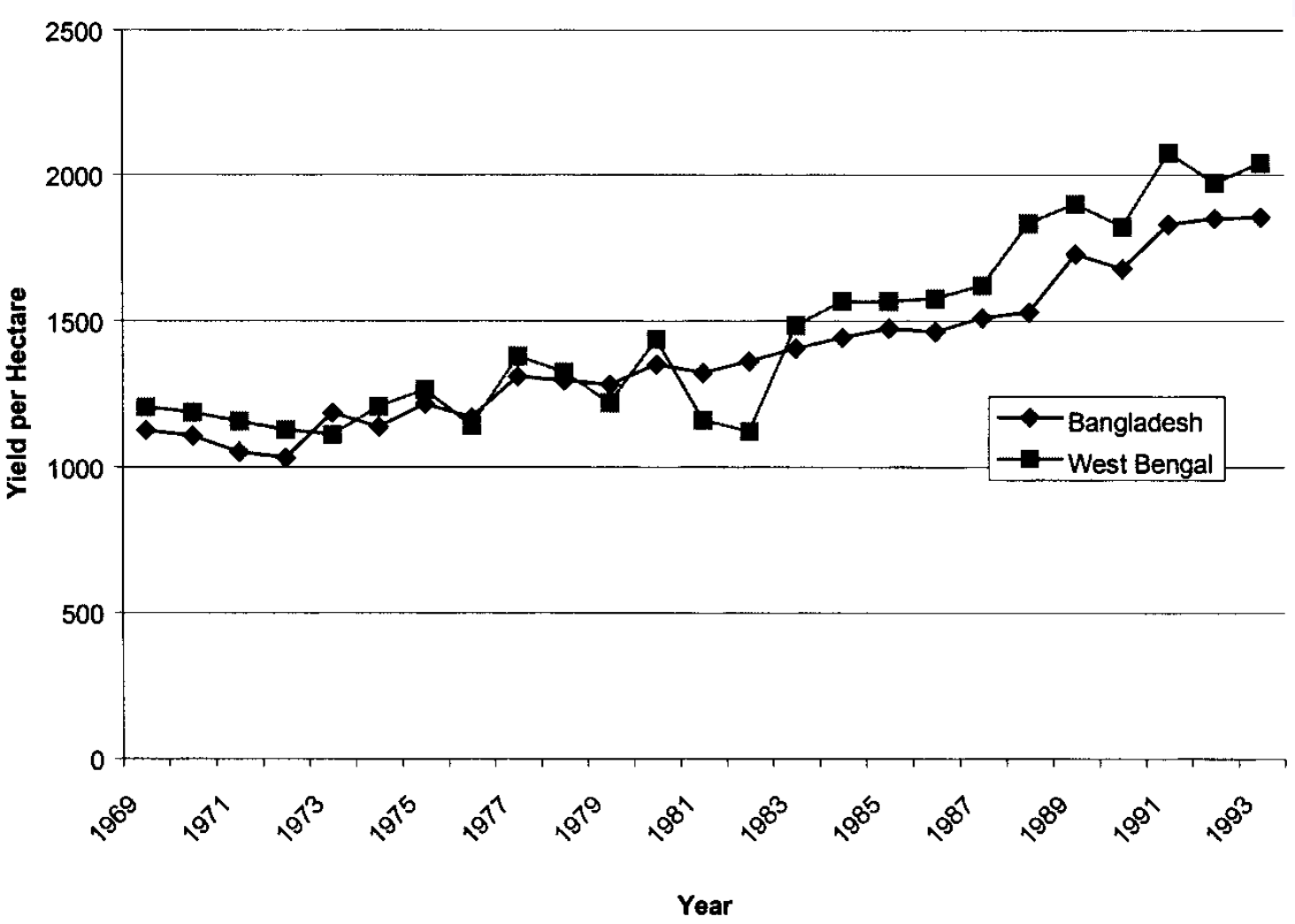


FIG. 4.—Rice yield in West Bengal and Bangladesh, 1969–93

Agricultural growth

- average annual rate of growth of food grains rose from a meagre 0.43% between 1968-81 to 5.05% between 1981-92 compared to the all India average of 1.94% and 3.08%
- Question: *What is the contribution of institutional reform?*
  - The problem in evaluation such a reform process is to find an appropriate *control group*.

