Introduction: Redistribution, Growth and Welfare

EC307 Economic Development

Dr. Kumar Aniket

University of Cambridge & LSE Summer School

Lecture 1

READINGS

Tables and figures in this lecture are taken from:

Chapters 1 & 2 of Ray (1998)

Basu, K. and Maertens, A. (2007). The pattern and causes of economic growth in India. *Oxford Review of Economic Policy*, 23: 143-167.

Collier, P. and Gunning, J. (1999). Why Has Africa Grown Slowly? *Journal of Economic Perspectives*, 13:2, Summer. pp. 3-22.

Banerjee, A.V. and Duflo, E. (2007). The Economic Lives of the Poor. *The Journal of Economic Perspectives*. 21(1):141–167

- **Class based on** Besley, T. and Burgess, R. (2003). Halving Global Poverty. *The Journal of Economic Perspectives*, 17(3):3–22.

INTRODUCTION

- This course will give you a comprehensive overview of the field of development economics
- Framework: Understand how tools of economic public policy can be used to improve economic performance and social welfare in low income countries
- We will focus on the key areas of public policy debate

The Economic Lives of the Poor

Based on household surveys conducted in 13 countries

The *poor* were identified as those living in households with consumption per capita less that $1.08 per person per day and well as *merely poor*, those living under $2.16.

PATTERNS

- Typical poor family tends to be *large* with 6 to 12 family members
- Young to Old ratio within families high – between 3 and 9
- Food represents $\frac{1}{2}$ to $\frac{3}{4}$ of total consumption
  - Poorest spend $\frac{1}{2}$ of a marginal dollar to get more calories and $\frac{1}{2}$ to purchase more expensive calories

Land

- Land ownership varies tremendously across the world
  - Apart from land, the poor own very few other assets
  - many operate their own businesses without *any productive assets*
  - capital constraint
- *Land reforms*
- *Financial instruments*

Health

- The pattern is a remarkably high level of morbidity

  While the poor certainly feel poor, their levels of self-reported hapiness or self reported health levels are not particularly low
  Banerjee, Duflo & Deaton (2004)

- *Health Policy*

EDUCATION

- Low level of household expenditure on education
  - Children from poor household normally attend non-fee charging schools, which often tend to be dysfunctional
- *Education Policy*
  - absent teachers and incentives to attract able teachers
  - infrastructure within school and around the school
  - *Teacher absenteeism tends to be low in schools easily accessible by roads*

ENTREPRENEURSHIP

- Substantial fraction of poor acts as entrepreneurs
  - raise capital, invest, are full residual claimant of earnings
- Pattern of multiple occupation – agriculture is often not the only occupation
  - diversify risks
  - lack of specialisation has costs
  - businesses run on small scale
- *Temporary migration* for work is common though *permanent migration* is not

Savings and Credit

- High proportion have loans from informal source but very few have loans from formal institution
  - credit from informal source is expensive
  - high interest rate reflect the cost of screening, monitoring, and enforcement and not the cost of default
  - delay in repayment is frequent, default is rare
- Lack of saving instruments
  - participation in semi-formal saving institutions not as common as expected
- *Financial Market Intervention*

INSURANCE

- Lack of formal and informal insurance from the social networks.
  - Informal insurance has a limited ability to protect households from risks – consumption of household strongly affected by variation in their own income
  - Townsend (1994) shows limited informal insurance in Indian Villages
- Availability of physical infrastructure varies quite a lot
  - Access to public goods or infrastructure greater for the urban than rural poor
  - Cost of essentials vary a lot between areas
- Components of an effective *Welfare State*

Economic Growth

Is there some action a government of India could take that would lead the Indian economy to grow like Indonesia's or Egypt's? If so, what exactly? If not, what is it about the "nature of India" that makes it so? The consequences for human welfare involved in questions like these are simply staggering. Once starts to think about them, it is hard to think about anything else.

- Robert E. Lucas (1985)

Bottom Billion

. . . there is a group of countries at the bottom that are falling behind, and often falling apart . . . countries at the bottom exist with the 21st century, but their reality is the fourteenth century: civil war, plague, ignorance. They are concentrated in Africa and Central Asia, with a scattering elsewhere.

Paul Collier (2007)

Aggregate Production Function

Aggregate Production Function:

$$Y_t = A_t K_t^{\alpha} H_t^{\beta} L_t^{(1-\alpha-\beta)}$$

$$\Rightarrow \quad \frac{Y_t}{L_t} = A_t \left(\frac{K_t}{L_t}\right)^{\alpha} \left(\frac{H_t}{L_t}\right)^{\beta}$$

Output Y_t at time period t depends on

- K_t capital,
- H_t the human capital
- L_t labour
- A_t technology and other *residual* things

Aggregate Production Function

Aggregate Production Function:

$$Y_t = A_t K_t^{\alpha} H_t^{\beta} L_t^{(1-\alpha-\beta)}$$

$$\Rightarrow \quad \frac{Y_t}{L_t} = A_t \left(\frac{K_t}{L_t}\right)^{\alpha} \left(\frac{H_t}{L_t}\right)^{\beta}$$

where A_t is the technology, K_t the capital, H_t the human capital and L_t the labour at time period t.

Aggregate production function suggests that

- $\Delta\left(\frac{Y_t}{L_t}\right)$ differences in per capita income across countries are due the following differences
- ΔK_t capital stocks (includes public capital)
- ΔH_t human capital stocks
- ΔA_t difference in technology

Almost impossible to measure stocks accurately, but national accounts try to do so.

