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Rural Non-Farm Employment in India: Access, Income and Poverty Impact

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Abstract

Attention has been paid to the significance of the non-farm sector in the rural Indian economy since the early 1970s. The importance of earnings from secondary non-farm occupations is not well documented. In this paper an attempt is made to assess the contribution of the non-farm sector across population quintiles defined in terms of average per capita income. The correlates of employment in the non-farm sector and the direct impact of a growing non-farm sector on agricultural wage rates in rural India have also been examined. The study is based on rural data from 32,000 households belonging to 1765 villages across all parts of India collected by the National Council of Applied Economic Research in 1993-94. Analysis shows that non-farm incomes account for a significant proportion of household income in rural India with considerable variation across quintiles and across major Indian states. Education, wealth, caste, village level agricultural conditions, population densities and other regional effects influence in determining the access to non-farm occupations. Direct contribution of the non-farm sector to poverty reduction is possibly quite muted as the poor lack the assets. It has also been found that the growth of certain non-farm sub-sectors is strongly associated with higher agricultural wage rates. The analysis presented in this study suggests that the policy makers seeking to maximise the impact of an expanding non-farm sector on rural poverty, should concentrate on two fronts. First, efforts should be focused on removing the barriers to the entry of the poor into the non-farm sector. This involves improving the educational level in rural areas. Second, the policy makers should note the strong evidence of an impact on agricultural wages of the expansion in rural construction employment.

1. INTRODUCTION

Debates about rural development attach increasing importance to the rural non-farm sector. Traditionally, rural households in developing countries have been viewed as though they were exclusively engaged in agriculture. There is mounting evidence, however, that rural households can have highly varied (and often multiple) sources of income. Rural households can, and do participate in a wide range of non-agricultural activities, such as wage employment and self-employment in commerce, manufacturing and services, alongside the traditional rural activities of farming and agricultural labour. Such non-farm incomes can contribute significantly to total incomes of farming households in developing countries.

Amongst policymakers there is a considerable interest in gaining a better understanding of how the non-farm sector contributes to economic growth and what, if any, specific role does it play in alleviating rural poverty. There is a fear in many parts of the world that rapid growth in agriculture during the next few decades may remain elusive, and that with the absence of other sources of rural growth it will be difficult to maintain, much less raise, rural per capita living standards. The result could be rising rural poverty and an acceleration of migration to urban areas. Whether and how the rural non-farm sector can be promoted so as to pick up any slack in the agricultural sector is a subject of keen interest.

This paper draws on recent household survey data for rural India to consider the specific case of India and the non-farm economy. In particular, the focus in this paper is on the contribution of the non-farm sector to rural poverty alleviation. The plan of the paper is as follows. In the next section we draw on earlier contributions to the literature to present a brief overview of the non-farm sector in India, and to motivate the subsequent empirical analysis. We also describe the data which underpin the analysis. In Section 3, we then turn, to an examination of the incidence of non-farm incomes by assessing the shares of non-farm income sources in the total income across population quintiles defined in terms of average per capita income. We find that non-farm incomes account for a significant proportion of household income in rural areas at the national level, but that this masks considerable variation across quintiles and across major states. We indicate that non-farm incomes accrue via wage employment as well as self-employment/own enterprise activities, and that within the former there is an important distinction between casual wage employment and salaried, regular employment. Next we examine, in Section 4, the correlates of employment in the non-farm sector, based on a multinomial logit model which distinguishes between various non-farm activities, agricultural wage employment and farming. We find evidence that

education and wealth is strongly correlated with the more remunerative non-farm activities; that (low) caste may pose a barrier to access; and that village level agricultural conditions, population densities, and other regional effects are also of independent significance. Many of these correlates are found to exercise a similar influence on levels of non-farm income. Up to this point the analysis thus suggests that while the non-farm sector may be non-negligible in size in rural India, its direct contribution to poverty reduction is possibly quite muted because the poor lack the assets which determine access to non-farm incomes. However, we then examine in Section 5 the indirect impact of a growing non-farm sector on agricultural wage rates in rural India. We find that growth of certain non-farm subsectors is strongly associated with higher agricultural wage rates, an observation which is consistent with a signficant poverty reducing impact and a tightening of rural labour markets. We offer some concluding remarks in Section 6.

2. A BRIEF REVIEW OF THE LITERATURE

Farm–Non-farm Linkages

Since the early 1970s attention has been paid to the significance of the non-farm sector in the rural Indian economy. The linkages literature launched by John Mellor in the early 1970s originated with reference to the rural Indian economy and has emphasised the intimate relationship between the agricultural and non-agricultural sectors in rural areas (see for example, Mellor and Lele, 1972 and Mellor, 1976). As a result of emerging green revolution technologies, Mellor saw a virtuous cycle emerging whereby increases in agricultural productivity and thus the incomes of farmers would be magnified by multiple linkages with the non-farm sector. These were production linkages, both backward, via the demand of agriculturalists for inputs such as plows, engines and tools, and forward, via the need to process many agricultural goods, e.g., spinning, milling, canning. Consumption linkages were also thought to be important: as agricultural income rose, it would feed *primarily* into an increased demand for goods and services produced in nearby villages and towns. Furthermore there were potential linkages through the supply of labour and capital. With increased productivity in agriculture either labour is released or wages go up. And the new agricultural surplus would be a source of investment funds for the non-farm sector. To complete the cycle, growth in the non-farm sector was expected to stimulate still further growth in agricultural productivity via lower input costs (backward linkages), profits invested back into agriculture, and technological changes. Thus growth in the two sectors would be mutually reinforcing with employment and incomes increasing in a dispersed pattern.

Hazell and Haggblade (1990) use Indian state and district level data to look at the relationship between rural non-farm income and total agricultural income interacting with factors thought to influence the magnitude of the multiplier: infrastructure, rural population density, per capita income in agriculture and irrigation. The estimations are done for rural areas, rural towns (urban < 100,000), and the combined area. They calculate that on an average a Rs. 100 increase in agricultural income is associated with a Rs. 64 increase in rural non-farm income, with an increase of Rs. 25 in rural areas and Rs. 39 in rural towns. All of the interaction terms, except irrigation, increase the multiplier as expected. In another study in India, in the North Arcot district in Tamil Nadu, a 1 per cent increase in agricultural output was associated with a 0.9 per cent growth in non-farm employment (IFPRI, 1985).

Vaidyanathan (1983) estimated a regression of the importance of non-agricultural employment in total employment, on farming income, its distribution on , the importance of

cash crops and on the unemployment rate, using several state-level data sets for India. In all cases he found a strongly significant, positive relationship between unemployment and the importance of non-farm employment. Where agriculture was unable to provide widespread employment, the non-farm sector played an important role in picking up part of the slack. The incidence of non-farm employment was also found to be positively associated with both higher farm incomes and a more equal distribution, pointing to consumption linkages. Average daily wage rates in non-agricultural sector are found to be highest in states with high agricultural daily wages, as expected, a relationship which is confirmed in the more disaggregated district level study of Hazell and Haggblade (1990). Overall, wage rates in the rural non-farm sector were found to be higher than the agricultural wage, indicating that non-farm activities are not mainly low productivity, residual activities in rural India (although one might expect such occupations to be under-enumerated in survey data due to their seasonal and self-employed character).

These questions have also been investigated using social accounting matrices (SAMs) to calculate growth multipliers from certain structural relationships among agents in the economy. SAMs trace the circular flow of income and expenditure, on the one hand, and goods and services, on the other, among households, firms, the government and the rest of the world. These multipliers can easily be decomposed into portions attributable to the various linkages. One can address in a detailed manner the question of how income distribution effects the magnitude of local linkages. The main drawback of SAM multipliers is the detailed data required for their calculation. SAMs require a (marginal) input/output table; an account of who receives income, both factor incomes and net transfers; and information on the marginal expenditure patterns of all agents. When supplies are not infinitely elastic, then price effects of demand changes must be incorporated. Data this rich are not readily available and information gives way to assumptions (for a critique see Harriss, 1987a).

Using a SAM constructed for the North Arcot district in India on 1982/83 data, Hazell et al. (1991b) calculate that Rs. 0.87 additional value added would be stimulated by a Rs. 1.00 increase in agricultural value added. This result is under the assumption of inelastic supplies of agricultural products so the additional value added is in the non-farm sector. Assuming elastic supplies of agricultural products, the multiplier is an additional Rs. 1.18 of (agricultural plus non-agricultural) income. Unfortunately, there is no distinction made between locally produced and locally retailed products so it is impossible to say how much of growth in non-farm value-added is commerce as opposed to manufacturing.

Haggblade et al. (1989) compare marginal consumption expenditures for rural households in Nigeria, Sierra Leone, Malaysia and India. Marginal consumption of locally produced non-foods is much larger in the Asian studies (about 35 per cent versus 15 per cent), although marginal expenditure on local products including food is about 80 per cent in all countries. They note that African expenditure on non-food goods is likely to be biased down more than in Asia because of the higher proportion of non-traded goods and services.

There may be changes in linkages as development proceeds. If we assume that the consumption behavior of higher income or more urban households reflects the direction in which expenditure patterns will move as incomes rise then one can look at cross-sectional data to predict these changes. Harriss (1987b) reports that in the rural town of Arni, south India, the relative importance of goods produced in metropolitan factories or wholesaled via big cities increased from an already high 57 per cent of local commodity flows in 1973 to 75 per cent by 1983. In the latter year, new urban products had appeared in the markets such as soft drinks, cosmetics and consumer plastics (Harriss and Harriss, 1984). For a similar finding in rural Bangladesh, see Hossain (1984). Although demand for local products increases as incomes rise, their relative importance appears to fall.

There is also likely to be a change in the nature of local linkages as development proceeds. For example, using town-size as a proxy, Hazell and Haggblade (1990) report that services and cottage industry dominate non-farm activities in rural areas of India with a growth in commerce and services as one moves to rural towns, accompanied by a shift from cottage to factory manufacturing as town size increases. They also note that, in rural areas alone, the same change occurs as one moves from low to high productivity states. On the other hand, there are examples of the survival and even growth of traditional handicraft sectors when an export market is successfully developed (see further below).

Small Scale Industry

Work by Little and colleagues in the late 1970s and early 1980s (Little et al. 1987) focussed on small scale industry (SSI) specifically rather than on non-farm enterprises generally. However, given that SSI accounts for most industrial activity in rural areas, the study's findings on the productivity of small enterprises are likely to apply to many of the non-farm enterprises in rural areas. An important finding of the study is that productivity in small scale industry was generally higher in medium-sized, as opposed to the smallest enterprises (where size is measured in terms of employment). In fact, total productivity of the smallest firms was often rather low. This conclusion is consistent with the view, described further below,

that some non-farm enterprises are best seen as residual, last-resort, activities.[1] However, Little et al. (1987) note that in their own investigation of Indian data, when enterprises are ordered by capital size, the expected relationships hold: the smallest firms are more labour intensive, have lower labour productivity and higher capital productivity.

An important issue in understanding the emergence of small scale enterprise activity in rural areas is the role played by access to credit. A common observation in rural areas throughout the developing world is that small enterprises in the non-farm sector are largely reliant on own (or family) capital. Combined with the observation that savings institutions in many rural LDC settings are highly rudimentary, this suggests that at least part of the investment in rural non-farm activity is driven by a lack of alternative investment opportunities (see for example, Vijverberg, 1988 and Banerjee, 1996). Banerjee and Munshi (2000) study the knitted garment industry in Tirupur, a town in Tamil Nadu which produces about 70 per cent of India's knitted garment exports. This knitted garment industry in Tirupur took off during the mid 1980s and is dominated by a caste known as the Gounders. The Gounders were traditionally an agricultural caste and the knitted garment industry is their first foray into non-agricultural activities. Banerjee and Munshi (2000) describe how the Gounders are generally less experienced, and of lower ability, than the migrant castes who have come to Tirupur and have also entered into this industry (mainly Marwaris, Gujaratis and Khattri Punjabis). However, the Gounders compensate for this ability differential by investing much more in the knitted garment industry than their competitors. Banerjee and Munshi (2000) indicate that this is because, unlike their competitors, the Gounders have few real options other than to invest their substantial agricultural wealth in the local garment industry. An implication of these observations is that improvement of financial services in rural areas (particularly on the savings mobilisation side), may result in a rather muted expansion of investment in rural non-farm activities. Those groups, such as the Gounders, who currently lack alternatives, may find it more attractive to shift their investments out of rural manufacturing and into other activities (which may or may not be rural-based).