Hypothesis

Impact of Operation Bagra on land productivity

Bargaining Power Effect

. . . post contract, the legal contract increases tenant's bargaining power and increases her crop share giving her ↑ incentive to work harder on the land

Security of Tenure Effect

Carrots increased incentive to make land specific investments, which could increase land productivity

Stick restricted threat of eviction, which could make tenant work less hard

Paper's survey found that eviction was used both as a *instrument for bargaining* and *incentive device*.

Justification for using Bangladesh as an control

- Before Bagra, agricultural productivity was growing at identical rates in West Bengal and Bangladesh
- Rice is the main crop in both states

Rice Yields	pre-1979	1979-93
West Bengal	9.3%	69%
Bangladesh	11%	44%

- Bengal was partitioned by the British in the 1905 but due to the high level of political unrest generated by the partition, the eastern and western parts of Bengal were reunited in 1911
- They were finally partitioned in the 1947 when West Bengal went with India and East Bengal went with Pakistan
- They speak the same language and are cultural very similar

Data: district-wise data from 14 West Bengal and 15 Bangladesh districts for the period 1969-93

Use a simple difference-in-difference model:

$$\log y_{dt} = \alpha_d + \psi_t + \beta \times \text{treatment}_d \times \text{post}_t + \Sigma_\phi X_{jdt} + \varepsilon_{dt}$$

y_{dt}: is the log rice yield per hectare in district d and year t

α_d: Fixed effect for each district

ψ_t: Fixed effect for each year

"treatment" denotes being in the *treatment group*, i.e., a district in West Bengal

"post" denotes being in the *post reform period*,

X_{jdt} are a series of control variables that vary across time and across districts.

TABLE 2
DIFFERENCE-IN-DIFFERENCE MODELS OF LOG OF RICE YIELD PER HECTARE (1969–93)

	DIFFERENCE (1969–78) (1)	LEVEL 1969–93 (2)	LEVEL Excluding 1981–82 (3)
West Bengal (=1)	.004	…	…
	(.17)		
West Bengal × (1979–83)[a]	…	- .09***	−.01
		(3.75)	(.38)
West Bengal × (1984–88)	…	.05**	.05**
		(1.99)	(2.00)
West Bengal × (1988–93)	…	.05*	.05*
		(1.77)	(1.78)
District fixed effects *F*-statistic	…	44.55	42.61
Year fixed effects *F*-statistic	4.26***	29.75***	31.81***
R^2	.12	.80	.81
Sample size	256	717	659

NOTE.—*t*-statistics are in parentheses.

[a] These variables are obtained by interacting a dummy variable that takes the value one if a district is in West Bengal and zero if it is in Bangladesh with another dummy variable that takes the value one if the observation is in the indicated time period (1979–83 in this case) and zero otherwise.

* Significant at the 10 percent level.

** Significant at the 5 percent level.

*** Significant at the 1 percent level.

Looking Within West Bengal

more direct method – focus only on West Bengal districts

estimating the following equation

$$\ln y_{dt} = \alpha_d + \psi_t + \delta b_{dt-1} + \sum_k \beta_k + \ln X_{jdt} + \varepsilon_{dt}$$

b_{dt} percentage of sharecroppers registered or the registration rate in district d at time t – this captures program intensity

X_{jdt} Vector of controls

TABLE 5
EFFECT OF REGISTRATION ON THE LOG OF RICE YIELD IN WEST BENGAL, 1979–93
(N=210)

