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ARTICLE

Rural Non-farm Employment in Eastern India: Implications for Economic Well-being

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Abstract

To be inclusive, economic development in India must focus on eastern India, which has a high population growth rate, population pressure, high incidence of poverty, small landholding size in agriculture, and underdeveloped rural infrastructure. Employment diversification towards the non-farm sector in eastern India from 1993–1994 to 2011–2012 shows considerable variation by income group and farm-size. The effects of diversification—whether driven by pursuit of higher income or distress—are stratified. Estimates based on instrumental variable regressions suggest that all types of non-farm employment improve the economic well-being of households.

Keywords Employment · Rural non-farm sector · Impact · Eastern India

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1 Introduction

India has experienced rapid economic growth in the past few decades, but the pace of its growth has been biased towards urban areas. Over-dependence in rural areas on the low-productivity agriculture sector has brought about a high and persistent disparity between rural and urban incomes (Chand et al. 2017). In the historical pattern of structural transformation, the income and employment shares of agriculture in total gross domestic product (GDP) and workforce decline unequivocally, but the high income disparity in India has bucked this trend. Increasing, the non-farm employment and diversification can boost the process of structural transformation and help India achieve its objectives of equitable and inclusive economic development (Binswanger-Mkhize 2012).

Occupational diversification in rural India is increasing, as is its contribution to income and employment (Lanjouw and Lanjouw 2001; Lanjouw and Shariff 2002; Lanjouw and Murgai 2009; Haggblade et al. 2010). The non-farm sector contributes 55.9% of the output in rural areas and 34.8% of the employment (Chand et al. 2017). Within the narratives and counter-narratives of diversification of rural non-farm employment (RNFE), the key issue is to understand whether the ongoing structural transformation is reducing the economic deprivation of rural households. Several pull and push factors determine the movement of rural workers towards non-agricultural activities.

One view holds that the non-farm sector plays a major role in the present developmental process: it has considerable potential to increase income and reduce poverty, overcome land constraints and other shocks in agriculture, and increase the capacity to invest (Lanjouw 1999; Reardon et al. 1998; Adams 2001; Barrett et al. 2001; de Janvry et al. 2005; Reardon et al. 2007; Himanshu et al. 2013; Reardon and Taylor 1996; Collier et al. 1986).

Another view is that an increase in the numbers of non-farm workers in rural areas does not necessarily result in positive economic development (Srivastav and Dubey 2002; Abraham 2009; Himanshu et al. 2013; Nagler and Naudé 2017; Kundu et al. 2003). The RNFE is pro-poor but inequality-driven; this duality requires policymakers to understand this structural transformation and its implications on inclusive development policies (Himanshu et al. 2013).

In India, the tendency towards employment diversification is significant and has sustained over time. However, employment diversification varies by region in both degree and extent. During 1977–1978, about 20% of rural male workers and 12% of rural female workers were employed in non-agricultural activities. Examining the regional characteristics of non-agricultural employment from 1972–1973 to 1983, Dev (1990) finds that the growth was around 1.5% per annum in the agricultural workforce and 4.7% per annum in the non-agricultural workforce. The share of agriculture and allied activities in GDP dropped from 41.1% in 1972–1973 to 14.1% in 2011–2012 and its share in employment (usual principal and subsidiary status) decreased from 73.9% in 1972–1973 to 48.9% in 2011–2012 (Reddy et al. 2014). This structural gap has significant implications for poverty and inequality.

Is rural employment driven by distress or by poor earning capacity (Abraham 2009)? Employment opportunities in the organised sectors (industry and services) are so scarce that labour is exiting agriculture and entering casual employment in the informal sector. Rural India has been experiencing this "stunted" structural transformation since the early 1970s (Binswanger-Mkhize 2013). Increased foodgrain production has linkages with growth in other sectors of the economy (Mellor and Lele 1973); for structural transformation and economic development, the agricultural sector must develop.

Examining the determinants of non-agricultural employment in rural India, Vaidyanathan (1986) hypothesised that non-farm employment has a high correlation with unemployment and that agriculture has a limited potential for absorbing labour. Providing evidence on several dimensions of rural non-agricultural employment, Dev (1990) estimated that in many states in India the incidence of poverty is lower among non-agricultural households than in agricultural households. Among non-agricultural households, the incidence of poverty is lower among households engaged in the services sector than in the manufacturing sector.

The RNFE is closely associated with income and employment in rural and peri-urban areas (Hazell and Haggblade 1990). Using state- and district-level data, the authors examine the influence of the agricultural income multiplier in the non-farm sector and conclude that ₹1 of value addition in agriculture leads to an additional ₹0.64 value addition in non-farm activities in rural and peri-urban areas. They emphasise the need for public policy to enhance the multiplier by increasing road, electricity, and banking services.

It is presumed that non-farm income accrues mostly to the richer segments of society, and therefore, it is inequality-increasing, but the poorer sections do benefit (Lanjouw and Lanjouw 2001). Employment in the RNFE is income-stabilising; income was more stable in rural areas that had public works programmes than in areas that did not. However, the role of the RNFE in reducing poverty depends on the type of non-farm occupations and wage in these occupations (Srivastav and Dubey 2002). A certain level of agricultural and industrial development could generate demand for non-farm goods and services which, in turn, would spur development. The study also emphasised on the development of human and physical capital for the poor as an outcome from the welfare-induced development in non-farm activities.