Non-farm Employment Patterns

Employment patterns in the non-farm sector, based on National Sample Survey data and Census data, have been carefully examined in Visaria and Basant (1994). This type of analysis is constrained by definitional and comparability issues associated with the major data sources on employment patterns. Nonetheless, the study documents the clear increase in the

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[1] Acharya and Mitra (2000) also find evidence that the smallest manufacturing and trading units in rural India have been the most transitory and least productive ones during the 80s and 90s.

share of non-agricultural employment in the rural workforce during the 1980s, with the trend more clearly evident among male workers than among female workers. In addition, the evidence appears to point to a more rapid expansion of tertiary sector employment rather than of secondary sector employment and that the bulk of employment growth is of a casual nature, rather than permanent.

A recent study on the non-farm sector concludes that between 18-25 per cent of rural employment occurred in the non-farm sector in the beginning of the 1990s (Fisher, Mahajan and Singha, 1997). An important observation made in this study is that approximately one-fifth of the total employment is estimated to be generated by public sector services, primarily public administration and education (see also Sen, 1996). Other important sectors in terms of employment shares were found to include retail trade, personal services, construction, wood products and furniture, land transport and textiles. While manufacturing activities are often the first that come to the mind when discussing the non-farm sector, the study shows that services are easily as important.

A study by Acharya and Mitra (2000) draws on multiple rounds of National Sample Survey data (spanning the period 1984-1997), and also on two rounds of the Economic Census (corresponding to 1990 and 1998) and asks whether the positive non-farm employment trends of the 1980s have continued through the 1990s. They find little evidence of further expansion. At the all-rural India level they find that employment in the secondary and tertiary sectors grew from about 22 per cent of the workforce in 1983 to about 25 per cent by 1987-88. There was no further growth during the 1990s; the latest NSS survey for 1997 (a "thin" round) indicates an employment rate of about 24 per cent. The authors note considerable variation across states in the degree of occupational diversification (with states such as Kerala, Punjab, Haryana, Gujarat and Tamil Nadu clearly more diversified than others), but observe no clear evidence of growth in non-farm employment rates during the 1990s in any state other than Kerala (Acharya and Mitra, 2000).

Evidence from Village Studies

Alongside the analysis of nationally representative, large sample survey data, there has been a long tradition in India of village-level and regional studies. Many village studies note an expansion of non-agricultural employment. Wiser and Wiser (1971), for instance, observe the emergence of a tea stall by the bus stand and new bicycle and tractor repair shops. Epstein (1973) reports on the movement of entrepreneurs to the tertiary sector; in 1970, cafes, shops and cattle trading posts, cane crushers and rice mills emerged where they had not existed in

1955. Srinivas (1976) notes investment in bus lines, while Saith and Tankha (1992) comment on bandplaying as a local speciality of growing importance to the residents of Parhil, Uttar Pradesh. These observations indicate an *expansion* of employment opportunities which often accompany the *contraction* of traditional services. The new labour market and self-employment opportunities tend to be rather caste heterogeneous, thus compensating at least in part, for the contraction in the market for traditional labour services.

Village study evidence suggests that off-farm labour market opportunities are an important means of offsetting declines or high variances in income. Walker and Ryan (1990) find that in the ICRISAT villages, non-agricultural earnings have become increasingly important sources of income, increasing the mean and dampening household income variability in the 1980s. The latter effect seems to be particularly important in raising living standards of households in these villages.

In the village of Palanpur, Uttar Pradesh, both regular and casual employment outside the village has expanded (Drèze, Lanjouw and Sharma, 1998 and Bliss, Lanjouw and Stern, 1998). Given its location on the densely populated Gangetic plain, wage employment outside the village generally involves commuting to some nearby town within the district. Commuters have found employment in a wide range of establishments, both public and private, but the jobs in question rarely involve advanced skills or educational levels. In Palanpur, demand for employment in the non-agricultural sector exceeds the supply of jobs available (wage rates and work conditions are attractive relative to agricultural work). Part of the explanation for the persistence of such a wage gap lies with the process through which these jobs are allocated. Drèze et al. (1998) suggest that the process is governed both by an ability to pay a bribe and by personal connections. They observe regular non-agricultural jobs "clustering" around a small number of establishments where some village resident initially succeeded in making an entry, and then helped others to enter. Those who follow are frequently of the same caste or are otherwise related to the initial entrant.

This role of personal contacts and influences in job search could have wide-ranging implications. It could, for example, explain the large gap which is often observed between agricultural and regular non-farm wages, the low turnover of regular non-farm jobs and the fact that persons with low social status seem to be at a disadvantage in the competition for regular

non-farm jobs, even for given skills and endowments.[2] These features of the labour market obviously influence the distribution of non-agricultural incomes.

Village studies indicate that expansion of non-farm employment can also have a negative side. One of the more alarming findings in many village studies has been a decline in the female-male ratio over time. In Karimpur, Uttar Pradesh, Wadley and Derr (1990) notice a declining female-male population ratio among the *Jati* caste. They interpret this as a growing negative valuation of women and link it to the rising incidence in off-farm employment outside the village of *Jati* men. Since, in Karimpur, female farm workers are not generally hired independently of their husbands, women now have fewer employment and income-earning opportunities. Drèze et al. (1998) observe a similar decline in the female-male ratio among Jatabs over time and suggest it may be linked to the absence of any expansion in female labour force participation and a growing identification of disadvantaged castes with the patriarchical norms of privileged castes.[3]

Poverty and the Non-farm Sector
The impact of the rural non-farm sector on poverty has not been the specific focus of most studies of the non-farm sector in India. Nonetheless a number of observations can be made.

Village studies indicate that the distribution of non-agricultural employment and earnings reflects two influences. On the one hand, the poor with lower "reservation" wages generally show the greatest inclination to become involved in non-agricultural activities. This is, at least in part, because the poor in many villages are usually dependent on agricultural casual wage employment and this occupation is typically viewed with considerable distaste — a *last resort* activity which they would rather not be involved in. On the other hand, the better educated (or otherwise privileged) tend to have more *opportunities* for non-agricultural employment. Whether the poor are able to gain access to the non-farm sector thus depends on the extent to which they are crowded out by those with better contacts, status or wealth. This may well evolve over time. In Palanpur there has been a clear shift over time, with the better-off in the village acquiring an increasing share of non-agricultural employment and earnings.

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[2] Probit models estimated by Bliss, Lanjouw and Stern (1998) indicate that Jatabs, the lowest caste in the Palanpur hierarchy of castes, were significantly less likely to be employed in regular wage employment outside the village, controlling for education and wealth characteristics. (See also Unni, 1997). We examine these issues with large sample data in Section 4.

[3] The declining female-male ratio among scheduled castes has also been observed in Uttar Pradesh more generally by Drèze and Sen (1995). They note that this female-male ratio fell from 0.94 in 1901 to 0.88 in 1991.

By the early 1990s, the high-ranked Thakurs (previously landlords) had acquired a disproportionate share of non-agricultural employment. This pattern of a gradual reduction in the share of non-agricultural employment and earnings for disadvantaged groups has also been observed by Wadley and Derr (1990) in Karimpur, also in western Uttar Pradesh, and Leaf (1983) for a village in Punjab. [4]

At the broader national level, Ravallion and Datt (1996, 1999) show that the effectiveness of non-farm growth in reducing poverty has varied widely across states, reflecting systematic differences in initial conditions. In states with low farm productivity, low rural living standards relative to urban standards, and poor basic education, the poor have been less able to participate in the growth of the non-farm sector. They note an important role of initial literacy rates: more than half the difference between the elasticity of poverty to non-farm output for Bihar and that for Kerala is attributable to Kerala's substantially higher initial literacy rate.

Another important link between the non-farm sector and rural poverty occurs via the effect of the non-farm sector on agricultural wage rates. Agricultural labourers are highly represented among the poor in rural India and as a result increases in agricultural wage labour earnings are strongly associated with lower poverty (see Datt and Ravallion, 1998). Expansion of the non-farm economy appears to have influenced agricultural wages in rural India. Until recently, secondary data (Kurien, 1980) suggested that real wages in rural India showed no significant upward trend. However, evidence now suggests that an upward trend did, in fact, emerge in the 1970s and 1980s in most regions of India (Acharya, 1989).[5] The rise over time of agricultural wages is also remarked on in numerous village studies (for example, Leaf, 1983; Ramachandran, 1990; Harriss, 1989; Guhan and Mencher, 1983).

In North Arcot, Tamil Nadu, Hazell and Ramasamy (1991) indicate that although new agricultural machinery was displacing hired labour in paddy cultivation, real wage rates in agriculture actually rose (at least for some activities) as a result of increased off-farm employment and the consequent tightening of village labour markets. Because of a withdrawal from agricultural labour by large farmers and the expansion of competing employment opportunities in dairying and non-farm activities, agricultural employment earnings doubled between 1974/75 and 1983/84 for landless labour, small paddy farm and non-agricultural

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[4] The recent expansion of non-agricultural employment in rural Uttar Pradesh as a whole has been widely documented, see for example Ranjan (1994) and Sharma and Poleman (1993).

[5] There is no clear indication of a trend during the 1990s (Unni, 1996).

households. In Palanpur, real wages since 1974/75 have displayed a rising (if not monotonic) trend and have consistently remained well above the levels that prevailed in either 1957/58 or 1962/63 (Drèze et al. 1998). This improvement is all the more dramatically expressed in wheat purchasing terms. Because the relative price of wheat declined in Palanpur, reflecting increased production over time, one day of casual labor in 1993 fetched more than 8kgs of wheat, compared to less than 3kgs in 1957/58.

In sum, our review of literature has yielded the following five observations. First, linkages between the farm and non-farm sector in rural India are multifarious and strong. To date, there are few examples in the literature of a vibrant nonfarm sector emerging without the support of the agricultural sector in generating demand and providing investment resources. Secondly, small scale industrial activity in rural areas is widespread but the evidence suggests that many of the smallest enterprises (in terms of employment) are not terribly productive. At least some of the smallest enterprises may comprise last-resort sources of income to those who are unable to access agricultural sources. Thirdly, employment levels in the nonfarm sector appear to be growing, at least till the 1990s, although much of the employment growth is of a casual nature rather than permanent. A non-negligible source of employment is the public sector. Fourthly, village studies indicate that access to regular non-farm jobs is positively correlated with individual and household characteristics such as education and landholdings. This implies that the most disadvantaged in village societies are rarely found to be employed in the non-farm sector, especially in those activities which are well-paid. Finally, although the poor may not directly participate in the non-farm sector, this sector's impact on agricultural wage rates can be considerable, and therefore of indirect importance to poverty reduction. In the analysis which follows, we will revisit some of these points, focussing in particular on the final two elements of the story above.

The NCAER Data

The data on which this study is based are from a household survey of 35,130 rural Indian households from 1765 villages, drawn from 16 states, in 1993-4. The survey was conducted by the National Centre of Applied Economic Research. Data from the survey have been analysed in detail for the Human Development Profile of India (Shariff, 1999) and also by Sipahimalani (1999) in a study of gender differences in education in rural India.

A multi-stage sampling design was used. Income from agriculture and the rural female literacy rate were the variables used to form homogenous strata. From these strata a

certain number of districts were selected with probability proportional to the total rural population in the district. Further, villages were chosen linear systematically with sampling intervals chosen to be partially self-weighting.