	Model 1 (1)	Model 2 (2)	Model 3 (3)	Model 4 (4)	Model 5 (5)	Model 6 (6)
Sharecropper registration (one year lagged)	.43*** (3.46)	.42*** (3.44)	.43*** (3.55)	.35*** (2.69)	.36*** (2.64)	.36*** (2.63)
Log(rainfall)	…	−.07* (−1.67)	−.08* (−1.82)	−.07 (−1.59)	−.08* (−1.74)	−.08* (−1.77)
Log(public irrigation)	…	.02 (1.01)	.01 (.70)	.01 (.60)	.02 (.83)	.02 (.79)
Log(roads)	…	.28*** (2.75)	.25** (2.46)	.21** (1.99)	.19 (1.55)	.22 (1.54)
HYV share of rice area	…	…	.57*** (2.85)	.45** (2.10)	.47** (2.16)	.47** (2.16)
F-statistic:						
South × year[a]	…	…	…	4.73***	4.36***	4.38***
Left Front × year[b]	…	…	…	…	2.64**	2.65**
Sharecropping × year[c]	…	…	…	…	2.64**	.12
District fixed effects	72.23***	15.10***	8.99***	9.01***	8.47***	7.68***
Year fixed effects	28.31***	27.67***	21.60***	17.63***	17.83***	12.17***
R^2	.91	.92	.92	.92	.92	.92

NOTE.—*t*-statistics are in parentheses.
[a] Represents a set of variables obtained by interacting a dummy variable that takes the value one if that district is in southern West Bengal with each year.
[b] Represents a set of variables obtained by interacting a dummy variable that takes the value one if that district had a Left Front majority at the local-level government in 1977 with each year.
[c] Represents a set of variables obtained by interacting the initial extent of sharecropping in a district with each year.
* Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

Property Rights Reform in China

- After a long phase of slow growth in agricultural productivity during the era of socialist economic policies
- very sharp growth in the late seventies coinciding with liberalization program initiated under the reformist leadership of Deng Xiaopeng
- one of biggest experiments in changing property rights ever attempted

EXPLANATIONS

1. Institutional Reform

- De-collectivisation of production teams
- Adoption of household responsibility system (HRS)?
- Return to household farming
- Household became residual claimant to effort put in
- Switch almost complete by 1983

2. Price Reform

- Procurement prices for compulsory delivery quotas raised in 1979 (by as much as 20% for grain)
- Better production incentives for households
- Higher premium for above quota delivery
- Prices of public-sector produced manufacturing goods used by the agricultural sector had been reduced.

3. Market Reform

- Looser regulations on private interregional trade
- Deregulation of entry for private traders
- Cutting down of procurement quotas
- Reduced number of agricultural products included in agricultural planning
- Explosion in growth of private markets and changes in composition of production
- China was no longer managed as one big input-output table

TABLE 3—HRS, CROP PATTERN, AND CROPPING INTENSITY

Year	Household responsibility system (1)	Sown area (percentage)			Multiple cropping index (percentage) (5)
		Grain crops (2)	Cash crops (3)	Other (4)	
1970	0	83.1	8.2	8.7	141.9
1971	0	83.1	8.2	8.7	144.7
1972	0	81.9	8.5	9.6	147.0
1973	0	81.6	8.6	9.8	148.2
1974	0	81.4	8.7	9.9	148.7
1975	0	81.0	9.0	10.0	150.0
1976	0	80.6	9.2	10.2	150.6
1977	0	80.6	9.1	10.3	150.5
1978	0	80.4	9.6	10.0	151.0
1979	0.01	80.3	10.0	9.7	149.2
1980	0.14	80.1	10.9	9.0	147.4
1981	0.45	79.2	12.1	8.7	146.6
1982	0.80	78.4	13.0	8.6	146.7
1983	0.98	79.2	12.3	8.5	146.4
1984	0.99	78.3	13.4	8.3	146.9
1985	0.99	75.8	15.6	8.6	148.4
1986	0.99	76.9	14.1	9.0	150.0
1987	0.99	76.8	14.3	8.9	151.3

Note: Column 1 indicates the proportion of production teams in China that had adopted the household-responsibility system.

