Determinants of Wages and Returns to Education in Rural India

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Introduction

Indian labour market is dualistic, with vast majority of workforce employed as casual labourers (representing the informal sector) mostly in the rural areas. The wage employees (representing the formal sector) are mainly urban workers forming a lesser percentage of the work force. Securing employment in informal sector is a survival strategy for the poor as it provides employment immediately to any individual with any or no skill.

Since the economic reforms that began in 90s, the labour market, especially in rural areas is undergoing active changes. In the primary sector, which is the prime occupation of rural India, there is little scope for expansion of employment (Government of India, 2001). Also there is an increasing 'casualisation' of the rural labour force with decrease in the number of self employed individuals and increase in the number of casual labourers. It is a disturbing situation where marginal and sub-marginal cultivators are pushed into the ranks of landless agricultural labourers. But there has been a slow diversification of rural economy to accommodate the increasing labour force. In the face of current changes, the determinants of rural wages need to be re-evaluated. Though there are previous studies that had studied wage determinants and returns to education, it was never assessed across primary (agriculture and related), secondary (manufacturing, utilities, etc.,) and tertiary (services, etc) sectors and for type of work contract (representing formal and informal duality) though above mentioned features influence the wages significantly. Further, rural India had always lagged behind in literacy rates. Role of education, which is an important wage determinant, needs to be analysed across the sectors in the rural economy and returns to private investment in education needs to studied across these sectors.

Materials and Methods

Earnings equation developed by Jacob Mincer (Mincer, 1974) is employed in this study. The equation that has its foundation in human capital theory is as follows,

ln(wages)=a +b(*primary*)+c(*middle*)+d(*secondary*)+e(*higher secondary*)+f(*university*)

+h (*experience*)+i(*experience^2*)+j(*caste*)+k(*mode of payment*)+l(*HDI rank of state of residence*)+m(*NDP of the state*)+n(*imr*)+e

Primary, middle, secondary, higher secondary and university are dummy variables representing educational levels. Experience is calculated as age minus years of schooling minus five, assuming age of entry into school would be five years. Squared term of experience captures quadratic relation with wages. Caste is a dummy variable for individuals from backward castes, used to capture the social status of the individual. Mode of payment is a dummy variable for wages paid in kind. States with top 15 Human Development Index ranks formed the dummy variable for HDI. Share of agriculture to Net Domestic Product of the state of residence forms the variable NDP. IMR, the Inverse Mills Ratio was obtained from probit regression performed with data from NSS to avoid any possible sample selection bias (Heckman, 1979), since only wage employees and casual labourers were selected from the data for analysis. The average rate of return to schooling was calculated as,

$$\frac{\text{coefficient of k}^{\text{th}}\text{ schooling level-coefficient for the k-1 level}}{\text{number of years required to complete k}^{\text{th}}\text{ schooling level}}$$

The age, when experience stops contributing positively to wages was calculated by, h/-2i; where i< 0.

The data on weekly wages, education, experience, caste, and mode of payment of wage employees and casual labourers was obtained from all India National Sample Survey (NSS) on employment and unemployment conducted in 1999-2000. Wage

data includes both cash and kind payments, with kind payments calculated at current retails prices. Data on HDI ranks for the year 1991 was obtained from national human development report, 2001. Share of agriculture in the state NDP was obtained from Reserve Bank of India's Handbook of statistics on Indian economy. The coefficients for dummy variables are adjusted by exp (coefficient)-1, since it is semi log equation.

Results and Discussion

Before studying the wage determinants, the structure of the rural labour market needs to be understood. As shown in table 1, agriculture is the predominant occupation in rural areas and majority of the work force are self-employed. Casual labourers were predominantly employed in the primary sector. Wage employees were predominantly employed in the tertiary sector. Only casual labourers and wage employees were selected for further analysis. Regression analysis was performed on this data to understand wage determinants for these two categories of workers employed in three sectors of the economy.