K_t *Capital stock:* the total stock of capital used in production of goods and services in the economy

L_t *Labour force:* all the workers matched with capital in the economy

H_t *Human Capital stock:* Education and skill level of the workforce

A_t *Technology:* reduced form representative of everything that leads to differences between economies that cannot be explained by differences in stocks of K, L and H. Includes

- efficiency of resource allocation
- institutions
- government

Algebra of Growth Rates

Example. If k, m and n are linked in the following way

$$k_t = B \cdot \left(\frac{m_t^{\theta} n_t^{\lambda}}{l^{\psi}} \right)$$

their growth rates would be

$$\left(\frac{\Delta k}{k} \right) = \theta \left(\frac{\Delta m_t}{m_t} \right) + \lambda \left(\frac{\Delta n_t}{n_t} \right) - \psi \left(\frac{\Delta l_t}{l_t} \right)$$

$$g_k = \theta g_m + \lambda g_n - \psi g_l$$

- If variable multiplied, growth rates get added up
- Powers become coefficient
- Constant disappear

GROWTH RATE OF THE RESIDUAL

Since technology is the least well measured, it is often treated as the *residual component* in growth, i.e., the component which does not come from growth in K_t, H_t and L_t.

$$\left[\frac{\Delta A_t}{A_t}\right] = \left[\frac{\Delta Y_t}{Y_t}\right] - \alpha\left[\frac{\Delta K_t}{K_t}\right] - \beta\left[\frac{\Delta H_t}{H_t}\right] - (1-\alpha-\beta)\left[\frac{\Delta L_t}{L_t}\right]$$

$$g_A = g_Y - \alpha g_K - \beta g_H - (1-\alpha-\beta)g_L$$

g_A Solow residual: measures productivity growth in the economy (or a sector of the economy)

INCOME PER-CAPITA

GDP per capita (constant 1995 USD)	1960	1980	2000	Growth *
East Asia & Pacific	150	297	948	4.8%
OECD	9,944	19,666	29,888	2.7%
Latin America & Caribbean	1,985	3,525	3,811	1.4%
Middle East & North Africa	..	2,072	2,050	0.2%
South Asia	186	240	460	2.4%
Sub-Saharan Africa	477	660	567	0.5%

* Average annual growth rate 1960-2003 (1975-2000 for ME&NA)
Source: World Development Indicators

POVERTY

- Many ways of measuring poverty.
- One of the most common way is to study the proportion of the population with incomes below a particular poverty line z

$$P = \frac{\#(i : y_i \leqslant z)}{(\text{total population})}$$

- The objective of the Millennium Development Goals (based on a \$1 day poverty line) is to *halve* the proportion of people living below \$1 a day from around 30% (of the developing world's population) in 1990 to 15% by 2015.

Galapagos Ecosystem

Near the end of *The Origin of Species*, Charles Darwin wrote, reflecting on the Galapagos Islands:

> *[The plants and animals of the Galapagos differ radically among islands that have] the same geological nature, the same height, climate, etc . . . This long appeared to me a great difficulty, but it arises in chief part from the deeply seated error of considering the physical condition of a country as the most important for its inhabitants; whereas it cannot, I think, be disputed that the nature of the other inhabitants, with which each has to compete, is at least as important, and generally a far more important element of success.* (Darwin [1859] 1993: 540)

Halving Global Poverty

Where do the Poor Live? See *Table 1: Poverty around the World*

- Main concentrations of the poor are in Sub-Saharan Africa, East Asia and South Asia
- 1990-1998:

  East Asia's poverty rate ↓ from 27.58% to 15.32% (44%↓)

  … absolute numbers ↓ from 452 to 278 (38%↓) million

  … China has made significant strides in reducing poverty

- **Impressive** – the region has come *close to halving the proportion in poverty* over 8 years – 15 years ahead of schedule
- they represent the largest fall in poverty ever witnessed in history and have led to referred to a "miracle" taking place in East Asia.

Table 1

Poverty Across the Globe

	Population Living Below $1.08 a day (1993 Purchasing Power Parity)									
	Poverty Rate (% Below $1.08)					*Number of Poor (1,000,000)*				
	1987	*1990*	*1993*	*1996*	*1998*	*1987*	*1990*	*1993*	*1996*	*1998*
East Asia & Pacific	26.6	27.6	25.2	14.9	15.3	415	452	432	265	278
(exclude China)	22.9	15.0	12.4	8.1	9.6	109	76	66	45	56
East Europe & Central Asia	0.2	1.6	3.9	5.1	5.1	1	7	18	24	24
Latin America	15.3	16.8	15.3	15.6	15.6	64	74	71	76	78
Middle East & North Africa	11.5	9.3	8.4	7.8	7.3	25	22	21	21	21
South Asia	44.9	44.0	42.4	42.3	40.0	474	495	505	532	522
sub-Saharan Africa	46.6	47.7	49.7	48.5	46.3	217	242	273	289	291
Total	28.7	29.3	28.5	24.9	24.3	1196	1293	1321	1207	1214
Total (exclude China)	29.6	29.3	28.5	28.2	27.3	891	916	955	987	991

Source: Table extracted from ⟨http://www.worldbank.org/research/povmonitor/⟩ on July 08, 2002.

Sub-Saharan Africa (1990-98)

- Completely different
  - Poverty rates remained stagnant – 47.67% to 46.30%
  - Absolute numbers in poverty increased from 242 to 291 million
  - No sense in which sub-Saharan Africa is on route to achieving the Millennium Poverty Reduction Goals - if anything it is threatening to go in the opposite direction
- This African tragedy stands in stark contrast with the East Asian miracle.

South Asia (1990-98)

- In between East Asia's and sub-Saharan Africa's situation
  - Poverty rates ↓ from 44.01% to 39.99%
    Absolute numbers in poverty ↑ from 495 to 522 million
- Between 1990 and 1998, the proportion of world's poor living in South Asia and sub-Saharan Africa has ↑ from 57% to 67% whereas the proportion living in East Asia has ↓ from 35% to 23%
- based on this evidence, South Asia, which has the largest concentration of poor people, *cannot be deemed to be "on track"* in terms of halving the proportion in poverty by 2015

- Poverty varies strongly over space and time (Table 1)
  - suggests that the factors which affect poverty are also time & space varying.
  - This pattern is difficult to square with some fixed effect argument, whether this has to do with resource endowments, disease burden, geography or societal norms.
- Political and social factors are clearly at work
  - these institutional factors affect not only the rate of capital accumulation but also the willingness and power to redistribute towards the poor.
  - The *divergent trends*, for example, in East Asia and sub-Saharan Africa, are a function of the policy and institutional reforms implemented in the countries that make up those regions.

- Role of modern economics is to identify the policy and the institutional reforms that are capable of attacking poverty
- Or put differently, as the argument cuts both ways, we want to identify policy and institutional choices that keep countries or regions poor.
- Backwardness and poverty do not have to be taken as a fact of life. There is real scope to confront them and over reasonable time periods.
- Period of huge potential - *major role for economic policy analysis*

Poverty & Growth

Are the millennium development goals achievable?