Sources: The data for column 1, 1979–1981, are from *Economic Weekly News* [*Jingji-xue Zhoubao*] (11 January 1982). Figures for 1982–1984 are taken from *China Agricultural Yearbook* (1984 p. 69, 1985 p. 120). Figures for 1985–1987 are inferred from the fact that no major change has occurred in the farming institution since 1984. Columns 2–5 are taken from Ministry of Agriculture Planning Bureau (1984 p. 132, 1989 pp. 130–1, 335–7) and *China Statistical Yearbook* (1988 pp. 224, 243, 276).

TABLE 2—PRICE INDEX (1978 = 100)

Year	State above-quota price index (1)	Rural-market consumer price index (2)	Rural industrial-product price index (3)	Ratio of state above-quota price to industrial-product price index (4)	Ratio of market price to industrial-product price index (5)
1970	97.2	80.4	101.9	95.4	78.9
1971	98.4	87.4	100.4	98.0	87.1
1972	98.4	94.6	99.8	98.6	94.8
1973	98.1	99.6	99.8	98.3	99.8
1974	98.4	101.4	99.8	98.6	101.6
1975	98.7	105.5	99.8	98.9	105.7
1976	99.4	109.7	99.9	98.5	109.8
1977	100.0	107.0	100.0	100.0	107.0
1978	100.0	100.0	100.0	100.0	100.0
1979	140.7	95.5	100.1	140.4	95.4
1980	140.4	97.4	100.9	139.2	96.5
1981	145.1	103.0	101.9	142.3	101.1
1982	144.3	106.5	103.6	139.3	102.8
1983	144.9	110.9	104.6	138.6	106.1
1984	142.5	110.5	107.8	132.1	102.5
1985	129.4	129.5	111.3	116.2	116.3
1986	130.1	140.0	114.9	113.3	121.9
1987	130.2	162.8	120.4	108.1	135.2

Sources: See Appendix.

Evaluation of Impact of Reforms

Panel data set consisting of observations for 28 of the 29 provinces of mainland China for the period 1970-87

Province-year observations – Roughly 28 x 18 = 504 observations

Panel data – same unit (province) followed over time

Data on the following variables (subscripts refer to province i and year t):

Y_{it} value of crop output in (using official 1980 prices as weights)

X_{1it} area of land cultivated

X_{2it} size of labor force

X_{4it} gross weight of fertilizer consumed

N_{Git} percentage of total sown area in non-grain crops

M_{Cit} multiple cropping index

HRS_{it} ratio of teams in province i converted to the HRS by the end of year t

GP_{it} index of above quota prices relative to manufacturing input prices

MP_{it} index of market prices of crops relative to manufacturing input prices

With a Cobb-Douglas production function of the following form:

$$Y_{it} = A_{it}\Pi_{k=1}^{4} X_{kit}^{\gamma k}$$

where the productivity parameter A_{it} depends on the institutional variables.

The equation to be estimated is the following:

$$\ln Y_{it} = \alpha_i + \alpha_t^{'} + \beta_1 HRS_{it} + \beta_2 GP_{it} + \beta_3 MP_{it} + \beta_4 NG_{it} + \beta_5 MC_{it} + \Sigma_4^{k=1} \gamma k X_{kit} + \varepsilon_{it}$$

where α_i is a province-specific intercept and $\alpha_t^{'}$ is a year-specific intercept.