The survey collected detailed information on a wide range of household characteristics and activities. The data permit the construction of a fairly comprehensive measure of rural household income. This can then be related to household demographics, education, land and other asset ownership, location, occupations, etc.[6]

While the NCAER data provide a rather unique opportunity to examine the sources of income and their levels in rural India, the data do not permit the construction of a comprehensive consumption aggregate (although some information on basic food consumption is available). This implies that one cannot compare poverty between the NCAER survey and the NSS survey of the same year (the 50th round survey) or other years, as the latter survey collects information on consumption and not income. In fact, it is difficult to decide what poverty line to employ even if one were content to simply calculate poverty measures within the NCAER dataset, as the poverty lines developed for India tend also to be interpreted as the expenditure levels necessary to reach a predetermined minimum standard of living (see for example GOI, 1993 and also Deaton, 1997). For these reasons we refrain from attempting to measure absolute poverty in this study, and confine our attention simply to the distribution of the rural population of India in terms of per capita income quintiles.

To render the income data spatially comparable incomes have been deflated by the state-level Tornqvist price indices for rural areas recently produced by Deaton and Tarozzi (2000).

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[6] Occupation and sector of employment information in the NCAER survey is provided at a very broad level. This restricts our ability to analyse the sectoral breakdown of non-farm activities.

3. SOURCES OF INCOME IN RURAL INDIA

According to the NCAER data, non-farm income in rural India contributed, on an average, about one third (34 per cent) of the total household income in 1993/4 (Table 1) compared to about 55 per cent from cultivation and 8 per cent from agricultural wage labour. It is clear that the non-farm sector is an important source of income, even at this highly aggregated national level. Examining the contribution of non-farm sources to total income across different per capita income quintiles indicates that among the middle three quintiles the contribution from non-farm sources is nearer two fifths than a third, while for the lowest and highest quintile the share is around 31 per cent. Taking all non-farm income sources together, the evidence in Table 1, thus suggests that the importance of non-farm income is fairly evenly spread across quintiles. This is in contrast with agricultural wage labour income, which contributes only a negligible amount to total income among the top quintile, but is fairly high for the lower quintiles. For the poorest quintile in rural India, agricultural wage labour income contributes as much as 28 per cent of the total income. Cultivation income shares, on the other hand, rise with per capita total income quintiles.

Table 1: Non-farm Income Shares in Rural India

Income Shares by (Real) Per Capita Income Quintile: All India
Quintiles Defined at the National Level

Quintile	Cultivation	Agricultural Wage Labour	Non-farm Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	38.2	28.2	15.8	11.4	4.4	31.6	2	1146
Q2	38	21.3	14.7	16.8	7	38.5	2.3	2113
Q3	45.2	13.4	10.1	16.3	11.7	38.1	3.2	3141
Q4	50.1	7.5	6.1	14.6	18.6	39.3	3.2	4712
Highest	64.5	2.1	2	7.9	21.1	30.9	2.5	11226
Total	54.9	8	5.9	11.5	17.1	34.4	2.7	4468

The picture is somewhat altered when one breaks non-farm incomes into three alternative sources: casual non-farm wage income, regular non-farm wage income and self-employment/own-enterprise income. For the poorest quintile, casual non-farm wage income accounts for about 16 per cent of total income. This drops to around 15 per cent for the second quintile and continues to fall monotonically across quintiles to only 2 per cent for the top quintile. In contrast, regular non-farm wage income shares rise sharply with the income quintiles – from only about 4 per cent among the poorest quintile to as much as 21 per cent for the richest. At the all-India level casual wage income accounts for about 6 per cent of total income while regular wage income contributes 17 per cent to total income. Own

enterprise income shares are highest for the second and third quintiles (around 16 per cent) and lowest for the top quintile. On the whole, own-enterprise income contributes about 11 per cent to total income.

These patterns are consistent with the view of the non-farm sector as a heterogeneous collection of activities which includes both productive and nonproductive occupations. The former contribute to growth, raise living standards and in general are associated with a dynamic process of intersectoral transfer out of agriculture into manufacturing and services, with specialisation and with technological change. The latter are more in the nature of residual activities into which people are *pushed* when other sources of income (cultivation income, rents, transfers, etc.) are not sufficient to make ends meet. For the poor, these activities contribute significantly to total incomes, but they do not actually generate significant returns. In the labour market, it appears that the low productivity and high-productivity activities can be neatly delineated by distinguishing between *casual* and *regular* employment. Among the own-enterprise activities, one can less readily distinguish between high and low-productivity activities in the absence of detailed sub-sectoral information. The important implication of these observations is that it is not obvious how non-farm income shares are likely to evolve in the face of broad economic development. While one would expect productive non-farm activities to become relatively more important with economic progress, the less productive activities would be expected to wither away. As a result, overall non-farm income shares might not rise (although, of course, both total and non-farm income *levels* would be expected to rise).

Appendix Tables present detailed tabulations, at the state-level. In these tables, the per capita income quintiles are defined over the state-population rather than the all-India level (so that the average per capita income for the bottom quintile in a rich state is higher than the average for the bottom quintile in a poor state). These tabulations reveal considerable heterogeneity across the 16 major Indian states covered by the NCAER survey.

Non-farm income shares are highest in the states of Himachal Pradesh, the Northeast, West Bengal and Tamil Nadu. In these states, non-farm income sources account for more than 45 per cent of total income (more than 50 per cent in Himachal Pradesh and the Northeast). Conversely, in the states of Gujarat, Madhya Pradesh, Andhra Pradesh, Maharashtra and Karnataka the share of income accruing from non-farm sources is below 25 per cent (and below 20 per cent in Maharashtra). For the remaining states the average share is typically around one-third.

When we look at the distribution of all non-farm income shares across state-level quintiles we see that in those states with high non-farm income shares (Himachal Pradesh, West Bengal, the Northeast and Tamil Nadu) the shares generally rise with income quintiles. For example in Tamil Nadu, while the average share of income from non-farm sources is about 46 per cent, the share for the lowest quintile is only 20 per cent and it is as high as 50 per cent for the richest quintile. Thus in those states where non-farm incomes are particularly important, it appears that shares are highest among the richest quintiles. This is in contrast to those states where the non-farm sector as a whole is relatively less important. In Andhra Pradesh, for example, while the share of income accruing from non-farm sources averages only 23 per cent, the share for the poorest quintile is 38 per cent and for the highest it is 18 per cent.

Another perspective on these patterns is obtained when we break non-farm income sources down into alternative categories. We saw above that total non-farm income shares may mask quite a bit of variation in terms of the relative importance of casual versus regular wage employment. In general, the pattern observed at the all-India level is reproduced respectively in each state: the share of income from casual wage employment is highest among the poorest quintiles, while for the rich quintiles the share from regular wage employment is the highest. In the state of Madhya Pradesh, for example, non-farm income accounts for 21 per cent of total income as a whole. Amongst the bottom quintile, the share of income from non-farm sources is 27 per cent, of which only 1.4 per cent can be attributed to regular non-farm wage income and 15 per cent to casual wage income. For the richest quintile the total non-farm income share is 16 per cent of which 11 per cent is from regular wage employment and 1 per cent from casual wage employment. In West Bengal, non-farm income accounts for 58 per cent of total income for the richest quintile of which 29 per cent come from regular wage employment and only 1.3 per cent from casual wage employment. In all the above examples, the balance is made up by income from own-enterprise activities.

At the all-India level, we found that self-employment incomes accrued mainly to the middle three quintiles. Across states this pattern is largely repeated although in certain states such as Andhra Pradesh, Kerala, and Madhya Pradesh income shares from own-enterprise activities decline across quintiles. For example, in Andhra Pradesh the share from own-enterprise income declines from a high of 24 per cent for the bottom quintile to 4 per cent for the top quintile. In these states, it seems likely that non-farm own enterprise activities are on balance mainly of the residual type: self-employment activities which households engage in to supplement meagre incomes from other sources, but which are unlikely to provide

adequate revenues to lift them out of poverty. For the rest of the Indian states, it appears that non-farm own-enterprise activities combine both low return and high return activities, such that the relatively well-off are also represented.

4. NON-FARM EMPLOYMENT PROBABILITIES AND INCOMES

We turn now to an examination of the individual, household and community characteristics which are associated with non-farm activities and incomes. We employ a multiple regression approach here which allows us to scrutinize, in turn, the statistical association between non-farm activities or incomes and specific characteristics, holding the influence of other characteristics constant. This multivariate approach is preferable to simple bivariate cross tabulations, but care must be taken to avoid misinterpretation. We will be careful to avoid suggesting clear causal relationships between the household characteristics and the particular dependent variable of interest. While in some cases the underlying relationship being explored may well be causal, we are not in the position to establish this rigorously. Further research on these questions is needed; one of our objectives with this paper is precisely to stimulate such activity.

Multinomial Logit Estimates of Non-Farm Employment Probabilities

We employ the multinomial logit model to explore the individual, household and community characteristics that are associated with the probability of non-farm employment in rural India (see Greene, 1993) for a useful exposition of this model). We consider five broad occupations in rural areas: agricultural labour; non-farm casual wage (daily wage) labour; non-farm own-enterprise activities; non-farm regular, salaried employment; and cultivation plus other remunerated activities.[7] Our "explanatory" variables comprise a selection of individual, household and community characteristics. At the individual level we consider the gender, age, educational status and caste status of each person.

At the household level, we have information on the size of the household to which each person belongs, the household's per capita landholding and the percentage of family members engaged in cultivation activities. These variables are intended to tease out some of the possible interactions between agriculture and the non-farm sector at the household level. For example, land ownership might proxy wealth and contacts, and thereby provide some indication of the extent to which individuals are better placed to take advantage of

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[7] We concentrate in this analysis on reported *principal* occupation, and are unable to consider, as a result, the set of issues associated with combining farm with non-farm activities during the course of, say, an agricultural year (with its associated peak and slack seasons).

opportunities in the non-farm sector.[8] At the same time, all things equal, larger per capita landholdings also equip a household better to engage in agriculture. Similarly, the percentage of family members engaged in cultivation might, on the one hand, proxy a latent demand to diversify out of agriculture (and thereby reduce exposure to agriculturally related risk) but on the other hand, capture a household's commitment to, and specialization in, cultivation.

At the community level we have calculated three variables which may influence the probability of an individual's involvement in non-farm actitivies. First, total village landholdings divided by the village population provides some indication of the population density in the village.[9] All things equal, a high population density would be expected to push people out of agriculture (as cultivation is increasingly unable to sustain livelihoods) and may well also stimulate non-farm activities (through lower transactions costs, economies of agglomeration, etc.). The second variable is a similarly constructed variable representing the agro-potential of the community. We simply divide the value of gross agricultural output in the village by total land cultivated to construct a measure of agricultural "yield" in the community. The variable can be used to explore the notion that the non-farm economy derives from and is sustained by agricultural productivity. The third community level variable is the *district* percentage of the labour force employed in non-farm activities. While this variable could well be collinear with the village "yield" variable, it is intended also to capture the strength of clustering of non-farm activities, and access to the specific infrastructure necessary to promote non-farm activities.[10]

In a country the size of India, it is probable that geographic variation provides an important additional dimension in explaining non-farm employment patterns. We allow geographic factors to influence results in two ways. First, we divide the country into four broad geographic regions (North-Central, East, West and South), and estimate the models separately in each of the regions.[11]

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[8] It is often noted that the market for the purchase and sale of land is rather thin in rural India, as opposed to the market for land use – tenancy (see Jayaraman and Lanjouw, 1999). Landholdings may therefore be reasonably exogenous in the kind of models estimated here.

[9] This variable, like the other community variables, is obtained by calculating "leave-out" aggregates over sampled households, where in turn each individual's household is left out of the calculation when assigning the aggregate to that individual.

[10] It is a fairly common observation that non-farm activites cluster together in rural area (Lanjouw and Lanjouw, forthcoming; see also Acharya and Mitra, 2000).

[11] Due to problems with convergence, we have not been able to include the state of Himachal Pradesh in our regression model for the North-Central region. Running the model separately for this state also encountered convergence problems.

Second, we introduce state dummies within each respective model.

