

Rural Non-Farm Employment

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Growth and Poverty

- Our question: How does growth matter to the poor and what is the role of the non-farm sector?
- Immediate implication: What kind of policies are likely to have the greatest impact on poverty?
- Most past work does not address the “how” of poverty decline.

Relevant Literature

- In India, debate has completely revolved around the measurement of poverty and its change.
- Very little work on the role of the non-farm sector.
- One exception: Foster and Rosenzweig (2003) present a causal framework.
- Their principal finding: importance of rural factory (traded) sector in driving rural non-farm sector and rural wages.
- We use a different data set (NSS +) and consider a different conceptual framework.

Our Study

- Our goal is to understand the process of poverty decline in India over the last 2 decades and examine the role of the non-farm sector.
- Since the 1980s, GDP has grown at 5.5% per annum and poverty ratio has declined from 44% in 1983 to 26% in 1999.
- Non-farm GDP has grown at more than twice the rate of farm GDP. Is this primarily responsible for the observed decline in poverty?
- Important to answer the question because it is easier to increase non-farm GDP than farm GDP.

Using Agricultural Wages

- We use agricultural wages rather than head count ratios as poverty measures. Why?
- Measurement is not an issue with wages.
- Agricultural wage rates at the region level are strongly (inversely) correlated with region-level poverty rates (Kijima and Lanjouw, 2005).
- Causal analysis is easier with agricultural wages.

Agricultural Wages ...II

- Between 1983 and 1999, real daily wages of agricultural labour increased by 69%.
- Is it because of productivity growth in the farm or in the non-farm sector or both?
Which was more important?

The Non-farm Sector: A Preliminary Look

- For males, % of agricultural employment to total declined from 60% to 53% between 1983 and 1999. For females, the ratio has been stagnant (74% to 73%).
- The sectors that expand the most in relative terms are construction, trade & hotels, and transport & communications.

Role of Non-farm Sector...II

- The employment share in agriculture of young males (18-26 years) in 1983 was 59%.
- Following this cohort over time, the employment share in agriculture fell to 51% in 1993 and 49% in 1999.
- The employment structure for older male cohorts in 1983 does not change much over time.
- Among females, the share of agriculture in employment is constant for all cohorts.

Role of Non-farm Sector...III

- The decline in agriculture's share has been modest (especially when compared to East Asia)
- So the absorption of labour by the non-farm sector has been small.
- As population has grown, the labour-to-land ratio in agriculture has increased in most states – which suggests that wages would have fallen were it not for agricultural productivity growth.

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 captures 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

- Suppose the economy is closed. Then output in each sector must exactly match its demand.
- Consider an increase in the total factor productivity of the non-farm sector.
- Higher productivity in the non-farm sector will reduce the price of non-farm good relative to the farm good.

Higher Non-farm TFP

- However, as long as the elasticity of demand for food with respect to the price of non-farm good is small, there is only a small decrease in the demand for food.
- 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.
- This will increase the price of non-farm good relative to the farm good.
- Two effects on farm demand – substitution and income effects.
- Substitution effect: when the relative price of non-farm good rises, demand for food increases (slightly).
- 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 and increase wages.
- It can be shown that if the cross price elasticity 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.

Reduced Form Expressions

- From theory:
- $Wages = f(\text{farm TFP}, \text{non-farm TFP})$
- $\text{Non-farm employment} = g(\text{farm TFP}, \text{non-farm TFP})$
- We construct NSS region level estimates of farm TFP for 1983 and 1993/94. Data for 1999/00 is unavailable.
- Non-farm TFP estimates not available.

The Wage Equation

- Substitute out non-farm TFP and write the wage equation as
- $Wages = h(\text{farm TFP}, \text{non-farm employment})$
- But this equation cannot be consistently estimated by OLS because non-farm employment is endogenous to wages.
- Valid instrument for non-farm employment is non-farm TFP – which is not available.

Deaton's 2 stage procedure

- Non-farm TFP, unlike farm TFP, is more likely to be determined by macro factors (infrastructure, policies) than by local factors.
- We assume that non-farm TFP does not vary within a state. Under this assumption, it can be modeled as a state fixed effect and farm TFP effects can be estimated consistently.
- Then Deaton's 2 stage procedure can be applied to generate consistent estimates of the impact of non-farm employment on wages.

Estimated Results

Dep. Variable: log(wages)		
	Deaton's Method	
	1983	1993
Log(farm TFP)	0.484	0.243
Standard error	0.033	0.036
t-ratio	14.39	6.75
Log(Nonfarm employment)	-0.106	0.11
Standard error	0.064	0.032
t-ratio	-1.65	3.44

Estimated Results...2

- In 1983, if farm TFP in Bihar was the same as that in Punjab (5.5 times higher), agricultural wages in Bihar would have been more than triple.
- In 1993, if farm TFP in Bihar was the same as that in Punjab (5.5 times higher), agricultural wages in Bihar would have been about 150% higher.

Estimated Results...3

- In 1983, if non-farm employment in Bihar was the same as that in Kerala (3 times higher), agricultural wages in Bihar would have remained the same.
- In 1993, if non-farm employment in Bihar was the same as that in Kerala (3 times higher), agricultural wages in Bihar would have been only 22% higher.

Estimated Results...4

- Previous analysis is done for males and females and for different male cohorts.
- For all male cohorts, there is no correlation between non-farm employment and agricultural wages in 1983. In 1993, males in agriculture benefit from the non-farm sector.
- Females, on the other hand, do not benefit from the non-farm sector.

Limitations of Previous Analysis

- No farm TFP data is available for 1999.
- Analysis is based on repeated NSS cross-sections.
- Cross-sectional variation in wages tells us little about wage changes over time.
- To investigate inter-temporal change in wages need another technique.

Counterfactual

- Wages can increase due to TFP increases in either sector
- We ask: if the non-farm sector had not absorbed any labour, what would the wage increase in agriculture have been?
- The answer to this question isolates the contributions of the farm and non-farm sectors.
- We push back the increase in non-farm employment into agriculture and predict the wage increase.

Contribution of Non-farm Sector: 1983-99

State	Δ NF Emp as % F Emp	Actual % Δ in Agri Wages	Pred. % Δ in Agri Wages	% Cont. of NF Sector
AP	18.5	70.4	57.0	19.1
Assam	28.3	-7.1	-18.3	-157.8
Bihar	11.8	56.5	50.8	10.0
Gujarat	21.3	33.0	22.4	32.3
Haryana	21.5	19.7	4.9	75.4
Karnataka	14.8	101.1	85.8	15.1
Kerala	44.5	66.2	33.1	49.9
MP	10.7	57.8	49.6	14.2
MH	26.5	68.4	47.1	31.1
Orissa	10.0	54.8	47.3	13.7
Punjab	30.0	58.3	30.6	47.4
Rajasthan	18.8	66.6	55.6	16.5
TN	27.1	128.3	106.1	17.3
UP	20.2	46.9	34.0	27.4
WB	24.5	56.3	34.8	38.2
All India	20.6	59.2	43.9	25.8

Counterfactual...

- Educated workers are more likely to be in the non-farm sector.
- If we were to push back into agriculture only the less educated workers, the contribution of the non-farm sector falls to 17%.

Conclusions

- Despite rapid growth of the non-farm sector, agricultural wages have responded more to changes in farm TFP.
- This is likely to be true in the foreseeable future as well.
- Improving agricultural TFP is our best poverty reduction program.