Run a regression of the form:

$$\log P_{it} = \theta_i + \eta \log \mu_{it} + \varepsilon_{it}$$

where

- P_{it} is the head-count poverty rate for country i at time t based on the \$1 a day poverty line
- θ_i is a country i's fixed effect
- μ_{it} is the country i's real per-capita national income at time t
- ε_{it} is the error term
- η is the *elasticity* of *poverty* with respect to *income per capita*

$$\eta = \frac{\%\text{ change in } P}{\%\text{ change in } \mu} \tag{1}$$

Table 2

Growth and Poverty Across the Globe, 1990–2015

	Whole Sample	*East Asia and Pacific*	*Eastern Europe and Central Asia*	*Latin America and Carribean*	*Middle East and North Africa*	*South Asia*	*Sub-Saharan Africa*
Elasticity of poverty with respect to income per capita	−0.73 (0.25)	−1.00 (0.14)	−1.14 (1.04)	−0.73 (0.29)	−0.72 (0.64)	−0.59 (0.36)	−0.49 (0.23)
Annual growth rate needed to halve world poverty by 2015	3.8%	2.7%	2.4%	3.8%	3.8%	4.7%	5.6%
Historical growth 1960–1990	1.7%	3.3%	2.0%	1.3%	4.3%	1.9%	0.2%
Total growth needed to halve world poverty by 2015	95%	70%	61%	94%	95%	117%	141%

Source: Authors' calculations—see ⟨http://econ.lse.ac.uk/staff/tbesley/hgp⟩ for details.
Notes: Robust standard errors in parenthesis.

Redistribution and Poverty

We can examine how inequality affects poverty to get a handle on whether redistribution might be a route for reducing poverty

Run a regression of the form:

$$\log P_{it} = \theta_i + \eta \log \mu_{it} + \beta \sigma_{it} + \varepsilon_{it}$$

where

- σ_{it} is income inequality for country i at time t measured by the standard deviation of the income distribution in logs
- β turns out to be positive and significant.
  (See Table 3: Inequality and Poverty Reduction)
- reducing inequality can reduce poverty

Table 3

Inequality and Poverty Reduction

	Whole Sample	*East Asia and Pacific*	*Eastern Europe and Central Asia*	*Latin America and Carribean*	*Middle East and North Africa*	*South Asia*	*Sub-Saharan Africa*
Standard deviation of income distribution in logs	0.76 (0.24)	0.72 (0.11)	0.54 (0.15)	0.98 (0.16)	0.67 (0.12)	0.59 (0.06)	0.86 (0.22)
Poverty decline after a one standard deviation reduction in inequality	67%	31%	42%	45%	34%	17%	62%

Source: Authors' calculations—see ⟨http://econ.lse.ac.uk/staff/tbesley/hgp⟩ for details.
Notes: Standard deviation in parenthesis.

Table 4

Social Infrastructure, Expropriation Risk and Poverty Reduction

	Whole Sample	*East Asia and Pacific*	*Eastern Europe and Central Asia*	*Latin America and Carribean*	*Middle East and North Africa*	*South Asia*	*Sub-Saharan Africa*
Percentage of required poverty reduction achieved by a one standard deviation change in risk of expropriation	240%	294%	240%	213%	250%	210%	118%
Percentage of required poverty reduction achieved by a one standard deviation change in social infrastructure	52%	114%	28%	36%	61%	39%	22%

Source: Authors' calculations—see ⟨http://econ.lse.ac.uk/staff/tbesley/hgp⟩ for details (1999).

Growth, Poverty and Inequality in India

- Data for 16 main states of India over the period 1960-2000
- these 16 states account for over 95% of Indian population
- Suggestions that states that experienced greater *structural transformation* and *economic growth* experience more rapid *reductions in poverty*
- real agricultural output per capita relatively flat over period

  $\Rightarrow$ growth in agricultural output basically keeps track with growth in population

Growth, Poverty and Inequality in India

- real non-agricultural output per capita begins to diverge from agricultural output around mid-1970s
- but pattern highly varied across states
  - ↓ Assam, Bihar, Jammu and Kashmir, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh had *limited structural change* and *economic growth*, they are *backward states* with poor economic and social indicators
  - ↑ Andhra Pradesh, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu, West Bengal - they are *modern states* with *good economic* and *social indicators*
- pattern even more marked when we look *registered* and *unregistered manufacturing* and *services sector*.