The multinomial model requires that a particular occupational category be designated as the numeraire against which all results should be compared. We have chosen agricultural wage labour as the comparison group. Agricultural wage labour is a key occupation of the poor in rural India. Choosing this category for comparison purposes thus allows us to ask whether the other occupational categories can be regarded as systematically different in any way (and therefore associated with lower poverty). This implies that parameter estimates for the categories which are included should be interpreted not as correlates of employment in a given occupational category, but as indicators of the strength of association of a particular explanatory variable with the respective occupational category *relative* to the same explanatory variable with agricultural labour. To ease interpretation we consider direct parameter estimates and also some generated tables which summarize the impact of specific explanatory variables.

Tables 2-5 provide the parameter estimates on the multinomial logits for the four regions respectively. In the Northern region (Table 2) women are strongly and significantly more likely to be involved in agricultural labour than in any of the other four occupational categories considered. The parameter estimate for this variable is consistently negative in all four categories, with a probability value of 0 (emphatically rejecting that the parameter estimate is zero). The parameter estimate on age indicates that the young are relatively more likely to be active in agricultural wage labour. Relative to agricultural wage labour, the probability of employment in other occupations increases with age until at least 50 years of age (75 years in the case of cultivation) whereupon the probability declines.

Education is strongly associated with employment outside of agricultural wage labour. Those with no education (i.e., less than the dropped education dummy of some, but less than primary, education) are more likely to be employed in agricultural wage labour than in either cultivation or regular salaried employment. However, the uneducated are not significantly more likely to be employed in non-farm wage labour or non-farm own-enterprise

Table 2: Multinomial Logit: Sector of Employment North-Central Region
(Agricultural Wage Labour as Comparison Group)

	Farming and other occupations		Non-farm casual wage employment		Non-farm own-enterprise		Non-farm regular employment	
	Coefficient	Prob value	Coefficient	Prob value	Coefficient	Prob value	coefficient	Prob value

Female	-2.229	0	-1.947	0	-2.735	0	-2.492	0
Age	0.120	0	0.217	0	0.200	0	0.341	0
Age squared |	-0.0008	0	-0.002	0	-0.002	0.006	-0.003	0
No education	-0.301	0.021	-0.217	0.714	-0.766	0.197	-1.093	0.067
Primary education	0.0495	0.755	0.220	0.751	0.478	0.492	0.710	0.309
Secondary education	0.619	0	2.470	0.001	3.305	0	4.355	0
Higher education	1.668	0.001	2.742	0.031	4.270	0.001	6.420	0
SC/ST	-0.484	0	0.009	0.979	-0.894	0.011	-0.696	0.048
Muslim	0.166	0.218	0.725	0.206	1.088	0.057	0.604	0.294
Household size	0.221	0	0.027	0.378	0.092	0.003	0.079	0.010
Per capita land owned	0.097	0	0.050	0.013	0.074	0.001	0.111	0
Per capita land squared	-0.0001	0	-0.00006	0.078	-0.00015	0.046	-0.00026	0
Cultivating household	20.645	0	15.772	0	14.307	0	16.809	0
Population density (Village land per capita)	-0.0076	0.394	-0.018	0.613	-0.027	0.456	-0.025	0.495
Village average yield (value of output per acre)	0.0001	0.421	0.0002	0.727	0.00014	0.812	0.00012	0.832
Percentage of non-farm workers in village labour force	8.859	0	21.765	0	23.805	0	24.325	0
Rajasthan	0.670	0	1.429	0.028	0.319	0.624	0.157	0.810
Haryana	-0.098	0.485	-0.671	0.267	-1.240	0.041	-0.718	0.236
Punjab	-0.383	0.022	-2.707	0	-3.083	0	-2.701	0
Bihar	-0.571	0	-1.889	0.001	-1.618	0.004	-2.439	0
Madhya Pradesh	-1.696	0	-1.873	0.001	-2.347	0	-3.035	0
Constant	-6.044	0	-13.790	0	-15.526	0	-19.458	0
Pseudo R^2					0.7054			
Log Likelihood					-12058			
No. of observations					29513			

Notes
1. The Northern Region comprises of the states of Rajasthan, Haryana, Punjab, Uttar Pradesh, Bihar and Madhya Pradesh
2. Himachal Pradesh could not be included in the estimations as this resulted in problems of convergence.

activities than in agricultural wage labour. This is consistent with the view that these activities comprise at least some residual activities that the poor have access to. Based on point estimates, having completed primary education makes it less likely (relative to having only some, but less than primary, education) that an individual will be employed in agricultural wage labour, than any of the other occupational categories considered. However, these point estimates are nowhere statistically significant, so that we can't say with confidence that having completed primary education relative to having stopped prior to completing primary schooling, imparts an advantage in this respect. That conclusion is overturned when the individual has some secondary schooling and it becomes even weaker when the individual has completed schooling beyond the secondary level. Now, it is clear that (relative to someone with only some primary education) education clearly (and signficantly) indicates that an individual is more likely to be involved in cultivation or any non-farm activity than in agricultural labour.

Turning to religion/social class categories, we can see from Table 2 that individuals belonging either to a scheduled caste or a scheduled tribe are relatively less likely to be

involved in cultivation than in agricultural labour, and similarly are less likely to be involved in either non-farm own enterprise activities or non-farm salaried employment. There is no statistically significant effect regarding employment in non-farm wage labour relative to agricultural wage labour. Non-farm wage labour does not seem all that different from agricultural wage labour in providing employment to this disadvantaged population group. Individuals who are muslim are significantly more likely to be engaged in non-farm own-enterprise activities than in agricultural wage labour. However, they do not seem to be disproportionately involved in other non-farm occupations or cultivation, relative to agricultural labour.

Household size is positively and significantly related to own-enterprise and regular non-farm employment, but not to casual non-farm employment. This indicates that individuals from large households are particularly likely to be engaged in the former two non-farm activities, relative to agricultural labour, but that there is no similarly greater propensity to be employed in non-farm wage employment. To the extent that own enterprise, and especially regular non-farm employment are high productivity activities, this finding provides weak support to the notion that large households in the north of India are not particularly poor.[12] Relative to involvement in agricultural wage labour, individuals coming from large landowning households are more likely to be involved in either cultivation or any of the non-farm occupations. This finding is consistent with the notion that larger landholdings provide both opportunities for cultivation as well as for non-farm activities (via a wealth effect), and that agricultural wage labour is a particularly unattractive occupation, even relative to casual non-farm wage employment.

When we consider the parameter estimates on the variable indicating the percentage of family members involved in cultivation, we can see that the higher this percentage, the more likely an individual will be engaged in any of the occupations other than agricultural wage labour. In the case of cultivation, it is possible that an individual from a household in which many family members are engaged in cultivation is relatively unlikely to prefer to work as an agricultural labour than to join other family members in cultivation. In the case of the non-farm occupations, an individual might be expected to be particularly keen to become engaged in non-farm activities so as to reduce his or her family's exposure to the income

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[12] See Drèze and Srinivasan (1998) for further discussion of this point.

variability associated with agriculture. In no case does agricultural labour appear to be an attractive option.

Turning to community level variables we find that population density does not exercise an independent statistical influence on occupation categories. This might arise from the fact that in more densely populated localities there is greater demand for non-farm jobs, and possibly even a greater supply of non-farm activities, but also that greater population density pushes people into more intensive cultivation (if they have some land to cultivate) or into agricultural wage labour, where no alternative exists. The lack of a statistical relationship suggests that one effect does not outweigh the other. Village yield also does not "explain" much of the variation in occupational categories, although the point estimates (which are not significant) do suggest that greater agricultural intensity is associated with relatively more cultivation and non-farm employment than agricultural labour.

The greater the percentage of the district level non-farm employment, the greater the likelihood that an individual will participate in cultivation and non-farm occupations rather than agricultural labour. The positive and significant coefficient on the non-farm activities is fairly straightforward to interpret, suggesting simply some clustering of non-farm activities. What is less obvious is why one would be more likely to be involved in cultivation rather than agricultural labour in districts with a larger non-farm sector. Possibly an increase in the supply of non-farm employment opportunities, particularly casual non-farm wage employment, acts as a syphon to divert labour from agricultural wage employment into other, more appealing, income sources. We will explore this notion further in section 5.

Turning, finally to the states in the north central region of rural India, we find that relative to Uttar Pradesh, an individual in Rajasthan is more likely to be engaged in cultivation than agricultural labour, but that there is no statistically significant greater odds of involvement in non-farm occupations. In the states of Punjab, Bihar and Madhya Pradesh, an individual has considerably lower odds of involvement in cultivation and all non-farm activities, relative to agricultural labour, than in Uttar Pradesh. (The point estimates in Haryana are similar but not statistically significant – with the exception of own-enterprise activities). Uttar Pradesh thus appears to have a particularly sizeable non-farm sector and a particularly low incidence of agricultural wage employment, in comparison to its neighbour states.

Tables 3-5 present model estimates for the other regions of the country (the West, East and South respectively). Rather than go through each of the estimates in turn, we compare here briefly the results with those for the North Central region, focussing in particular on those results which differ. On the whole, the models for the other regions yield broadly similar findings, although the actual parameter estimates are generally quite different.[13] In all regions, women are significantly more likely to feature among agricultural labourers than any of the non-farm occupations or cultivation. Similarly, in all regions, the odds of employment in the non-farm sector and in cultivation, relative to agricultural labour, increases with age (with a turning point generally above the age of 50).

There are some slight differences in terms of the impact of education in the West, relative to the other regions. In the West there is less clear evidence that the non-educated are concentrated in agricultural labour (Table 3). In addition, in the West, those with primary education are significantly more likely to be engaged in cultivation rather than agricultural labour, relative to those with less than primary education. In all regions, the West included, the strong statistical association of non-farm employment with educational levels of secondary schooling and higher is confirmed.

The association between occupation and social/religious status does vary geographically. In the West, not only are scheduled castes relatively less represented in cultivation and own-enterprise and salaried non-farm employment, but they are also statistically less likely to be involved in non-farm casual wage employment compared to agricultural labour. Unlike in the North Central regions, muslims are not particularly more likely to engage in own-enterprise activities than agricultural labour, but they are statistically less likely to engage in cultivation than in agricultural labour. In the East, neither the effect of caste nor religion is found to exercise any independent statistical impact. In the South the caste effect mirrors that in the North Central region, but in the case of muslims it is found that the latter are significantly more likely to engage in cultivation, own-enterprise and salaried non-farm activities than agricultural labour.

The finding for the North Central region that household size is generally positively related with non-farm activities and cultivation, relative to agricultural labour, is repeated in the other regions, although in the East and West, it is found to be statistically significant even in the case of casual non-farm wage employment. Similarly, in all regions the effect of

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[13] Formal tests that the models are different are pending.

higher per capita landholdings and of an increase in the percentage of cultivating family members in reducing the odds of involvement in agricultural labour is reproduced.

Differences across regions are somewhat more pronounced for the village level indicators. In the West, population density reduces the relative odds of employment in any non-farm activities relative to agricultural labour. In this region, it appears that higher population pressure has the effect of releasing significant numbers of people for agricultural labour, without a compensating increase in non-farm employment opportunities. In the East, a similar line of reasoning appears to apply to non-farm salaried employment only, while in the South an effect of higher population pressure is observed with respect to the relative odds of engagement in cultivation as opposed to agricultural labour. In the latter region, the higher population pressure is associated with a greater propensity to be engaged in cultivation rather than agricultural labour.

