

How Does Poverty Decline?

Suggestive Evidence from India

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Joint work

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Growth and Poverty

- Does growth matter?
- Yes. (e.g., Besley and Burgess, 2003; Dollar and Kraay (2002), Kraay (2004), Ravallion (2001))
- Dollar and Kraay: growth increases incomes of the poor in the same proportion as average incomes.
- Besley and Burgess: 1% increase in GDP growth reduces poverty by 0.73% on average.

Variation in the Growth-Poverty Link

- Country and regional experiences are diverse.
- Elasticity of poverty with respect to economic growth is -1 in East Asia but only -0.59 in South Asia
- Do some kinds of growth have greater impacts on poverty? What are they?
- Need to understand the processes by which growth impinges on poverty.
- How does growth matter?

Annualized Growth Rates

	Non-Farm GDP	Farm GDP	Agricultural wages
1983-04	7.09	2.62	2.68
1983-93	6.43	2.86	3.15
1993-04	7.70	2.41	2.26
1999-04	7.20	1.84	0.62

Questions

- Why are agricultural wages growing more slowly when the non-farm sector is growing faster?
- Which sector – farm or non-farm – has greater impact on agricultural wages?
- Impt to answer the Qn because it is easier to increase non-farm GDP than farm GDP.
- What is the process by which growth in these sectors trickles down to the poor?

Our Study

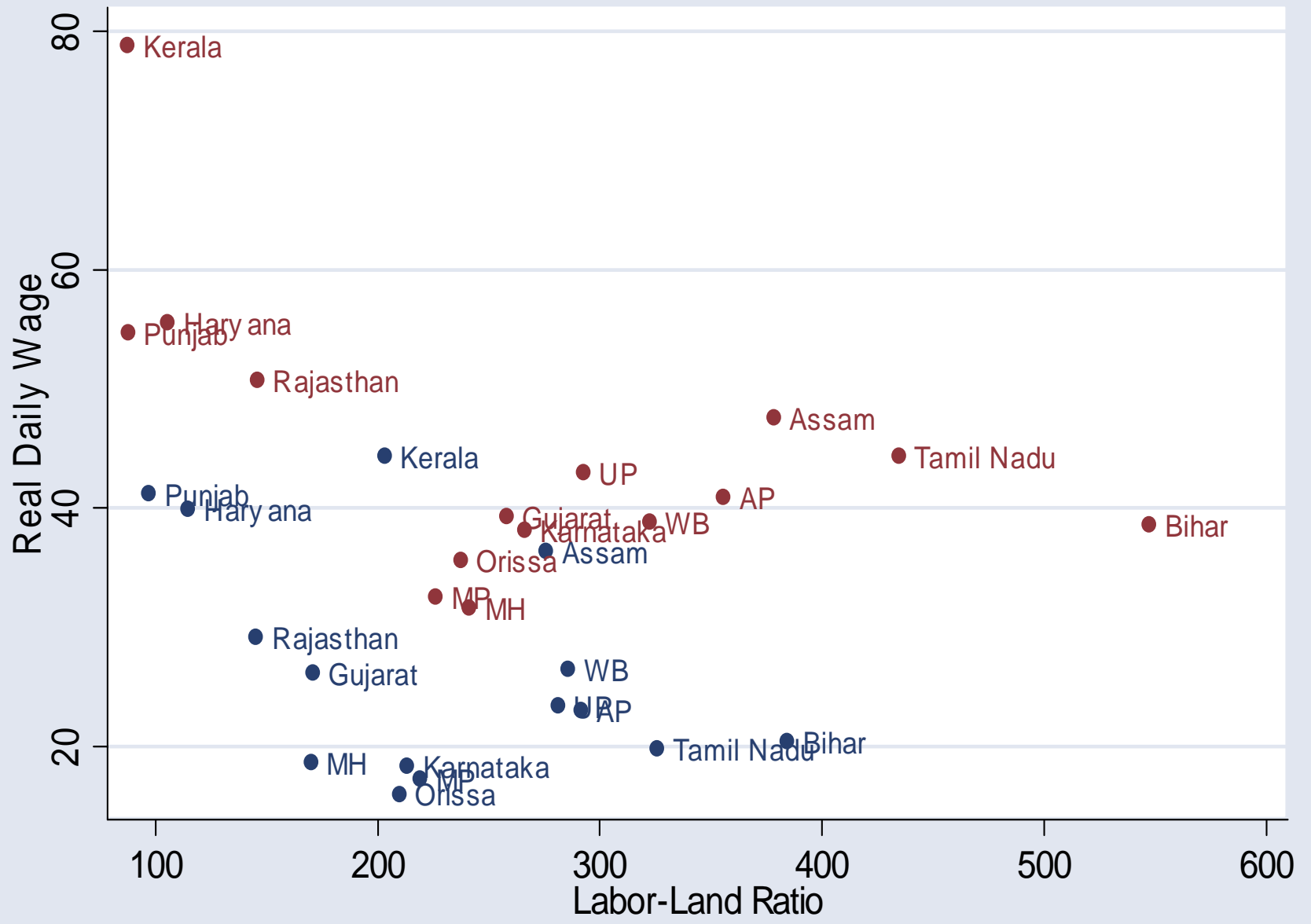
- The goal is to understand the process of poverty decline in India over the last 2 decades.
- Since the 1980s, GDP has grown at 5.8% per annum and poverty ratio has declined from 44% in 1983 to 26% in 2004.
- Non-farm GDP has grown at more than twice the rate of farm GDP. Is this primarily responsible for the observed decline in poverty?