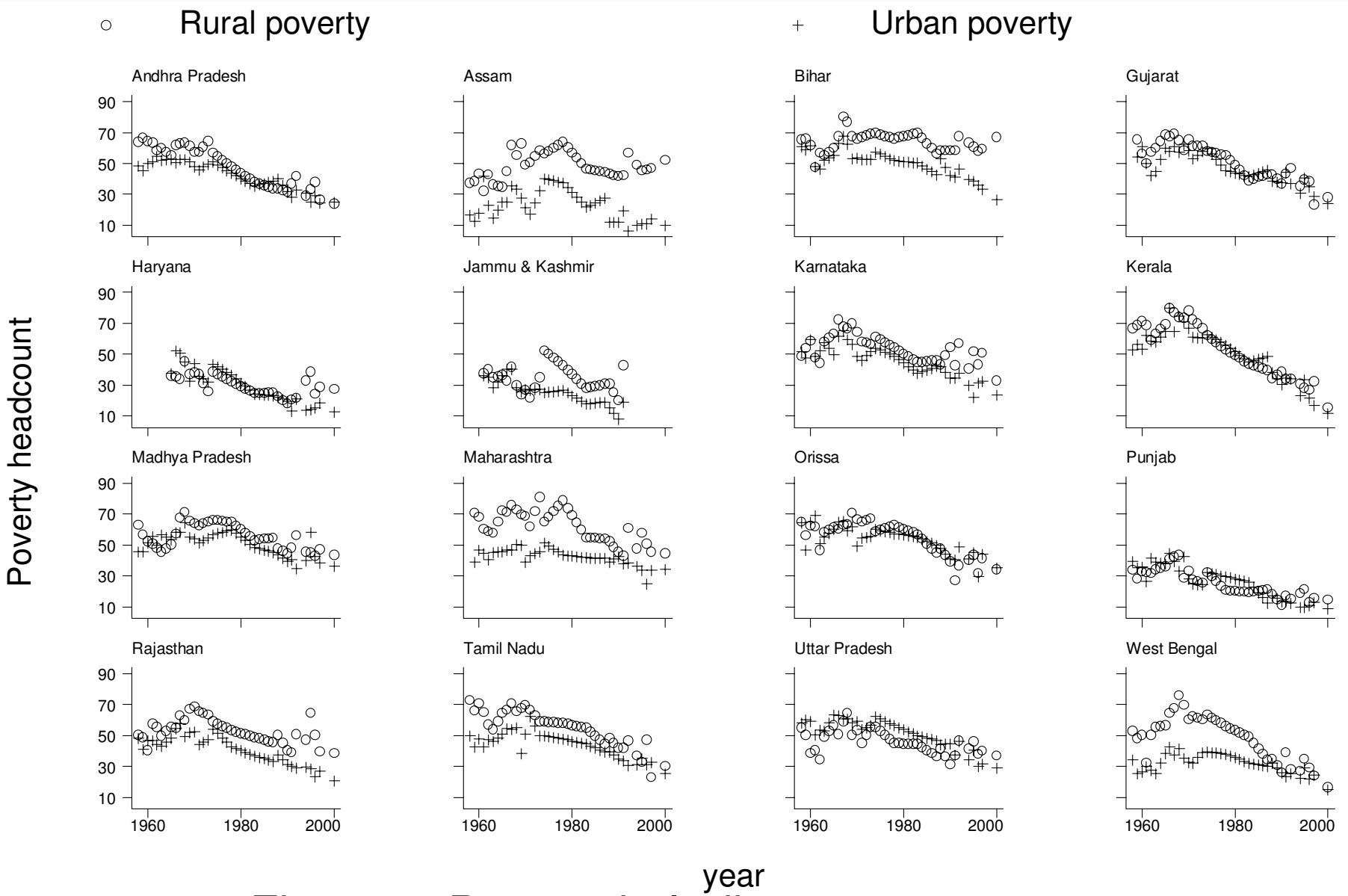

Figure 5: Poverty in Indian states: 1958-2000

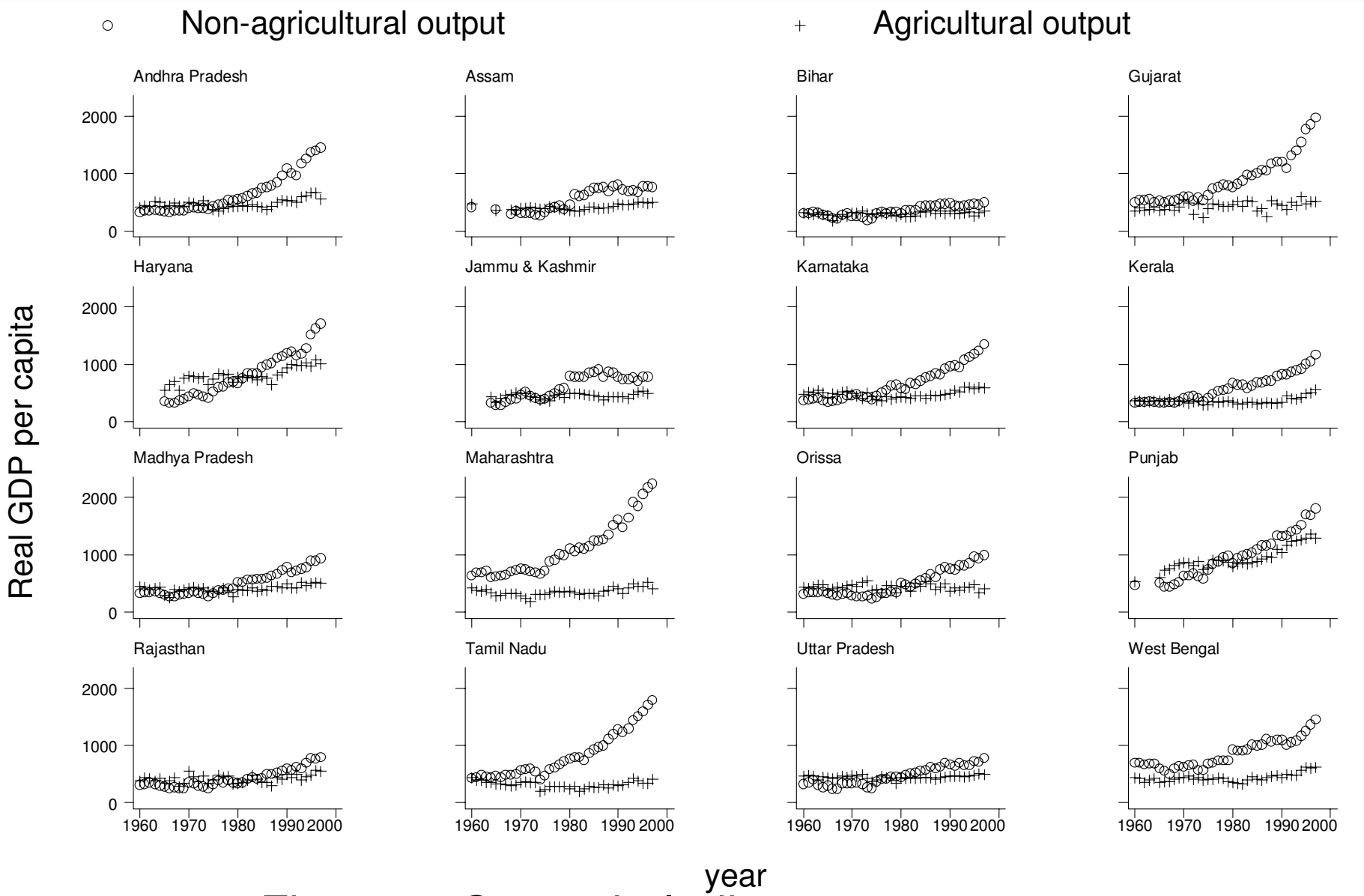

Figure 6: Output in Indian states: 1960-1997

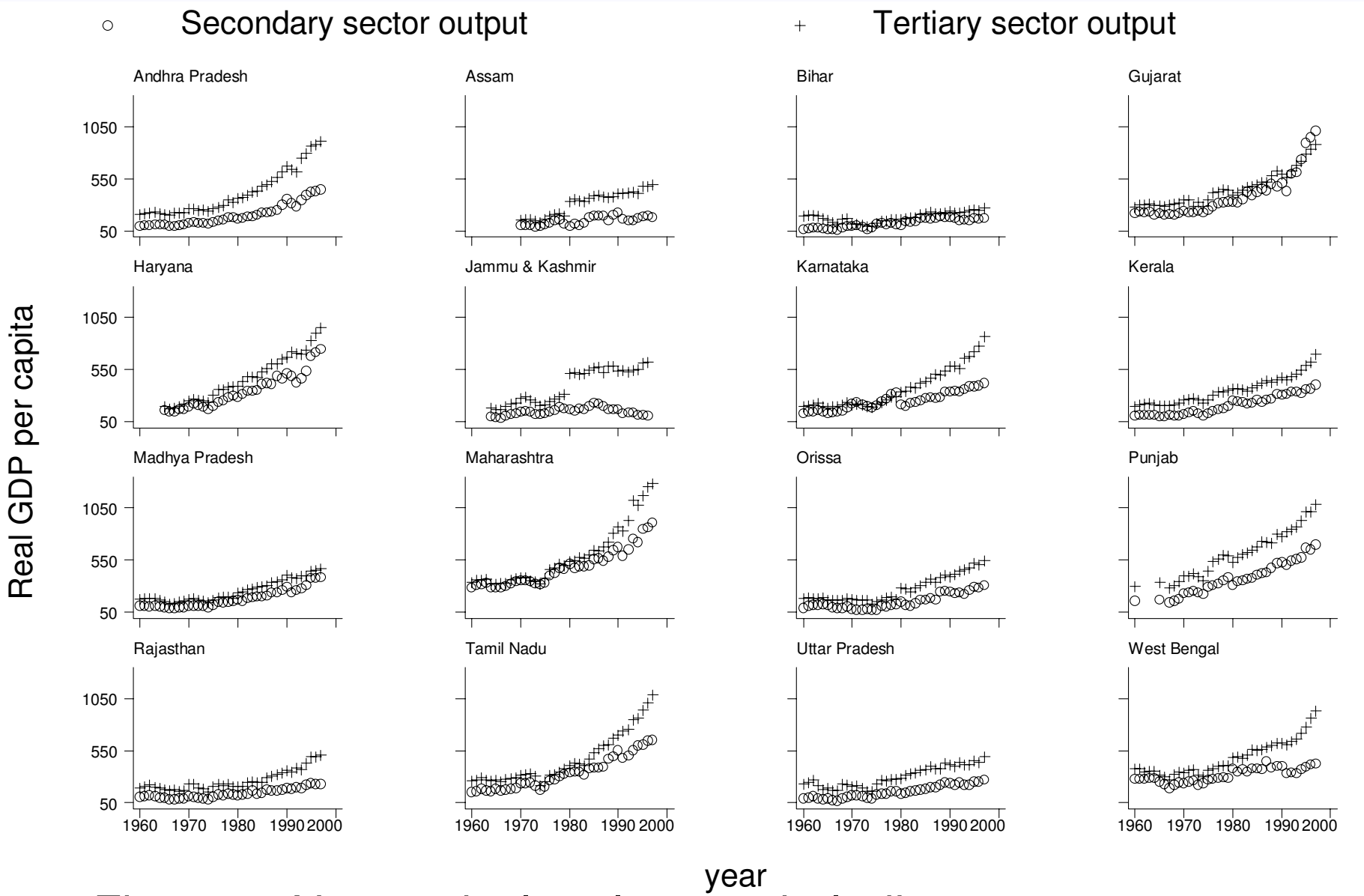

Figure 7: Non-agricultural output in Indian states: 1960-1997

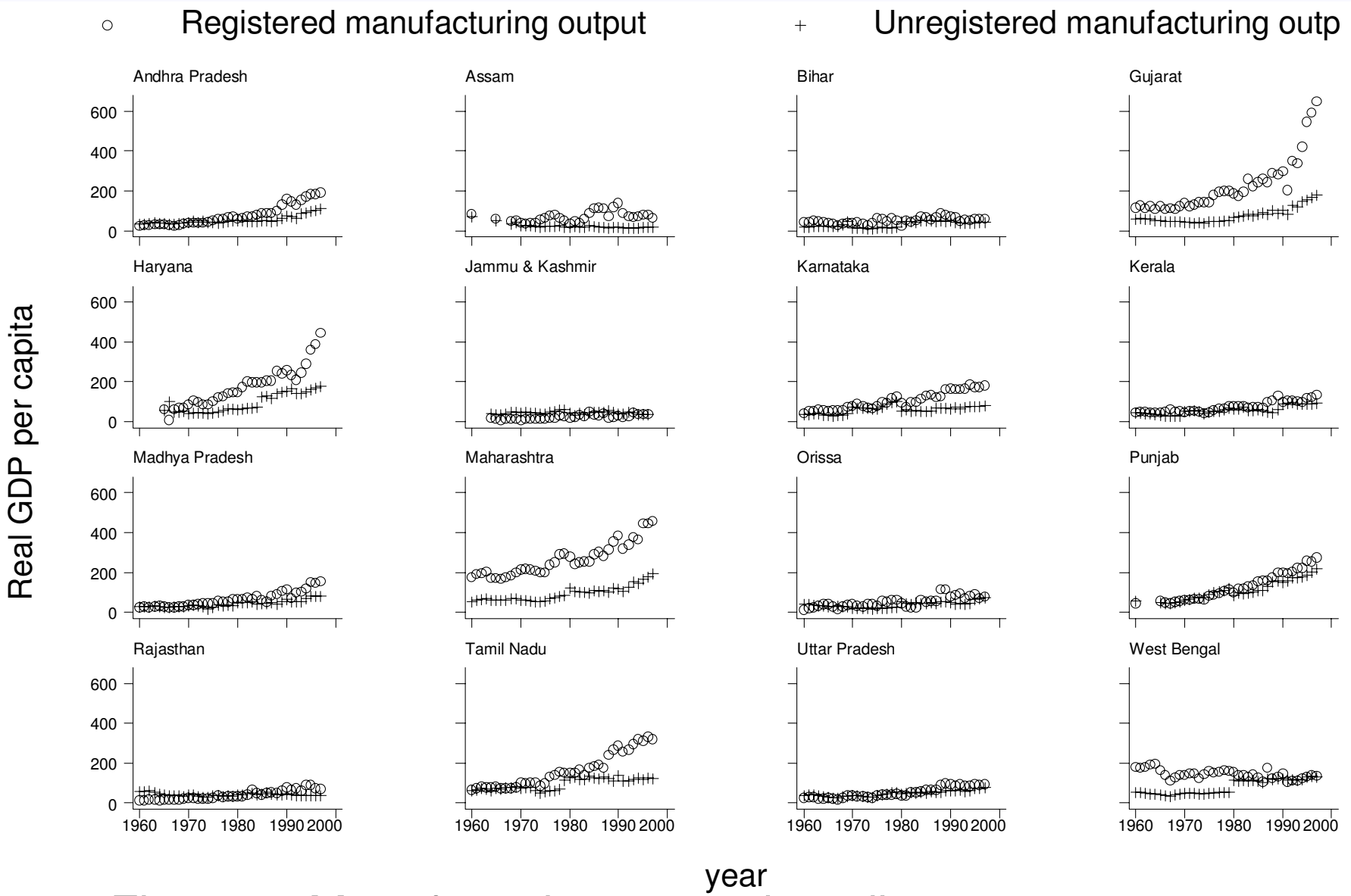

Figure 8: Manufacturing output in Indian states: 1960-1997

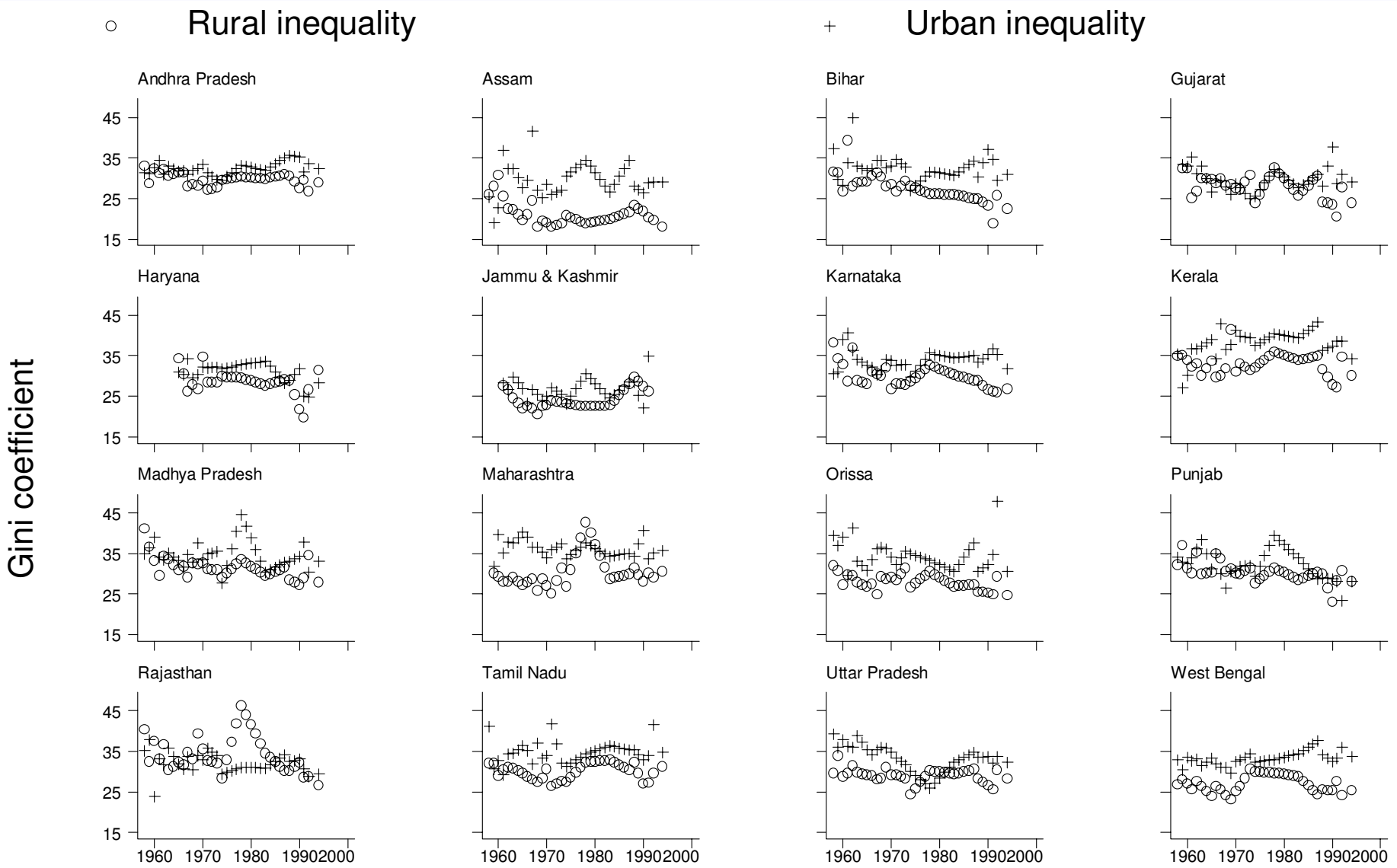

Figure 9: Inequality in Indian states: 1958-1994

Table 9: Poverty-growth regressions for aggregate India (1960-97)

Dependent variable: log of poverty headcount						
	(1)	(2)	(3)	(4)	(5)	(6)
log real GDP per capita	-0.372		-0.37		-0.326	-0.628
	[0.059]**		[0.063]**		[0.063]**	[0.193]**