Table 3: Multinomial Logit: Sector of Employment Western Region
(Agricultural Wage Labour as Comparison Group)

			Non-farm casual wage employment		Non-farm own- enterprise		Non-farm regular employment	
	Coefficient	Prob value	Coefficient	Prob value	Coefficient	Prob value	Coefficient	Prob value
Female	-2.044	0	-2.597	0.003	-3.520	0	-3.220	0
Age	0.130	0	0.134	0.170	0.163	0.099	0.335	0.001
Age squared	-0.001	0	-0.0005	0.676	-0.0003	0.751	-0.002	0.059
No education	0.024	0.869	1.293	0.163	0.177	0.850	-0.190	0.839
Primary education	0.429	0.016	0.601	0.545	1.243	0.212	1.290	0.196
Secondary education	0.659	0	2.281	0.052	3.393	0.004	4.269	0
Higher education	2.319	0.003	4.701	0.014	6.762	0	8.562	0
SC/ST	-0.724	0	-1.618	0.031	-2.433	0.001	-1.820	0.016
Muslim	-0.484	0.060	-0.073	0.969	0.041	0.982	-0.467	0.803
Household size	0.221	0	0.127	0.170	0.204	0.027	0.169	0.066
Per capita land owned	0.065	0	0.039	0.449	0.007	0.878	0.037	0.445
Per capita land owned squared	-0.0002	0	-0.0008	0.341	-0.00001	0.955	-0.0007	0.244
Cultivating household	17.54	0	13.721	0	14.623	0	16.160	0
Population density (Village land per capita)	-0.010	0.283	-0.163	0.001	-0.102	0.038	-0.149	0.003
Village average yield (value of output per acre)	0.0003	0.059	-0.0016	0.034	-0.0015	0.043	-0.0013	0.095
Percentage of non-farm workers in village labour force	8.766	0	22.154	0	24.319	0	24.537	0
Gujarat		-0.135	0.220	-0.769	0.245	-1.063	0.110	-1.038	0.118
Constant	-7.265	0	-13.216	0	-17.085	0	-20.84	0
Pseudo R^2				0.739				
Log Likelihood				-2997.021				
No. of observations				9,172				

Notes: 1. The Western Region comprises of the two states of Gujarat and Maharashtra.

Table 4: Multinomial Logit: Sector of Employment Eastern Region
(Agricultural Wage Labour as Comparison Group)

	Farming and other occupations		Non-farm casual wage employment		Non-farm own-enterprise		Non-farm regular employment	
	Coefficient	Prob value	coefficient	Prob value	Coefficient	Prob value	Coefficient	Prob value
Female	-1.552	0	-3.224	0	-3.430	0	-2.489	0
Age	0.169	0	0.246	0	0.265	0	0.387	0
Age squared	-0.001	0	-0.002	0.007	-0.002	0.009	-0.003	0
No education	-0.617	0.001	-0.337	0.520	-0.878	0.093	-1.077	0.046
Primary education	-0.153	0.534	-0.444	0.506	-0.208	0.753	-0.034	0.960
Secondary education	0.448	0.059	1.669	0.050	3.390	0	4.572	0
Higher education	22.594	0	21.327	.	24.749	0	27.437	0
SC/ ST	-0.234	0.121	0.048	0.903	-0.586	0.135	-0.486	0.222
Muslim	-0.082	0.709	0.366	0.583	0.0868	0.895	-0.141	0.833
Household size	0.295	0	0.296	0	0.315	0	0.336	0
Per capita land owned	0.223	0	0.142	0.028	0.217	0.001	0.268	0
Per capita land owned squared	-0.002	0	-0.0009	0.361	-0.002	0.113	-0.003	0.028
Cultivating household	23.214	0	18.329	0	16.453	0	17.618	0
Population density (Village land per capita)	-0.025	0.494	-0.067	0.503	-0.146	0.143	-0.242	0.017
Village average yield (value of output per acre)	-0.0003	0.274	0.0005	0.485	0.00005	0.941	-0.0007	0.281
Percentage of non-farm workers in village labour force	10.410	0	22.230	0	22.629	0	23.606	0
Northeast	0.350	0.106	0.535	0.341	-0.477	0.390	-0.664	0.237
Orissa	-0.432	0.024	1.142	0.031	-0.316	0.544	-0.527	0.318
Constant	-8.374	0	-19.190	0	-18.200	0	-22.600	0
Pseudo R^2				0.6948				
Log Likelihood				-3480				
No. of observations				7858				

Notes: 1. The Eastern Region comprises of the states of West Bengal, Orissa and the Northeastern states.

Table 5: Multinomial Logit: Sector of Employment Southern Region
(Agricultural Wage Labour as Comparison Group)

	Farming and other occupations		Non-farm casual wage employment		Non-farm own-enterprise		Non-farm regular employment	
	Coefficient	Prob value	coefficient	Prob value	Coefficient	Prob value	Coefficient	Prob value
Female	-1.995	0	-2.70	0	-3.046	0	-2.880	0
Age	0.135	0	0.309	0	0.353	0	0.460	0
Age squared |	-0.001	0	-0.003	0.001	-0.003	0	-0.04	0
No education	-0.611	0	0.715	0.200	-0.093	0.868	-0.812	0.157
Primary education	-0.239	0.150	0.944	0.163	0.926	0.171	0.933	0.175
Secondary education	0.503	0.002	2.023	0.001	2.639	0	3.641	0
Higher education	3.167	0.002	5.148	0.004	7.226	0	9.520	0
SC/ST	-0.659	0	-0.620	0.173	-1.724	0	-0.957	0.038
Muslim |	0.371	0.014	1.200	0.104	2.023	0.006	1.617	0.029
Household size	0.231	0	0.109	0.080	0.122	0.048	0.076	0.228
Per capita land owned	0.106	0	0.009	0.823	0.075	0.103	0.111	0.018
Per capita land squared	-0.0003	0	0	0.629	-0.0007	0.195	-0.001	0.037
Cultivating household	19.682	0	16.694	0	15.927	0	17.487	0
Population density (Village land per capita)	0.0196	0.080	-0.067	0.222	-0.005	0.932	-0.0359	0.519
Village average yield (value of output per acre)	0.000005	0.129	0.00001	0.384	0.000009	0.440	0.000006	0.621
Percentage of non-farm workers in village labour force	10.539	0	23.154	0	23.73	0	60.212	0
Andhra Pradesh	-0.307	0.054	-0.062	0.923	1.419	0.028	1.2119	0.062
Karnataka	-0.087	0.583	0.996	0.147	1.823	0.008	1.9393	0.005
Tamil Nadu	0.108	0.528	1.899	0.016	2.163	0.006	2.7481	0.001
Constant	-7.979	0	-19.477	0	-21.868	0	-61.529	./.
Pseudo R^2				0.717				
Log Likelihood				-6246.124				
No. of observations				15,486				

Notes: 1. The Southern Region comprises of the states of Andhra Pradesh, Karnataka, Tamil Nadu and Kerala.

The Village yield effect is not significant in the North Central region. This is similarly the case in the East and South. However, in the West, villages with higher yields are associated with a significantly greater relative odds of cultivation as opposed to agricultural labour, and significantly lower odds of non-farm employment relative to agricultural labour. The impression gained is that in the West, areas which are suited for cultivation (higher yields) tend to specialize in agriculture.

The strong evidence that agricultural labour declines significantly in relative importance as an occupation in those districts with a higher concentration of non-farm activities is repeated in all regions. The significance of this finding for poverty alleviation is considered further below.

In the West, there is no clear difference between Maharashtra and Gujarat in terms of average relative odds of non-farm employment and cultivation relative to agricultural labour. In the East, it appears that relative to West Bengal, the state of Orissa has a lower concentration of cultivators and a higher concentration of casual non-farm wage employment, compared to agricultural labourers. In the South, Kerala appears to stand out as a state in which non-farm activities, especially own-enterprise and salaried employment are less common relative to agricultural labour. In addition, in Andhra Pradesh, there appears to be a less frequent incidence of cultivation relative to agricultural labour, compared to Kerala.

The broad picture which emerges from these findings is that non-farm activities appear to be strongly associated with higher educational levels. Secondary schooling and higher is found to be strongly associated with non-farm activities, especially those such as salaried employment, which are presumably most productive. Women and scheduled castes (and scheduled tribes) tend to be particularly highly represented in agricultural labour activities, and commensurately underrepresented in the non-farm sector. In the North and South, muslims appear to be particularly well represented in non-farm own-enterprise activities. Household size is nowhere found to be positively associated with a higher relative probability of agricultural wage labour employment. This provides indirect evidence that large households are not necessarily those at greatest risk of poverty (which presumably would compel them to opt for an unattractive option such as agricultural wage labour). An interesting finding is that per capita land holdings are often (only weakly in the West) associated with both a higher relative probability of cultivation (relative to agricultural labour) but also to a higher relative probablility of non-farm employment – particularly salaried employment and own enterprise activities. This provides some support to the notion that access to non-farm activities may benefit from greater wealth. Field studies often argue that rationing of non-farm employment is at least partly determined by the ability to pay bribes, and/or access to networks of contacts. It is possible that wealth, represented by land holdings, proxies these factors.

Another strong and general statistical association is found between the percentage of the family labour force engaged in cultivation and the relative likelihood of cultivation or

some non-farm occupation. In no case does it seem that families with a high percentage of cultivators are relatively well represented among agricultural labourers. Our hypothesis is that an individual having to choose between cultivation and agricultural labour will choose the former if at all possible and this ability is being proxied by the share of cultivators in the family workforce. When the choice is between agricultural labour and some non-farm activity, then the larger the share of family members in cultivation the greater the exposure of the household to income fluctuations and as a result the greater the latent demand for some diversified source of income.

Our village-level variables, intended to capture linkages between non-farm activities and agriculture, were not everywhere strongly conclusive. This is not surprising because there are usually opposing effects. On the one hand, a greater population density, for example, might be associated with greater efforts to seek employment in the non-farm sector and possibly even some greater supply of non-farm opportunities, but it is also likely to result in more people being available for cultivation activities and agricultural wage labour activites. In the event, this particular variable was found to exercise some significance in regions other than North Central (reducing the relative odds of any non-farm employment in the West, reducing the odds of salaried non-farm employment in the East and raising the relative odds of cultivation in the South).

The village yield variable, intended to capture the suitability of the village land to agriculture, was also non-significant in the North Central, East and South regions. Once again, a higher yield could, on the one hand, increase the propensity to concentrate on agricultural activities, but on the other hand, be associated with higher demand for non-farm products and therefore stimulate greater non-farm activities (such as construction, manufacturing, services, etc.). In the West, there was some evidence to suggest that the former effect outweighs the latter so that relative probabilities of non-farm employment were lower in villages with higher yields.[14]

Finally a general, negative statistical association was found between the district level size of the non-farm sector (proxied by the share of district labour force employed in non-farm activities) and the relative odds of agricultural labour employment. It appears that non-farm activities display some propensity to cluster together and that in those districts in which the non-farm sector is sizable, the effect is to divert at least some segment of the traditional

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[14] Epstein (1973) provides a detailed case study of the impact of agricultural intensification on non-farm diversification in two villages in Southern India.

agricultural labour population into the non-farm sector. An important question we will turn to in the next section is what impact does this have on agricultural wage rates in those districts.

So far we have focussed on results in terms of the sign of coefficients and their statistical significance. The multinomial logit model estimates we have scrutinised are not readily interpretable in terms of size of impact. In order to provide some feel for these aspects, we provide in Tables 6 and 7 some predicted employment probabilities, under alternating assumptions about membership of social group and educational levels. In Table 6 we present predicted probabilities of employment in the five respective employment categories assuming respectively that the population is made up entirely of scheduled caste/scheduled tribe households, muslim households and neither. The exercise is repeated for each broad region in turn. Table 6 indicates that although the effect of social group on employment probabilities was often found to be strongly significant, the quantitative impact of these characteristics is not particularly large. In the North Central region, for example, the predicted probabilities indicate that SC/ST's are relatively more likely to be engaged in agricultural wage labour than Muslims or higher caste Hindus. However, the predicted probability for SC/ST's is 18.5 per cent compared to 16.7 per cent for Muslims and 16.5 per cent for higher caste Hindus. Similarly, the probability of salaried non-farm employment for SC/ST's is 10.5 per cent in this region, compared to barely one percentage point higher for other Hindus and one percentage point *lower* for Muslims. Own-enterprise activities are relatively more common among Muslims (13.6 per cent) than either SC/ST's (8.8 per cent) or other Hindus (12.2 per cent). Casual wage non-farm employment, on the other hand, like agricultural labour, is most common among SC/ST's and cultivation is marginally more common among higher caste Hindus.