TABLE 5—ESTIMATES OF PRODUCTION AND SUPPLY RESPONSE FUNCTION (DEPENDENT VARAIBLE = LN(VALUE OF CROP OUTPUT IN CONSTANT PRICES)

	One-way fixed-effects		EGLS			Two-way fixed-effects
Explanatory variable	OLS (1)	Stochastic frontier (2)	(3)	(4)	(5)	(6)
ln(Land)	0.65 (0.07)	0.59 (0.05)	0.67 (0.04)	0.67 (0.04)		0.58 (0.09)
ln(Labor)	0.14 (0.03)	0.11 (0.03)	0.14 (0.02)	0.13 (0.01)		0.15 (0.03)
ln(Capital)	0.037 (0.040)	0.057 (0.034)	0.050 (0.027)	0.070 (0.015)		0.10 (0.04)
ln(Fert)	0.18 (0.02)	0.18 (0.02)	0.20 (0.01)	0.19 (0.01)		0.17 (0.02)
Proportion in household farming (HRS)	0.19 (0.03)	0.22 (0.03)	0.19 (0.01)	0.20 (0.01)	0.18 (0.01)	0.15 (0.05)
(Market price)/(input price) at time $t-1$ (MP_{t-1})	0.00038 (0.00123)	0.0010 (0.0013)	0.00051 (0.00061)		0.0034 (0.0007)	
(Government price)/ (input price) at time t (GP_t)	−0.00067 (0.00055)	−0.00054 (0.00059)	−0.00058 (0.00035)		0.0021 (0.0004)	
Multiple cropping index (MCI)	0.0020 (0.0009)	0.0018 (0.0011)	0.0015 (0.0006)	0.0020 (0.0006)		0.0020 (0.0008)
Percentage of nongrain crops (NGCA)	0.0067 (0.0023)	0.0093 (0.0023)	0.0068 (0.0015)	0.0078 (0.0013)		0.0078 (0.0022)
Time trend (T)	0.0065 (0.0065)	0.0005 (0.0068)	0.0028 (0.0042)		0.021 (0.003)	
Regional dummies	yes	yes				yes
Time dummies						yes
Adjusted R^2:	0.961					0.966
Log likelihood:		430.35				
$R_{it,it-1}$:	−0.15					

Notes: Numbers in parentheses are standard errors or estimated asymptotic standard errors. The estimated coefficients of 27 provincial dummies in columns 1, 2 and 6, and of 16 year dummies in column 6 are not reported.

KEY RESULTS

- Comparing columns (1) and (5) of Table 5, where in the Column (1) the previous equation is estimated while in Column (5) the same equation is estimated dropping all explanatory variables except for the institutional ones, i.e., HRS_{it};GP_{it} and MP_{it}, we see that:
  - β_1 is significantly positive and ratheroughly the same in both estimates which indicates the *HRS* affected the production by augmenting efficiency rather than through greater use of inputs
  - β_2 and β_3 are significantly positive only if the inputs are dropped, so market and price reforms worked mainly through increasing input use
  - Output grew by 42% between 1978 and 1984 and of this, 42% is attributed to the *HRS*, 16% to price reform, 30% to a time trend and 12% remains unexplained

New Institutional Economics

R.C.O. Mathew's pronouncement on New Institutional Economics (NIE)

- institutions matter
- determinants of institutions can be analysed by tools of economic theory

COASIAN VIEW OF THE WORLD

A private system cannot function properly unless property rights are created in resources and when this is done, someone wishing to use the resources has to pay the owner to obtain it.

Chaos disappears; and so does the government, except that a legal system to define property rights and arbitrate disputes is, of course, necessary. *Coase (1959, p12)*

- Government steps aside after

  property rights defined &
  enforcement assured.

- Market allocates resources to its highest value

PROPERTY RIGHT LITERATURE: *Strength & Weakness*

Strengths

- brings property rights to the forefront
- innovative property rights idea contribute to development debate

Weakness

- tall claims
- chaos eliminated by defining and enforcing property rights

- Property rights align the ex ante incentives

... other institutions and initial conditions interact with property rights

  - land-less labourers ...
  - poverty traps ...