Results for all rural workers, including both casual labourers and wage employees show that human capital coefficients, education and experience are significant and positive. Quadratic term of experience is negative as expected. Casual labourers earn lesser than wage employees by 36.99% and workers in secondary and tertiary sector earn more than those in primary sector by 54.34% and 60.64% respectively. Experience stops adding positively to wages by 34.97 years. Individuals from backward castes earn 6.77% more than individuals from forward castes, indicating absence of discrimination based on caste. Coefficient for HDI ranks is positive indicating that residing in a state with a HDI rank within top 15 ranks would increase the wages by 4.6%. Individuals receiving kind payments earn 12.89% lesser than individuals with wage payments representing that being paid in kind reduces the

actual wage received. Results on regression involving casual labourers in all sectors shows that the explanatory power of the model (adjusted R^2) is poor indicating that there might be are other unstudied variables that influence the wages. Coefficients for schooling and experience are significant. Coefficient for caste was significant, except in the tertiary sector, and it is negative, indicating the low wages for the individuals from the backward castes. In the primary sector, the variable was highly significant suggesting the discrimination in wages (4.99% lesser than individuals from forward castes) based on caste that is still prevalent in rural agrarian society. Wage payments in kind were lower by 12.54%, 15.72% and 32.49% in primary, secondary and tertiary sectors respectively. Coefficients for HDI ranks was positive and improvement of the state's rank to top 15 would increase wages by 3.37%, 11.18% and 6.76% in primary, secondary and tertiary sectors respectively. Share of agriculture to NDP was significant in primary sector alone and implied that being predominantly agricultural state increase wages, though by a meagre 0.09%. IMR was insignificant in all the cases, indicating an absence of selection bias and the analysis was performed without the variable.

The equation's explanatory power is robust in the case of wage employees. Analysis with the wage employees reveal that the human capital coefficients are significant and signs are as expected. Experience adds positively to wages till the age of 42.13 years for those in secondary sector, which is highest among all cases. It is around 35 years for the other two sectors. Caste is a significant variable except for those in secondary sector. Contradictory to casual employment, lower castes do not have negative relation with wages, but employees from lower castes earn 11.41% and 14.34% more in primary and tertiary sectors. Kind payments, though not common in wage employment (only 2.1% of the wage employees were paid in kind, majority of them

received monthly kind payments) its coefficient was significant in primary and tertiary sectors. They received 17.71% and 18.05% less than persons receiving cash payments. HDI ranks contribute significantly to wages except in tertiary sector. Living in states with top 15 ranks would increase the wages by 5.04% and by 38.12% and 15.60% in primary and tertiary sectors. Share of agriculture in the state's NDP was significant in primary and secondary sectors. Increase in share of agriculture to NDP by one percent would increase wages in primary and secondary sectors by around 0.7%.

Returns to education

For all rural workers, the returns to education are positive and increasing with educational level, except for higher secondary schooling. But for casual labourers, the rates are low and negative for higher levels of education. Returns to higher secondary schooling are negative for those in secondary and tertiary sectors, while for those employed in primary sector both higher secondary and university education. Decreasing and negative returns signal that education brings lesser incentives; this explains the poor literacy rates in rural India. However, these results are just private returns to education. Social returns to education, of having educated citizens, will be greater, but difficult to measure. But returns to education in wage employment sector are higher and mostly increasing with increasing educational level following patterns noted in other studies (Duraisamy, 2002). Returns to primary education is very low in secondary and tertiary sector, but as mentioned above the results measure just the private returns and social returns especially to primary education should be very high.

Conclusion

Human capital determinants, schooling and experience had significant effect on wages in all the cases. Personal social characteristic caste had varied effects in casual

employment and wage employment. In the first case, individuals from the lower caste were discriminated with lower wages, but in the latter case they earned better wages than individuals from other castes. Individuals with kind payments were usually paid less than those who were paid in cash. HDI rank of the state had a positive relationship with wages in casual employment in all the sectors and for primary and secondary sectors in wage employment. Share of agriculture to NDP of the state had a positive relation with wages for casual labourers in primary sector and for individuals employed in primary and secondary sectors as wage employees.