These conclusions are based on simple scrutiny of predicted probabilities; it is not impossible that testing for differences statistically would not allow one to reject the hypothesis that there are no differences across population groups. Of course, it is important to recognise that the counterfactuals considered here are somewhat artificial, because they impose the assumption that in every other respect individuals are identical. Once one allows for the fact that SC/ST's are also less educated than the rest of the population and generally less wealthy, the actual employment incidence across employment categories and population subgroups are likely to be much more pronounced. On the other hand, it is clear, then, that the differences could not be solely attributable to the effect of caste or religion.

Table 6: Caste and Predicted Probabilities of Sector of Employment from Multinomial Logit Model By Region

	North-Central			West			East			South		
	SC/ST	Muslim	Other	SC/ST	Muslim	Other	SC/ST	Muslim	Other	SC/ST	Muslim	Other
Cultivation	48.4	49.6	50.0	49.2	49.0	52.3	42.5	42.6	43.2	36.7	39.3	39.0
Agricultural wage labour	18.0	16.7	16.5	30.1	30.2	26.8	18.9	18.7	18.3	32.8	30.0	30.4
Casual non-farm wage	14.3	10.6	9.6	7.5	7.0	6.0	9.9	9.8	6.7	13.5	7.2	9.6
Self-employment	8.8	13.6	12.2	4.1	7.1	6.6	15.7	17.4	18.5	7.3	15.5	12.5
Regular non-farm	10.5	9.4	11.7	9.1	6.7	8.2	12.7	11.4	13.2	9.7	8.1	8.5

Note: The statewise breakdown of the regions is as follows

North-central: Rajasthan, Punjab, Haryana, Uttar Pradesh, Bihar, Madhya Pradesh,

West: Gujarat, Maharashtra,

East: Northeast, West Bengal, Orissa,

South: Andhra Pradesh, Karnataka, Tamil Nadu, Kerala.

Broadly similar patterns are observed in the other regions, with SC/ST's relatively well represented in agricultural labour and casual non-farm wage labour, and less well represented in own-enterprise activities and salaried non-farm employment. In general, non-farm employment probabilities (combining own-enterprise with employment activities) account for around 35 per cent of total employment in the East of the country compared to roughly 30 per cent in the North Central and South and around 20 per cent in the West.

We next turn to a similar set of simulated employment probabilities where we consider alternative educational outcomes across the population. In Table 7 we consider, in turn across the four regions, the predicted probabilities of employment assuming, respectively, that no person has any education in the population, all have somewhere between no and primary-level education, all have primary-level, secondary level, and graduate level education. Here we see considerable differences across the alternative scenarios. In the North-Central region, the probability of employment in a salaried non-farm occupation is as high as 25.7 per cent if all individuals were educated up to the graduate level (controlling for all other characteristics) compared to 4.7 per cent if nobody had any education. Even if educated only to the level of completed primary the probability of salaried non-farm employment is more than twice the no-education probability. Interestingly, both of the other two categories of non-farm employment – casual daily wage employment and own-enterprise activities – are not monotonically related to education. In the case of non-farm daily wage employment, the employment probabilities decline as one postulates higher education levels. In the case of self-employment or own-enterprise activities, some education seems preferable to none, but with high levels of education employment probabilities decline again.

The very distinct association between non-farm employment probabilities and education levels, depending on whether one considers regular employment, own-enterprise, or casual employment, is repeated in each of the four main regions. These findings provide yet another important reminder that the non-farm sector is very heterogeneous and that in the absence of a careful delineation of different types of non-farm activities, the importance of education might be easily overlooked or misinterpreted.

Rural Non-Farm Earnings

We now turn to an examination of non-farm *earnings* as opposed to employment probabilities. Our explanatory variables remain unchanged. A brief comment about our econometric approach is in order. It is well known that a regression of non-agricultural incomes on a range of explanatory variables, using simple OLS techniques, yields biased estimates on the explanatory variables. This is because the OLS regression does not properly

Table 7: Education and Predicted Probabilities of Sector of Employment from Multinomial Logit Model

	North-Central				
	No Education	Below Primary	Completed Primary	Up to Secondary	Beyond Secondary
Cultivation	48.7	49.6	49.7	51.2	54.1
Agricultural wage labour	17.8	16.9	16.8	15.1	12.0
Casual non-farm wage	17.5	12.9	10.7	5.6	1.7
Self-employment	11.1	13.0	13.3	11.3	6.4
Regular non-farm	4.7	7.5	9.5	16.9	25.7

Note: The state wise breakdown of the region is as follows
North-Central: Rajasthan, Punjab, Haryana, Uttar Pradesh, Bihar, Madhya Pradesh.

Education and Sector of Employment
Predicted Probabilities from Multinomial Logit Model

	West				
	No Education	Below Primary	Completed Primary	Up to Secondary	Beyond Secondary
Cultivation	50.3	50.3	52.1	52.8	58.9
Agricultural wage labour	29.0	29.1	27.2	26.3	19.3
Casual non-farm wage	13.6	7.9	5.4	2.8	0.7
Self-employment	4.3	6.6	7.8	6.0	3.7
Regular non-farm	2.8	6.1	7.5	12.2	17.4

Note: The statewise breakdown of the region is as follows
West: Gujarat, Maharashtra.

Table 7: continued
Education and Sector of Employment
Predicted Probabilities from Multinomial Logit Model

	East				
	No Education	Below Primary	Completed Primary	Up to Secondary	Beyond Secondary
Cultivation	42.1	44.0	44.6	44.3	60.7
Agricultural wage labour	19.8	17.9	18.3	16.6	0.0
Casual non-farm wage	16.0	11.6	9.7	2.3	0.2
Self-employment	17.1	19.7	20.2	18.4	7.8
Regular non-farm	5.0	6.7	8.2	18.4	31.2

Note: The statewise breakdown of the region is as follows

Central: Northeast, West Bengal, Orissa.

Education and Sector of Employment
Predicted Probabilities from Multinomial Logit Model

	South				
	No Education	Below Primary	Completed Primary	Up to Secondary	Beyond Secondary
Cultivation	37.0	39.6	38.3	41.0	51.2
Agricultural wage labour	32.5	30.2	31.1	28.3	17.5
Casual non-farm wage	17.7	11.4	11.6	6.1	0.9
Self-employment	10.7	13.4	13.5	12.1	7.3
Regular non-farm	2.1	5.4	5.4	12.5	23.0

Note: The statewise breakdown of the region is as follows

South: Andhra Pradesh, Karnataka, Tamil Nadu, Kerala.

take account of the censoring of the dependent variable at zero (corresponding to all households which do not have any non-agricultural sources of income). A standard approach in this case is to estimate the tobit model instead. Recently however, concerns have been raised regarding the use of the tobit model in contexts, such as ours, where heteroskedasticity is likely to be present.[15] In the presence of heteroskedasticity, parameter estimates on the tobit model are not consistent.[16]

To overcome these difficulties we proceed by estimating a censored least absolute deviation model (CLAD) of non-agricultural incomes on a set of explanatory variables (see Jolliffe, 1998 and also Deaton, 1997). The approach here consists of estimating a quantile regression on the full sample of households (both with zero and non-zero non-farm incomes), predicting non-farm income on the basis of the parameter estimates, dropping those households for which predicted non-farm income is negative, re-estimating the quantile regression and then repeating the exercise with multiple iterations until no more negative predicted values are obtained. We then calculate bootstrapped standard errors on the parameter estimates.

Table 8 presents results from the estimated CLAD model in each of the four broad regions of India. Considering first the North-Central region, we can see that gender is strongly and significantly related to non-farm earnings. Controlling for all other characteristics, a woman would expect to earn 64 per cent less per year from non-farm activities than a male.[17] This earnings gap is likely to be the product of a conflation of factors. First, women may spend fewer days in non-farm employment during the course of a year. Second, women are likely to be more highly represented in lower-paid occupations (see also the previous section). Third, they might receive lower pay than men for the same occupation. Consistent with a general perception that women are more economically active and less constrained in the eastern and southern parts of the country, the earnings gap in those regions, while significant, is smaller in absolute value (35 per cent in the East and 54 per cent in the south).

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[15] Deaton (1997) provides a recent exposition and useful overview of the approach adopted here.

[16] It should be noted that testing for heteroskedasticity in these models is not straightforward as such tests require an assumption of normality and this is routinely rejected empirically (see Deaton, 1997).

[17] A coefficient c multiplying a dummy variable can be interpreted as a percent change in the endogenous variable only as long as c is close to zero. For larger values, in absolute terms, the percent change in the endogenous variable is given by $100[\exp(c)-1]$.

Non-farm earnings rise with age. In all regions this continues until the mid to late 30's whereupon earnings begin to decline with age. The association between non-farm earnings and education is as strong as the association between non-farm employment probabilities and education. Controlling for all other characteristics, an individual with no education earns some 35 per cent less in the North-Central region than if he or she had some, but less than completed primary, education. In the West and South this earnings gap would be even greater (70 per cent and 67 per cent, respectively). The gap is smallest in the East (24 per cent). On balance these gaps are remarkable and suggest that even a little education may be very important in improving rural incomes. Raising educational levels from the below primary-completion to the primary-completion level does not further raise non-farm incomes in all regions other than the West. There, achieving this outcome would raise non-farm incomes by about 76 per cent. The impact of raising educational levels to the secondary and higher levels is particularly strong. Controlling for other characteristics, an individual with secondary education in the North-Central region earns some 168 per cent more than a person with less than primary education, while if he is educated beyond the secondary level the earnings differential would be nearly nine-fold. These differentials are repeated in the other regions and are generally even greater in size.

Not surprisingly, given that the scheduled castes and scheduled tribes are less likely to find employment in the well paid non-farm occupations, we find evidence that controlling for other characteristics such individuals also earn lower non-farm incomes. In the North-Central and Eastern regions, the earnings gap is about 11-12 per cent, while in the South it is about 52 per cent. In the West the gap is not statistically significant. In all regions other than the East, Muslims tend to earn higher non-farm incomes than forward caste Hindus. In the North-Central and Southern regions the gap is around 50 per cent while in the West it is about 168 per cent. We have seen in the previous section that the Muslims are not, in general, well represented in non-farm wage and salaried employment, but are relatively more likely to be involved in own-enterprise activities such as shopkeeping, etc. These activities, it seems, can be quite lucrative. Household size is significantly related to non-farm incomes only in the West and South of the country. In these two regions, individuals coming from larger households tend to earn lower non-farm incomes.

In the previous section we saw that per capita landholdings were positively associated with employment in salaried and own-enterprise non-farm occupations. In the non-farm income regressions here, we see that the relationship is negative. The relationship becomes more negative the larger the per capita landholdings. It is likely that while landownership

acts as a reasonable proxy for access to non-farm employment opportunities, it also reflects wealth and other sources of income so that individuals with larger landholdings may choose to spend fewer days in non-farm employment than they would otherwise.

The larger the percentage of family members employed in cultivation the higher are non-farm incomes in the West and South. Here, the mechanism is presumably that an individual from a family in which many other family members are cultivators is likely to devote himself to his non-farm occupation rather than combine non-farm activities with cultivation. This translates into more days worked in the non-farm sector and higher total earnings.

Turning to village level characteristics, we find that low population density (more land per capita at the village level) is associated with lower individual non-farm earnings. This suggests that non-farm activities are entered into more intensively when population pressure is high and is also consistent with the notion that high population pressure occurs where there are more non-farm earnings opportunities and returns. This would be expected if non-farm activities are linked to agricultural productivity and this productivity is greater where labour inputs per acre are higher. To the extent that population pressure proxies agricultural productivity the significance of this variable might explain the lack of significance on the other village-level variable included in the model: village "yield" (the value of total agricultural production divided by total land cultivated). Only in the West is the village yield variable strongly significant and in this case the sign is negative, indicating that an increase in the village yield of Rs. 1000 is associated with a 0.3 per cent lower non-farm income. It appears that in the West non-farm activities and agricultural production are substitutes rather than complementary activities. This was also the case with employment probabilities.[18]

Turning to an examination of state-level effects, it appears that relative to Uttar Pradesh, in the North-Central region non-farm incomes are generally higher in Rajasthan (by 37 per cent) and Haryana (by 13 per cent), while in Bihar and Madhya Pradesh they are significantly lower (by 27 per cent and 42 per cent, respectively). Non-farm incomes in Punjab are not significantly different from Uttar Pradesh. In the West it appears that, controlling for all other characteristics, a person with a non-farm source of income in Gujarat would expect to earn roughly the same in Maharashtra. Relative to West Bengal in the

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[18] We were unable to add the district level variable proxying non-farm employment rates, as this led to convergence difficulties in our CLAD model.