diversification (non-ag GDP/ag GDP)		-0.004	-0.004			
		[0.0017]**	[0.0017]**			
standard deviation of log income				-0.044	0.091	-3.84
				[0.148]	[0.144]	[2.373]
log real GDP per capita* std deviation of log income						0.574
						[0.345]
constant, state, year fixed effects	YES	YES	YES	YES	YES	YES
Number of observations	568	568	568	562	523	523
R-squared	0.87	0.87	0.88	0.85	0.88	0.88

Notes: Robust standard errors are in parentheses. * significant at 5% level; ** significant at 1% level.

Some Interesting Correlations

↓ in **poverty** associated with

- ↑ in *income*
- ↑ *structural change* as proxied by share of non-agricultural output in total output

  ↑ *non-agricultural output*
  limited relationship with *agricultural output*

- uncorrelated with *inequality*

  … but some evidence that *lower inequality* heightens the *poverty impact of economic growth*

- **rural poverty** inversely correlated with *unregistered manufacturing and services*
- **urban poverty** inversely correlated with *registered manufacturing*

Comparative Poverty Reduction Experiences

- Examine the link between poverty and income per capita in different Indian states - by describing the data using 16 time series regressions of the form:

$$p_{st} = \alpha_s + \beta_s y_{st} + \varepsilon_{st}$$

where p_{st} = log of poverty head count; y_{st} = log of income per capita.