Using Agricultural Wages

- We use agricultural wages rather than head count ratios as poverty measures. Why?
- Agricultural wage rates are strongly (inversely) correlated with poverty rates (Kijima and Lanjouw, 2005).
- Poverty measures sensitive to distribution of population around the poverty line.
- Measurement is not an issue with wages.
- Causal analysis is easier with agricultural wages.

A Primitive Analysis

- Land is a constraint to agricultural production.
- Suppose technology is invariant and land quantity is fixed – then greater is the amount of labor working on land, lower would be agricultural wages.
- How can wages increase?
- Higher agricultural productivity: direct positive impacts (can have indirect impacts too!)
- Higher productivity in non-farm sector: by drawing labor off the land.



● w age83 ● w age04

Implications....

- For most states, labor-land ratio increased – yet agricultural wages also rose.
- Contribution of agricultural productivity is therefore evident.
- If there was no rise in agricultural productivity, wages would have declined.
- What's the contribution of non-farm sector? Without rapid growth in this sector, labor-land ratios would have risen even more. But by how much?

Estimating the contribution of the non-farm sector

- Non-farm TFP growth can increase agricultural wages if it increases non-farm employment and draws labour away from land.
- Suppose we attribute the entire increase in non-farm employment between 1983-99 to productivity growth in non-farm sector.
- This is an overestimate as long as part of non-farm sector employment is because of TFP growth in agriculture. This is certainly the case with a closed economy.

Estimating.....II

- Suppose w_H is the hypothetical or counter-factual wage that would have prevailed if agriculture had to absorb the entire increase in non-farm employment.
- Suppose w_2 is the observed wage in 1999
- Then an upper bound of the contribution of non-farm sector is $(w_2 - w_H)$
- It is an upper bound because some of the increase in non-farm employment is due to TFP increase in the agricultural sector

Estimating the counter-factual

- Specify Cob-Douglas production functions
- Then w_H can be expressed as a function of the hypothetical agricultural employment and share of labor in total value of agricultural output.
- Share in labor in total value of agricultural output derived from employment and wage surveys and national account statistics.

	% change in wages	Change in nonfarm employment as proportion of farm employment in 1999	% Contribution of non-farm sector to change in wages	Standard error (bootstrapped)	t-value
All India	0.69	0.25	0.23	0.01	21.935
Andhra Pradesh	0.72	0.23	0.19	0.024	7.898
Assam	0.06	0.39	2.29	114.101	0.02
Bihar	0.69	0.13	0.09	0.018	4.895
Gujarat	0.42	0.27	0.27	0.066	4.127
Haryana	0.65	0.27	0.32	0.156	2.022
Karnataka	0.97	0.17	0.16	0.034	4.544
Kerala	0.73	0.80	0.47	0.045	10.575
Madhya Pradesh	0.66	0.12	0.13	0.026	5.007
Maharashtra	0.96	0.36	0.26	0.037	6.912
Orissa	0.70	0.11	0.12	0.044	2.687
Punjab	0.46	0.43	0.56	0.096	5.791
Rajasthan	0.54	0.23	0.19	0.065	2.924
Tamil Nadu	1.36	0.37	0.17	0.025	6.671
Uttar Pradesh	0.68	0.25	0.22	0.028	7.673
West Bengal	0.54	0.32	0.39	0.075	5.224

Is it always an upper bound?

- Yes, if the net impact of higher agricultural productivity on nonfarm employment is positive.
- This is always the case in a closed economy, i.e., where agricultural trade is negligible relative to domestic consumption.
- In an open economy, higher agricultural productivity will have 2 effects: higher demand for nonfarm goods (especially nontradables) which increases nonfarm employment and greater agricultural exports which increases farm employment. Net impact??