Eastern region, non-farm incomes are on an average 33 per cent higher in the Northeast. Average non-farm incomes in Orissa are broadly the same as in West Bengal. In the South, non-farm incomes are on average 7 per cent lower in Andhra Pradesh than in Kerala. In Karnataka and Tamil Nadu they are respectively 27 per cent and 46 per cent higher than in Kerala.

Table 8: CLAD Estimates of Log Non-farm Incomes Per Person

	North-Central		West		East		South	
	Coefficient	Prob value	Coefficient	Prob value	Coefficient	Prob value	Coefficient	Prob value
Female	-1.03143	0	-1.105163	0	-0.435568	0	-0.7818998	0
Age	0.1300223	0	0.1455695	0	0.1289844	0	0.1541419	0
Age squared |	-0.001878	0	-0.0018428	0	-0.001718	0	-0.0021387	0
No education	-0.418358	0	-1.198231	0	-0.273212	0	-1.099429	0
Primary education	0.1412545	0.096	0.5625102	0.001	0.1388868	0.193	0.0775989	0.451
Secondary education	0.987368	0	1.773302	0	1.161127	0	0.6865052	0
Higher education	2.274153	0	4.123845	0	1.6164	0	2.738416	0
SC/ST	-0.11695	0.01	-0.2302661	0.136	-0.152467	0.012	-0.7280089	0
Muslim	0.4280701	0	0.9837774	0	0.0405875	0.66	0.4562186	0
Household size	0.0043233	0.421	-0.1757424	0	0.0109775	0.403	-0.0563809	0
Per capita land owned	-12.07731	0	-9.750092	0	-16.95775	0	-10.86366	0
Per capita land squared	-0.040348	0	-0.0532174	0	-0.000645	0.959	-0.0941615	0
Cultivating household	0.0000669	0.315	0.0002986	0	0.0001833	0.596	0.0010137	0
Population density (Village land per capita)	-0.009611	0.066	-0.0821932	0	-0.084351	0	-0.064575	0
Village average yield (value of output per acre)	0.0001143	0.093	-0.000344	0.023	0.000046	0.647	3.08E-06	0.132
Rajasthan	0.318354	0						
Haryana	0.130664	0.029						
Punjab	0.0071726	0.922						
Bihar	-0.319625	0						
Madhya Pradesh	-0.552186	0						
Gujarat			-0.1120325	0.266				
Northeast					0.2865019	0		
Orissa					-0.020889	0.834		
Andhra Pradesh							-0.0728254	0.38
Karnataka							0.2409561	0.006
Tamil Nadu							0.3769547	0
Constant	7.603238	0	7.367737	0			7.229913	0
Pseudo R^2	0.2235		0.3046		0.2335		0.2239	
No. of observations	32341		9909		8875		17863	

Notes: See Tables 2-4 for definitions of regions

5. NON-FARM EMPLOYMENT AND AGRICULTURAL WAGES

As described in Section 2 of this paper, village study evidence suggests that an important conduit through which expansion of the non-farm sector might be expected to influence rural poverty is via an impact on agricultural wages. One of the more robust stylized facts about rural poverty in India is that the poor are highly represented among agricultural labourers. We have indicated in the preceding sections that many of the qualities and characteristics which seem to influence access to non-farm jobs, particularly well-paying salaried and own-enterprise occupations (such as education, wealth and social status) are precisely those which the rural poor lack. At a first glance, therefore, the non-farm sector does not seem to hold out great prospects for rural poverty reduction. However, if an expanding non-farm sector tightens rural labour markets and leads to a rise in agricultural wages, then even if the poor are not direct beneficiaries in the sense of finding employment in the non-farm sector, their living standards may well still rise.

Table 9 presents some evidence in support of this latter contention. In this Table we present results of a village-level regression in which village average wage rates (in turn, the average wage rate for sowing and harvesting) are regressed on employment levels in the non-farm sector, plus control variables proxying the village "yield" and population density.[19] We also add dummies for each state (leaving out the dummy for Uttar Pradesh.) Note, the village average wage rate is a meaningful indicator of what a given individual in that village would expect to earn as an agricultural labourer, as there exists quite a wide body of evidence pointing to uniform village wage rates in rural India.[20]

One of the major arguments in this paper has been the importance of recognising that the non-farm sector is heterogeneous. Specifically, we have emphasised that access to different types of non-farm occupations is likely to vary considerably with educational levels and other assets. We have suggested that the poor would most readily have access to low-return, unskilled non-farm occupations. It therefore comes as no surprise that we find in Table 9, that agricultural wage rates are strongly and positively related to the share of village employment in construction activities, controlling for agricultural productivity and population

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[19] In this model the population density variable has been defined in terms of persons per acre in the village. The greater this number, the higher the population density.
[20] See for example Datt (1997) and Drèze and Mukherjee (1989). In our data, too, the degree of variation of reported agricultural wages within villages is very low.

density.[21] An increase in the construction employment rate of 1 per cent is associated with a Rs. 3 increase in the average wage rate from sowing and a Rs. 5 increase in the wage rate from harvesting. There is no comparable significant association between agricultural wages and the employment rate in skilled non-farm activities or in service activities.

An expansion of employment in "other" (non-domestic) service activities is associated with a *lower* wage rate in harvesting. In the case of sowing, a negative association is observed between the village average wage rate and the employment rate in "other" non-farm unskilled labour. Both of these latter two non-farm employment category activities may be proxying destitution in the village, in the sense of representing the share of the village labour force employed in residual, last resort activities. As such activities expand, reservation wages in agricultural labour also decline and one would consequently expect village average agricultural wages to fall.

Relative to Uttar Pradesh, it appears that agricultural wage rates are on an average (significantly) lower in the states of Karnataka, Madhya Pradesh, Maharashtra and Orissa. They are on an average higher in Andhra Pradesh, Haryana, Himachal Pradesh, Kerala, the Northeast, Punjab and Tamil Nadu. In the case of Haryana, Kerala and Punjab agricultural wage rates are markedly higher than in Uttar Pradesh.

We note, finally, that while non-farm employment rates in construction are positively related with agricultural wage rates, agricultural productivity and population density are also positively related to wages. The impact of agricultural productivity suggests that, on balance, agricultural intensification (multiple cropping, adoption of new technologies, a shifting of cropping patterns towards cash crops, etc.), has been associated with intensified labour use. The positive sign on population density suggests that this variable might be capturing proximity to urban areas, access to infrastructure and other facilities and so on. Such an interpretation seems plausible in a context where there are relatively few constraints on mobility.

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[21] The employment rate figures reported here represent the number of days of employment in the respective sector in the village in question. This definition varies somewhat from what was employed in earlier sections in that there the focus was on primary occupation.

Table 9: Determinants of Village-Level Average Wage Rates OLS Model

	Village average wage rate for sowing (males)		Village average wage rate for harvesting (males)	
	Coefficient	Prob Value	Coefficient	Prob Value
Constant	21.746529	0.0001	24.566128	0.0001
% of village labour force with primary occupation in domestic service	0.432686	0.8296	-0.115276	0.9572
% of village labour force with primary occupation in other service	-1.045891	0.4066	-2.876245	0.0416
% of village labour force with primary occupation in skilled labour	1.213982	0.4025	0.0552	0.9722
% of village labour force with primary occupation in construction	3.072909	0.0251	4.961683	0.0008
% of village labour force with primary occupation in other unskilled labour	-1.53274	0.0408	-1.294669	0.1161
Village "yield"	0.000167	0.0039	9.7803E-05	0.0551
Village Population Density	0.169533	0.0687	0.217714	0.0365
Andhra Pradesh	5.553194	0.0001	3.170341	0.0001
Bihar	1.125815	0.1134	-1.594117	0.0469
Gujarat	-0.826472	0.2959	-3.564703	0.0001
Haryana	21.798196	0.0001	22.021861	0.0001
Himachal Pradesh	9.620984	0.0001	5.892293	0.0012
Karnataka	-2.038842	0.0038	-4.640865	0.0001
Kerala	19.176737	0.0001	15.190447	0.0001
Madhya Pradesh	-2.258348	0.0001	-4.39736	0.0001
Maharashtra	-1.682735	0.0103	-4.939335	0.0001
Northeastern States	5.761454	0.0001	2.920817	0.0067
Orissa	-3.541855	0.0001	-6.978922	0.0001
Punjab	14.359729	0.0001	12.67435	0.0001
Rajasthan	1.871775	0.0744	0.174812	0.8624
Tamil Nadu	4.025685	0.0001	1.567717	0.097
West Bengal	0.876529	0.2904	-1.524302	0.1008
Adj. R^2	0.5756		0.5625	
No. of observations	1328		1387	

6. CONCLUDING REMARKS

The non-farm sector in India is a relatively under-researched component of the rural economy. Drawing on a large nationally representative household survey for rural India in 1994, we have indicated that non-farm incomes account for roughly one third of household income, on average. This estimate is most likely an understatement of the importance of non-farm incomes in rural areas, as our calculations are based on incomes from primary occupations only. We thereby are unable to document the importance of non-farm earnings from secondary, possibly seasonal, occupations.

Non-farm income shares vary considerably across states of India and also across population quintiles. We have indicated that a helpful three-way classification of non-farm activities distinguishes between casual non-farm wage labour, own-enterprise activities and regular, salaried non-farm employment. This ordering of the three categories reflects their respective importance as sources of income to the poor. While in aggregate terms total non-farm incomes are not particularly more important for the richer quintiles than the poorer quintiles, the poor tend to earn signficant shares of total income from casual non-farm wage employment. The rich earn mainly non-farm incomes from salaried employment. Own-enterprise activities appear to comprise both low-productivity activities as well as well-remunerated activities, such that the share of total income accruing from this category of activities is highest among the middle quintiles.

The states in which average non-farm income shares are particularly high are the states of Himachal Pradesh, Tamil Nadu, West Bengal and the Northeast. In these states non-farm income shares typically rise with income quintiles. This can be contrasted with those states in which average non-farm income shares are particularly low: Gujarat, Madhya Pradesh, Andhra Pradesh, Maharashtra and Karnataka. In these states, non-farm income shares tend to fall with per capita quintiles.

Analysis of non-farm employment probabilities and earnings finds strong evidence of the importance of education in determining access to non-farm occupations. There is clear evidence that education improves prospects of finding non-farm employment and that with higher levels of education the odds of employment in well-paid regular non-farm occupations rises. An important aspect of this general finding is that relative to no education at all, even small amounts of education can improve prospects considerably. This has important policy implications because it suggests one might expect to see appreciable changes in non-farm

employment patterns and levels, even with incremental improvements in general education outcomes.

The non-farm sector appears to offer relatively few real opportunities for women in rural India. Irrespective of region, women are markedly more likely to be employed in agricultural labour than in non-farm activities and to earn lower non-farm incomes. A weaker, but still significant, similar pattern applies to individuals from scheduled caste, scheduled tribe backgrounds. Not only do these groups typically possess much lower levels of human capital, but controlling for these assets, they face additional constraints on employment and earnings in the non-farm sector.

Wealth also seems to influence access to non-farm occupations. The evidence strongly suggests that the odds of non-farm employment relative to agricultural wage labour are considerably higher for those with larger per capita landholdings. We have suggested that a possible mechanism driving this finding is that per capita landholdings act as a proxy for an ability to pay bribes and for access to networks of contacts. Although per capita landholdings influence non-farm employment probabilities in a positive direction, the evidence suggests that this variable has a generally negative association with non-farm earnings. We have suggested that as non-farm earnings are a composite of the wage rate and the duration of employment, the negative association between earnings and landholdings may be attributable to a *choice* by the relatively large landholders to work shorter spells even though their landholdings do provide them *access* to the higher wage occupations.