- the "explained" component of poverty reduction between any two time periods is:

$$\Delta \hat{p}_{st} = \beta_s g_s = \beta_s \Delta y_s$$

where the coefficient β_s represents the efficiency of poverty reduction due to economic growth within states. We find that it varies a fair bit across states.

Decomposing Reductions in Poverty

When we look at the comparative poverty performance across the states, we can use the following decomposition:

$$\Delta\hat{p}_{st} = \beta_s g_s = \bar{\beta} \cdot \bar{g} + \left(\hat{\beta} - \bar{\beta}\right) g_s + \beta_s \left(g_s - \bar{g}\right)$$

Thus, we have

- $-\bar{\beta} \cdot \bar{g}$: the average reduction
- $-\left(\hat{\beta}_s - \bar{\beta}\right) g_s$: the effect of β's deviation from its mean
- $-\beta_s \left(g_s - \bar{g}\right)$: the effect associated with deviation of growth rate from its mean

$$\beta_s g_s - \bar{\beta} \cdot \bar{g} = \left(\hat{\beta} - \bar{\beta}\right) g_s + \beta_s \left(g_s - \bar{g}\right)$$

Table 11: Classification of states according to total poverty elasticity and growth components

	(+) High growth	*(-) Low growth*
(+) High poverty elasticity	Andhra Pradesh Kerala Punjab	Orissa West Bengal
(-) Low poverty elasticity	Gujarat Haryana Karnataka Maharashtra Tamil Nadu	Assam Bihar Jammu & Kashmir Madhya Pradesh Rajasthan Uttar Pradesh

Table 10: Poverty and growth by Indian state (1960-1997)

Coefficients from regression of:	poverty on GDP				poverty on inequality
State	β_s	g_s	$\bar{g}(\beta_s - \bar{\beta})$	$\beta_s(g_s - \bar{g})$	γ_s
	(1)	(2)	(3)	(4)	(5)
Andhra Pradesh	-0.75**	0.027	0.18	0.35	-1.29
Assam	-0.42**	0.010	-0.34	-0.34	-1.79**
Bihar	-0.33**	0.008	-0.48	-0.32	-0.02
Gujarat	-0.63**	0.029	-0.02	0.38	1.48*
Haryana	-0.6**	0.031	-0.07	0.45	3.4**
Jammu & Kashmir	-0.57**	0.018	-0.11	-0.12	-1.47
Karnataka	-0.48**	0.023	-0.24	0.08	-0.29
Kerala	-1.16**	0.025	0.81	0.36	0.21
Madhya Pradesh	-0.39**	0.017	-0.39	-0.11	0.89*
Maharashtra	-0.4**	0.025	-0.37	0.12	0.55
Orissa	-0.69**	0.018	0.08	-0.15	2.25
Punjab	-1.07**	0.031	0.67	0.81	4.74**
Rajasthan	-0.39**	0.018	-0.39	-0.08	0.49
Tamil Nadu	-0.58**	0.025	-0.10	0.18	-1.1
Uttar Pradesh	-0.64**	0.013	0.00	-0.38	-0.41
West Bengal	-1.13**	0.016	0.77	-0.41	1.06
Average	-0.64	0.021	0	0	0.54

Notes: All regressions include state and year fixed effects. Significance levels obtained using robust standard errors, where * indicates significance at the 5% level, and ** significance at 1% level. Elements in columns (3) and (4) have been divided through by the average amount of poverty reduction, or by $\bar{\beta}\,\bar{g}$.

Table 12. Total poverty-growth elasticity by productive sector

State	$\beta_{s1}\, s_1$ *Primary Income*	$\beta_{s2}\, s_2$ *Secondary Income*	$\beta_{s3}\, s_3$ *Tertiary Income*	R^2
Andhra Pradesh	-0.04	-0.16	-0.44	0.95
	(0.09)	(0.16)	(0.10)	
Assam	-0.90	-0.72	-0.78	0.68
	(0.22)	(0.12)	(0.16)	
Bihar	-0.41	-0.31	-0.57	0.56
	(0.10)	(0.09)	(0.11)	
Gujarat	-0.40	-0.55	-0.50	0.82
	(0.08)	(0.09)	(0.14)	
Haryana	-0.18	0.02	-0.65	0.65
	(0.20)	(0.37)	(0.14)	
Jammu & Kashmir	-0.75	-0.52	-0.72	0.34
	(0.44)	(0.56)	(0.30)	
Karnataka	0.07	0.04	-0.18	0.68
	(0.14)	(0.14)	(0.10)	
Kerala	-0.78	-1.07	-0.93	0.93
	(0.13)	(0.14)	(0.13)	
Madhya Pradesh	-0.25	0.02	-0.58	0.57
	(0.15)	(0.17)	(0.12)	
Maharashtra	-0.15	0.02	-0.39	0.75
	(0.11)	(0.17)	(0.04)	
Orissa	0.10	-0.25	-0.29	0.78
	(0.12)	(0.20)	(0.09)	
Punjab	-0.45	-1.27	-0.48	0.89
	(0.19)	(0.33)	(0.36)	
Rajasthan	-0.16	-0.96	-0.07	0.58
	(0.10)	(0.23)	(0.14)	
Tamil Nadu	-0.20	-0.14	-0.60	0.85
	(0.14)	(0.17)	(0.09)	
Uttar Pradesh	-0.37	-0.33	-0.60	0.61
	(0.16)	(0.20)	(0.19)	
West Bengal	-0.82	-0.86	-1.01	0.78
	(0.30)	(0.35)	(0.13)	
Pooled regression	-0.25	-0.36	-0.32	0.88
	(0.11)	(0.14)	(0.14)	

Notes: robust standard errors in parentheses. Primary sector: mining and quarrying, forestry and logging, fishery, and agriculture; secondary sector: manufacturing, construction, electricity and gas; tertiary sector: transport, storage, communication, trade, banking, and public administration. We estimate $\log p_{st} = \alpha + \beta_{s1} s_{s1}\, y_{s1} + \beta_{s2} s_{s2}\, y_{s2} + \beta_{s3} s_{s3}\, y_{s3}$ including fixed and year effects, where y_1 denotes logged primary income, y_2 denotes logged secondary income, y_3 denotes logged tertiary income, and s represents the respective income shares. The bottom row presents results from the pooled regression, where standard errors have been clustered by state. See Table 8 for average share of sectors.