Returns to education are low for those employed as casual labourers and higher levels of education had negative returns. These analyses indicate that studies that had clubbed formal and informal sectors had been overstating the returns to education in rural areas. Negative returns also infer the mismatch between demand and supply of labour. With increase in the number of individuals completing tertiary education, the supply of individuals with higher education will exceed the demand. The rates return for these individuals will continue to fall and individuals will be underemployed. It specifies that higher education is devalued in the informal sector of the rural economy and the formal sector is not large enough to accommodate them. Policies to promote employment opportunities in rural sector should be pursued seriously to avoid underemployment and to increase the profitability of higher education, which in turn would promote literacy rates and enrolment in higher education. Returns in wage employment were positive in all the cases and was mostly increasing with increasing educational levels. Higher returns to higher education show that there is indeed a room for private/state financing for higher education. Shifting the burden of costs from the individual to the state will promote higher education. Expansion of

employment in the formal sector will accommodate the higher educated of the rural

areas and thereby correcting the negative returns in informal sector.

References

Duraisamy, P., 2002. Changes in returns to education in India, 1983-94: by gender

age cohort and location. Economics of education review, 21, 609-622.

Government of India, Planning commission, 2001. Report of the task force on

employment opportunities. Government of India, New Delhi.

Heckman, J., 1979. Sample selection bias as a specification error. Econometrica, *47*,

154–161.

Mincer, J., 1974. Progress in Human Capital Analysis of the Distribution of Earnings.

Working paper No.53, NBER

Table 1 Types of employment across sectors in rural India (percent)

Industry	Self employed	Wage employees	Casual labourers	Total
Primary sector	49.39	1.18	23.72	74.29
Secondary sector	5.09	1.60	4.11	10.81
Tertiary sector	7.65	5.43	1.75	14.83
Total	62.14	8.21	29.58	99.93

Source: Authors' calculation from NSS data on employment and unemployment,

1999-2000

Table 2 Regression results

Variable	Rural	Rural casual labour			Rural wage employment		
		Primary sector	*Secondary sector*	*Tertiary sector*	*Primary sector*	*Secondary sector*	*Tertiary sector*
Constant	4.186***	4.649***	5.175***	5.098***	3.637***	4.652***	4.295***
Primary school	0.234***	0.235***	0.200***	0.146***	0.315***	0.0906*	0.0735*
Middle school	0.367***	0.273***	0.291***	0.329***	0.649***	0.365***	0.315***
High school	0.617***	0.345***	0.374***	0.445***	0.996***	0.66***	0.686***
Higher secondary school	0.788***	0.332***	0.347***	0.371***	1.263***	0.865***	0.899***
University education	1.059***	0.267***	0.431***	0.390***	1.489***	1.173***	1.157***
Experience	0.0452***	0.0142***	0.0270***	0.0326***	0.0534***	0.0622***	0.0808***
Experience^2 x 10^{-2}	-.0646***	-0.0194***	-0.037***	-0.0499***	-0.0734***	-0.0739***	-0.114***
Dummy HDI	0.0452***	0.0331***	-0.106***	-0.0654*	0.323***	0.145***	-0.0435**
Dummy caste	0.0656***	-0.0529***	-0.0342*	-0.0366	0.108*	0.0425	0.134***
Dummy mode of payment	-0.138***	-0.134***	-0.171***	-0.393***	-0.195**	0.00654	-0.199***

Dummy for casual labour	-0.462***	-	-	-	-	-	-
Dummy secondary sector	0.434***	-	-	-	-	-	-
Dummy tertiary sector	0.474***	-	-	-	-	-	-
Percent share of agrl. in NDP	0.0062***	0.00921***	-0.00111	0.0000079	0.0074***	0.0070***	0.00122
Inverse Mills Ratio	0.384***	-	-	-	0.447***	-	0.425***
Adjusted R^2	0.482	0.042	0.062	0.079	0.366	0.251	0.300
Sample size	62134	36189	6962	3103	2142	3075	10620

*P < 0.05, **P < 0.01 and ***P < 0.001

Table 3 Rates of returns to education levels across sectors

Level of Education	Rural	Casual labour			Wage employee		
		Primary sector	Secondary sector	Tertiary sector	Primary sector	Secondary sector	Tertiary sector
Primary	5.27	5.30	4.43	3.14	7.41	1.90	1.52
Middle	5.99	1.63	3.88	7.75	18.11	11.52	9.80
Secondary	20.50	4.90	5.79	8.55	39.69	24.71	30.77
Higher secondary	17.28	-0.91	-1.94	-5.57	41.43	22.01	23.57
University	22.82	-2.92	4.13	0.93	29.89	28.56	24.11

Source: Calculated from Table 2