Non-farm employment probabilities are not uniformly related to community and district-level characteristics across the country. This is not surprising given the heterogeneous nature of non-farm activities as both residual sources of income and sources of genuine upward mobility. In the western region of India (comprising of Gujarat and Maharashtra), for example, average non-farm income shares are quite low and tend to be higher for the poor than for the non-poor. In this region, higher agricultural productivity is associated with lower odds of non-farm employment relative to agricultural labour. It thus seems as though the non-farm sector acts as a substitute for agriculture when agriculture is not productive enough to sustain adequate incomes. In other regions, where the non-farm sector is more clearly productive, growth in agricultural productivity is positively (although nowhere significantly) related with non-farm employment probabilities. In terms of non-farm earnings the same pattern is observed (although here non-farm earnings are also weakly and positively related to agricultural productivity in the North-Central region).

The relationship between non-farm employment probabilities and earnings and village population density also varies across regions. In the West, higher population densities are clearly associated with higher odds of non-farm employment (relative to agricultural labour) and also higher non-farm incomes. In other regions, employment probabilities are not systematically related to population densities, but in all regions non-farm earnings tend to be higher in more densely populated villages. While population density may not generate additional non-farm employment opportunities, it seems likely that non-farm employment spells (and therefore incomes) of those with a non-farm job are higher in locations in which their contribution to family cultivation is less urgent.

The analysis of non-farm employment probabilities and earnings suggests that the poor are not particularly well placed to benefit from expansion of this sector. Low education levels, wealth and social status, all appear to restrict access of the poor to the relatively more attractive non-farm occupations, those which are most likely to be able to lift them out of poverty. Clearly, a very significant expansion of the non-farm sector might be expected to dilute the nature of the handicap that these characteristics impose on the poor. If the rationing of non-farm employment is gradually relaxed, it is likely that factors such as networks of contacts, or ability to pay bribes, might diminish in importance. However, in the absence of such a large, non-marginal, expansion of the non-farm sector it is difficult to see on the basis of the evidence presented here how the poor are going to feature among the main direct beneficiaries of a larger non-farm sector.

We have indicated however that the indirect impact of an expanding non-farm sector on agricultural wage rates (the sector in which the poor are most represented and likely to remain represented in the short run) can be considerable. This was found to be particularly the case with an expansion of employment in construction. Construction activities do not typically have a high skill requirement, yet they are generally preferred over agricultural wage employment. Expansion of construction employment opportunities is thus likely to syphon labour out of the agricultural labour market and thereby raise agricultural wage rates. A significant increase in agricultural wages can have a powerful impact on rural poverty. The analysis presented here thus suggest that policy makers seeking to maximise the impact of an expanding non-farm sector on rural poverty should concentrate on two fronts. First, efforts should be focussed on removing the barriers to the entry of the poor in the non-farm sector. This involves first and foremost, improving educational levels in rural areas. The evidence presented here suggests that even relatively small gains in educational outcomes may yield considerably improved employment prospects in the non-farm sector. Attention should also

be paid to the possibility of discrimination against population groups of low social status (most of whom are poor) and to the evidence that the process of job-search seems to favour the non-poor (because of their better contacts and greater ability to pay bribes).

Second, policy makers should note the strong evidence of an impact on agricultural wages of expansion in rural construction employment. The Government of India has long availed of public works programs as a means to respond to drought and other natural disasters. The evidence here suggests that an important distributional impact of such programs might be via their impact on agricultural wages. This implies that evaluation of employment programs (such as the EGS program in Maharashtra and the JRY in India more generally) requires looking beyond the incidence of employment creation to looking, as well, at agricultural wage trends.

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APPENDIX TABLE

Non-Farm Income Shares in Rural India by State

Andhra Pradesh

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	16.7	43	8.9	24.3	5.1	38.2	2.1	1397
Q2	24.9	38.6	7.4	20.7	7.3	35.4	1.1	2449
Q3	33.3	33.8	8.2	15.1	6.4	29.8	3.2	3503
Q4	53.2	24.2	7	6.2	8.6	21.8	0.8	5141
Highest	73.1	7.8	1.9	3.8	12.8	18.5	0.6	12709
Total	55.7	19.7	4.7	8.6	10.1	23.4	1.1	5046

Bihar

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	29.8	24	23.5	18.6	3.1	45.2	1	1064
Q2	30.9	19.1	16.6	26.1	5.4	48.1	1.9	1951
Q3	43.8	14	11.4	21.1	7.4	39.9	2.3	2870
Q4	51.4	4	4.7	21.7	16	42.3	2.2	4137
Highest	64.5	0.4	1	10	23	34	1.1	8418
Total	52.8	6.7	6.4	16.5	16	38.9	1.6	3690

Gujarat

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	36.7	44.7	11.3	2.9	3.2	17.4	1.2	1081
Q2	41.4	34.7	9	6.7	5.5	21.1	2.7	2091
Q3	49.7	21.5	7.3	7.3	11.6	26.1	2.7	3239
Q4	48.6	7	3.4	11.3	25.2	39.9	4.5	5133
Highest	77.1	1.6	1	5.7	12.5	19.2	2.1	14788
Total	63.7	9.5	3.3	6.9	13.9	24.2	2.7	5272

Haryana

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	31.3	21.9	28.5	7	6.2	41.8	5	1755
Q2	36.2	10.3	16.8	11.6	21.9	50.2	3.3	3252
Q3	44.4	2.6	8	11.6	28.5	48.1	4.9	4847
Q4	53.7	1.5	3.6	9.4	24.2	37.2	7.6	7257
Highest	73.6	0.1	0.3	4	17.4	21.7	4.6	14707
Total	58.5	3	5.5	7.3	20.5	33.3	5.2	6368

Himachal Pradesh

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	53.9	1.5	22.9	9.5	6.7	39.1	5.5	1123
Q2	41.2	1.6	27	9.8	10.5	47.3	9.9	2187
Q3	39.8	0.6	20.5	8	21.5	50	9.5	3348
Q4	34.8	0.1	10.7	11.1	32.6	54.4	10.7	4829
Highest	34.4	0	5.1	10.5	37.9	53.5	12.1	9335
Total	37.1	0.4	12.1	10.1	29.5	51.7	10.8	4168

Karnataka

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	39.8	41.7	7.1	7.7	1.6	16.5	2	954
Q2	44.9	31.5	9.5	10.2	2	21.7	1.9	1870
Q3	53.9	18.8	8.2	10.3	6.3	24.8	2.4	2874
Q4	61.8	9.2	4.7	10.6	12.4	27.7	1.3	4530
Highest	81	1.2	0.9	5.7	10.1	16.6	1.2	13602
Total	69.6	8.9	3.4	7.6	9.1	20.1	1.4	4767

Kerala

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	24.1	24.9	23.8	14.5	5.4	43.6	7.3	1670
Q2	24.9	24	28.6	12.1	6.5	47.2	3.9	2974
Q3	30.3	17.6	18.4	12.9	11.2	42.5	9.6	4041
Q4	36.4	11.7	11.8	11	15.3	38.1	13.8	5859
Highest	62.3	2.5	2.1	4.9	20.4	27.4	7.8	14288
Total	46.5	10	10.3	8.6	15.8	34.7	8.8	5768

Maharashtra

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	29.3	47.8	10	6.9	4	20.9	2.1	1345
Q2	37.1	30.3	11.4	8	8	27.3	5.3	2363
Q3	50.2	19.2	5.6	8.1	10.9	24.7	5.9	3572
Q4	61.7	8	3.2	5.4	17.3	25.9	4.3	5635
Highest	81.2	1.8	0.4	3.9	10.4	14.7	2.3	14684
Total	66.9	10	3	5.2	11.3	19.6	3.4	5524

Madhya Pradesh

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	42.4	27.7	15.2	10.7	1.4	27.3	2.6	1261
Q2	47.3	21.5	13.7	10.7	4.7	29.2	2	2093
Q3	57.9	12.5	10.5	10.3	6.5	27.3	2.3	2914
Q4	68.1	6.2	5.9	8.3	9.5	23.8	1.9	4329
Highest	81	0.9	1.1	4.2	11.1	16.5	1.6	10196
Total	69.4	7.3	5.6	7	8.9	21.4	1.9	4159

Orissa

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	44.9	25.6	18.6	7.9	0.9	27.4	2.1	743
Q2	44.6	16.9	20.2	13	3.6	36.8	1.6	1454
Q3	50.6	10.2	13.2	17.8	6.2	37.1	2	2223
Q4	55.6	4.3	6.3	15	15.7	37.1	3.1	3413
Highest	55.2	1.2	2.2	15.5	24.3	42	1.6	7287
Total	53.1	5.9	7.3	15.1	16.6	39	2	3027

Punjab

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	26	24.5	27.9	11.8	5.1	44.8	4.6	1473
Q2	28.6	9.5	16.9	17.2	21.8	55.8	6.1	2793
Q3	37.7	4.9	9.8	17.6	26.9	54.4	3.1	4221
Q4	51.1	2.2	4.3	8.4	27.2	39.9	6.9	6706
Highest	70.1	0.2	1	4.7	20.4	26.1	3.5	16690
Total	56.2	3.2	5.5	8.6	22.1	36.2	4.4	6380

Rajasthan

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	57.9	5	28.1	5	2.9	35.9	1.2	1179
Q2	55.9	2.8	25.8	7	4.8	37.6	3.7	2056
Q3	54.5	1.3	17.4	11.8	9.4	38.6	5.6	3032
Q4	52.2	0.6	8.6	13	19.6	41.2	6	4511
Highest	57.7	0.1	2.9	11.8	24.5	39.3	2.9	10328
Total	55.9	0.9	9.8	11.2	18.2	39.2	4	4227

Tamil Nadu

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	26.3	51.6	11.4	7.3	1.1	19.8	2.3	1093
Q2	27.8	27.5	18.2	14.1	10.9	43.2	1.6	2130
Q3	32.6	21.6	15.5	18	10.9	44.4	1.4	3377
Q4	35.7	14.9	14.2	7.8	23.4	45.5	4	5431
Highest	42.8	5.2	7	9.7	33.7	50.4	1.6	12292
Total	37.7	13.7	11	10.7	24.8	46.4	2.1	4867

Uttar Pradesh

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	48.4	14.2	16.3	14.2	5.1	35.7	1.7	995
Q2	44.2	9.7	15.9	19.9	9	44.8	1.4	2008
Q3	46.8	4.7	9.2	17.6	19.1	45.9	2.6	3047
Q4	50.7	1.9	5.1	15.1	24.7	44.8	2.5	4553
Highest	61.2	0.3	2	8.5	26	36.5	2	10317
Total	54.6	2.9	5.7	12.6	22.1	40.4	2.1	4185

West Bengal

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	36.3	27.4	10.2	8	17.7	35.9	0.4	1124
Q2	36.5	27.2	9.9	16.1	8.8	34.9	1.4	1858
Q3	33.6	19.3	6.6	29.7	10.3	46.6	0.5	2471
Q4	40.2	10	4.3	30.9	13.4	48.5	1.2	3534
Highest	36.1	4	1.3	27.6	28.9	57.8	2	6788
Total	36.7	12.2	4.4	25.9	19.4	49.7	1.4	3158

Northeast States

Quintile	Cultivation	Agriculture Wage Labour	Non-farm Wage Labour	Non-farm Self-Employment	Non-farm Regular Employment	Total Non-farm Sources	Other Sources	Real Per Capita Income
Lowest	46.6	15	13.7	21.2	2.4	37.3	1.1	1708
Q2	51.4	9	7.7	22.8	7.8	38.3	1.4	2783
Q3	43.4	6	9.4	25.4	13.6	48.4	2.2	4140
Q4	35.3	1.1	4.6	24.5	32	61.1	2.6	6043
Highest	31.9	0.1	0.4	16	48.5	64.9	3.1	10669
Total	37.7	3.3	4.6	20.7	31.3	56.5	2.5	5071