1. Human Capital

- Developed & developing countries – each additional year of schooling is associated with a 6–10 % increase in earnings (Duflo, 2001)
- investment in education can be used to attack poverty both by *encouraging economic growth* and being a method of *redistributing* to the poor
- But how can education be expanded?
- Merely increasing the school budget is not enough.
  - Effective delivery mechanisms have to be found.
  - The poorer the area, more difficult to deliver education

1. Human Capital

- Expanding Education
- *Policy redesign*: randomised experiments in Western Kenya look at whether increasing the supply of textbooks or improving child health affects attendance and attainment in NGO run schools (Glewwe, Kremer and Moulin, 2000; Kremer and Miguel, 2002)
- *Reorganization* of how *policy* is *delivered*: public schooling, for example, may require a variety of monitors and competitors – *including different levels of government, community and NGOs and private sector* – in order to be accountable and effective (Reinikka and Svensson, 2002; Hsieh and Urquiola, 2002)

2. FINANCE

- Poor often do not have access to financial services provided by formal financial institutions.
- Access to financial services (credit and saving opportunities) central to expanding productive opportunities
- A central concern in this literature is whether changes in institutional design can overcome the problems of *elite* and *political capture* which have plagued formal credit.

2. FINANCE

- Need to examine whether changing the way that formal and informal institutions work can affect outcomes for the poor.
- *Formal Credit:* Burgess and Pande (2004) – social banking experiment in India – licensing rules were used to force commercial banks to open over 30,000 branches in rural areas → reductions rural poverty
- *Informal Credit* / *Microfinance:* - innovation in the design of informal institutions institutions in order to provide finance to a wider range of individuals (greater outreach) and projects. (Aniket, 2005, 2006)
- Important to analyse the role savings can play in uplifting the poor from poverty (Aniket 2006)

3. Property Rights

- Increasing evidence that *secure land rights*, in particular, are an important vehicle for the poor that may promote both *equity* and *efficiency*
- Acemoglu Johnson Robinson (2001) – countries with *less risk of expropriation* (more secure property rights) experience *higher growth rates*.
- Lin (1992) – shows that the *move from collective to household farming* in China starting in 1978 led to large *productivity increases in agriculture*.

4. Regulation

- Postwar model of economic development was built on a raft of regulation – benevolent governments intent on correcting market failures – central planning was in fashion
- Djankov et al. (2002) collect data on the time and number of procedures an entrepreneur must complete to start a business in 85 countries – finds that *heavy regulation of entry* is associated with *less democratic governments*, *greater corruption* and *larger unofficial economies* – which supports the idea that entry regulations are not in the public interest.
- Besley and Burgess (2004) finds that *pro-worker state-level amendments* to the Industrial Disputes Act in India were associated with *lower output*, *employment*, *investment* and *productivity in registered (formal sector) manufacturing* and *higher urban poverty*.

5. Responsiveness & Accountability of Government

- Recent research has begun to look at how governments can be made more responsive and *accountable* for their actions
- Besley and Burgess (2002) show that state governments in India are *more responsive* to falls in food production and crop flood damage via public food distribution and calamity relief expenditure *where local newspaper circulation is higher*. They also find that *higher political competition* and *electoral turnout* are associated with greater responsiveness to food production shortfalls and floods.
- Djankov et al. (2001) develop a remarkable data set on media ownership patterns in 97 countries and find that *state ownership of the media* is, on the whole, negatively correlated with *good government*.

Summing Up

- Empirical approaches based on sub-national data provide the most credible base for economists to influence the debate about global poverty reduction.
- The evidence based approach to policy has proven effective in a range of industrialised countries and its expansion into the developing world is long overdue.
- The overarching theme is the *centrality of the institutional context* in which policy decisions are made.
- Responsibility for achieving the goal of cutting global poverty rates in half lies firmly at the door of domestic governments.
- Aid and debt reduction can play a limited role.

Advantages of Economic Evidence based approach

- it provides a consistent and common theoretical framework within which we can evaluate policy and institutional reforms
- provides some quantification of the effects of various measures
- advances in theoretical and empirical political economy provide a basis for encompassing an agenda that puts more weight on aleinstitutional change
- deliver a better understanding of the micro-economic processes that generate income growth.

The kind of evidence currently being built by *micro-economic research at the sub-national level* will doubtless be the most persuasive and credible advice to policy makers in the decade to come. But it is clear that there is no magic bullet to halve global poverty.

ELASTICITY

Elasticity measures the responsiveness of variable of y to a change in variable x

$$\text{Elasticity} = \frac{\%\text{ change in } y}{\%\text{ change in } x}$$

$$= \frac{d \ln y}{d \ln x}$$

$$= \frac{dy/y}{dx/x}$$

Note: If we run a regression on the log values of the variables, the coefficients gives us the elasticity of the dependent variable with respect to the independent variable.

Ordinary Least Squares (OLS) Regression

OLS regression minimises the square of the residuals. We can run a regression of the form:

$$Y = \alpha + \beta X + \varepsilon$$

and obtain the OLS estimators $\hat{\alpha}$ and $\hat{\beta}$ by minimising the square of the residuals given by $(Y - \hat{\alpha} - \hat{\beta} X)^2$.

The regression gives us a functional (causal) relationship which predicts the value of Y given that value of X.

$$E[Y \mid X] = \hat{\alpha} + \hat{\beta} X.$$

where $\hat{\alpha}$ is the intercept and $\hat{\beta}$ is the slope in the $X - Y$ space representation of this functional relationship.

Cross-section Data and Panel Data

- *Regression for cross-sectional data:*

$$Y_i = \alpha + \beta X_i + \varepsilon_i$$

where i represent individual units of interest.

- *Regression for panel data with fixed effect:*

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it}$$

where i represent individual units of interest and t represents time.

→ α_i is the *fixed effect* or the intercept term that varies for each i. Of course, this intercept term varies over i but does not vary over t.

OLS

Estimate a linear relationship between variable x and y

$$y_i = \alpha + \beta x_i + \varepsilon_i$$

Estimation:

$$\min \varepsilon_i^2 \quad \text{where} \quad \varepsilon_i = y_i - \hat{\alpha} - \hat{\beta} x_i$$

$$\text{variance of } \hat{\beta} = \frac{1}{N} \cdot \frac{\text{variance of residuals}}{\text{variance of } x_i}$$

Testing:

$$t = \frac{\hat{\beta}}{\sqrt{\text{variance of } \hat{\beta}}} > 2$$