Upper bound....

- For India as a whole, agricultural exports are small relative to value of domestic consumption. Therefore, a closed economy describes it best.
- Using indicators of trade policy, Warcziarg and Welch (2003) (updating Sachs and Warner, 1995) classifies country as open or closed. During the period 1983-99, India is classified as closed.
- Cannot be so sure for results for individual states.

What about the future?

- The non-farm sector benefits educated workers more than it does illiterate workers.
- Analysis by cohorts reveals it is mainly younger males who make a transition to non-farm sectors.
- Females (of all ages) and older males show little mobility across sectors. Direct benefits from nonfarm growth will be limited. Slow agricultural growth will affect them immediately.

More on implications....

- For a poor and large economy, non-farm sector TFP alone can shift people away from land only if domestic demand for its products increases. This is constrained if farm TFP does not increase.
- A small but poor country could certainly use trade in non-farm goods to pull people out of agriculture and decrease poverty.
- But the world is a closed economy! So such countries necessarily depend on productivity increases in agriculture elsewhere.

Message...

- Message of the paper is not new – Mellor, Lipton, Timmer,.....
- Contribution is to the causal process – the mechanism of trickle down and an estimation of its magnitude.
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A Theoretical Framework

- We consider a two sector model with a farm and a non-farm sector.
- The farm sector produces food with labour and land. The marginal product of labour is diminishing with respect to labour.
- Constant returns to scale prevail in the production of the non-farm good which uses only labour.

Theory ...2

- Consumption preferences are such that at a high enough level of income, increments to it are spent only on the non-farm good. This follows Engel's law.
- In equilibrium, total employment is allocated between the two sectors such that wages are equal to the value of marginal product in either sector.

Comparative Statics: Closed Economy

- Consider an increase in the total factor productivity of the non-farm sector.
- Can this draw labor off the land? For this to happen, domestic demand for non-farm good must increase if the economy is largely closed. Can this happen?
- Answer: not much!

Higher Non-farm TFP

- Higher productivity in the non-farm sector reduces the price of non-farm good relative to the farm good.
- However, as long as food and the non-farm good are not substitutable in consumption, the decrease in demand for food is small.
- Hence in equilibrium, the labour absorbed by the non-farm sector and therefore, wages, increases only by little.

Higher Farm TFP

- Suppose farm TFP increases.
- Direct positive impact on wages.
- Two effects on demand – substitution and income effects.
- Substitution effect: when the relative price of food declines, demand for food increases (slightly). So this effect can be ignored.
- Income effect: higher incomes from higher productivity increase demand for non-farm good (Engel's law).

Farm vs Non-farm TFP

- Income effect will dominate. Thus, higher farm TFP will reduce employment in agriculture, increase employment in non-farm sector and increase wages – through direct impact and indirect impact (reducing employment in agriculture)
- It can be shown that if substitutability between farm and non-farm good is small enough, farm TFP impact is larger than non-farm TFP impact on wages.

Small Open Economy

- Output in each sector need not match its demand.
- Higher non-farm TFP reduces farm employment and increases wages.
- Higher farm TFP increases farm employment with no impact on wages.

Data and Econometrics

- From theory:
- $Wages = f(\text{farm TFP}, \text{non-farm TFP})$
- $\text{Non-farm employment} = g(\text{farm TFP}, \text{non-farm TFP})$
- Ideally, we would like data on large enough geographical aggregates (states, India) for which the assumption of a closed economy is plausible.
- But very few data points available for all India analysis (1983, 1987, 1993/94, 1999/00) or even for states as farm TFP data available only for 1983 and 1993/94. Also limitations on nonfarm TFP data

Data and Econometrics II

- An `ideal' econometrics relation cannot be estimated.
- We estimate a “suggestive” relation instead.
- By the sample design, we have independent cross-sections of village level data.
- Estimate village level regressions using state-level estimates of farm TFP and other controls.
- If non-farm TFP is state specific, then farm TFP effects can be consistently estimated using fixed effects.

Estimated Results: Impact of Farm TFP in village regressions

	1983		1993	
	Elasticity	t-ratio (robust)	Elasticity	t-ratio
Average daily wages	0.48	14.39	0.243	6.75
Farm employment	-0.225	2.82	-0.008	0.18
Young males farm employmen	-0.331	2.25	0.3	3.2

Discussion

- Empirical results imply even village economies functioned as closed economies in 1983. Hence, little scope for nonfarm sector to impact poverty.
- Empirical evidence mixed for 1993 – positive impact of farm TFP on wages and on farm employment. Hence, greater role for nonfarm sector in reducing poverty at village level.
- However, the economy could have been closed at a higher level of aggregation.