The non-farm sector can contribute to growth and reduce poverty (Deininger et al. 2007). In Sri Lanka, pro-poor policies have aimed to remove constraints in the expansion of small firms. Highlighting the economic importance of the rural non-farm sector, the study concluded that poverty is reduced faster by the non-farm economy than the indirect effect of wages. Using the Vietnamese Household Living Standards Survey, Hoang et al. (2014) find that an increase of 25–75% in an hour of non-farm work increases the probability of reducing poverty by 8–14% in a two-year period. Similarly, if one additional household member works in the non-farm sector, household expenditure increases by 14% in two years and 50% in 6 years. In India, rural transformation after the 1980s has contributed to an increase in household incomes and a decline in rural poverty (Himanshu et al. 2011, 2013).

There is an alternative view. The informal employment generated by structural transformation does not provide health or unemployment insurance; therefore, workers remain insecure (Binswanger-Mkhize 2013). Economic growth has been rapid, but structural transformation has not solved the unemployment problem. Restrictive labour legislation and poor power, water, and transport infrastructure slow down manufacturing growth. Further, non-farm opportunities in rural areas are accessible mostly to males as females in rural areas have limited access to education, which indirectly supports the views of Srivastav and Dubey (2002).

Eastern India has a high population growth rate and incidence of poverty; small landholding size; underdeveloped rural infrastructure; and the highest population pressure in India (Kumar et al. 2012). To be inclusive, economic development in the country must focus on eastern India. Empirical studies discuss and debate the narrative of non-farm sector development, but most existing studies, which are at the national level, exclude regional dimensions. This article aims to characterise the structural transformation in rural eastern India. Considering that diversification towards the RNFE has developmental benefits that reduce deprivation, this article attempts to identify when the benefits percolate in eastern India. It tries to understand whether the RNFE is reducing the economic deprivations of people in the eastern region.

2 Data Sources

This article uses household-level data from the quinquennial employment and unemployment surveys of the National Sample Survey Office (NSSO) pertaining to 1993–94 (50th round), 2004–05 (61st round), and 2011–12 (68th round). The 50th round survey was carried out from July 1993 to June 1994. The sample size in this round was 115,409 households, out of which 69,230 were rural. The second dataset used is 61st round survey, which conducted from July 2004 to June 2005. It covered 124,680 households, of which 79,306 were rural households. The third round used in the study is the 68th round, a survey conducted from July 2011 to June 2012. The sample size in the 68th round was 101,724 households, of which 56,700 were rural households. The surveys covered all Indian districts except certain interior areas of Nagaland and the Andaman & Nicobar Islands. In Jammu & Kashmir, it surveyed only 3 out of 14 districts.

This article considers rural eastern India to be composed of Assam, Bihar, Chhattisgarh, Eastern Uttar Pradesh, Jharkhand, Odisha, and West Bengal (Table 1). The surveys provide detailed information on the "principal industry of activity" by which a household obtains the major part of its income. These surveys provide information on socio-demographic and economic variables such as household size, religion and caste affiliation, monthly per capita expenditure (MPCE) on food and non-food items, and asset ownership status. These also make available data at a disaggregated level on family members of each household, such as age, gender, education, training, employment status at principal as well subsidiary level and type of job contract, availability of social security benefits, payment method, and unemployment level.

Table 1 Sample size of rural eastern India in the National Sample Survey, 1993–1994, 2004–2005, and 2011–2012

States	1993–94 (50th round)	2004–05 (61st round)	2011–12 (68th round)
Assam	3196	3349	2608
Bihar	4766	4354	3311
Chhattisgarh*	1487	1999	1438
Eastern Uttar Pradesh	3732	3419	2591
Jharkhand*	2209	2378	1759
Odisha	3337	3835	2971
West Bengal	4476	4988	3568
Eastern India	23,203	24,322	18,249

Source: Authors' calculations based on NSSO data

In 1993–1994, Chhattisgarh and Jharkhand were not created; to define eastern India, the sample households were calculated from the districts

3 Analytical Background

3.1 Descriptive Statistics

Based on the principal industry of activity, rural households are grouped broadly into "farm households" and "non-farm households". Since this article focuses on the non-farm sector, it groups the sector into mining and quarrying; manufacturing; electricity, water, etc.; construction; trade, hotels, and restaurants; transport, communication, etc.; and other services. Employment is defined on the basis of principal-cum-subsidiary ("usual") status. Farm versus non-farm assignment is based on workers' reported industry, occupation, and employment status.

A worker's principal status is determined by the worker's primary activity (equal to or greater than 180 days) in the year preceding the survey. Principal status workers spent most of their time in those activities. Any activity other than the principal status constitutes a worker's subsidiary status if he/she is engaged in any economic activity for a period of 30 days or longer. Usual status workers include principal status workers and subsidiary workers who spent part of their time working in the year preceding the survey.

The trend in employment diversification in eastern India is examined by comparing the percentage of employment participation across states, sectors, and subsectors over time. Variations in the pattern of farm and non-farm employment are analysed on the basis of household expenditure, which is taken as the proxy for household income and land ownership. Households are categorised into five quintile groups based on MPCE and five land or farm size categories: marginal (below 1 hectare), small (1–2 hectare), semi-medium (2–4 hectares), medium (4–10 hectares), and large (10 hectares and above).

3.2 Empirical Framework: Instrumental Variable Estimation

To assess the impact of diversification of the RNFE and other socio-economic and demographic characteristics on the household expenditure, two-stage instrumental variable (2SLS-IV) regression model and multinomial logit model are used. To examine the effect of non-farm activity on household consumption expenditure, the instrumental variable regression method is used. The purpose of the instrumental variable technique is to overcome the endogeneity problem in determining the factors of non-farm diversification and its impact on MPCE.

Participation in non-farm employment may not be random; several unobserved factors determine it. An ordinary least squares regression will likely lead to biased estimates and to address this possibility, the instrumental variable regression model is used, and estimation is performed in a two-step procedure.

In the first stage, the dependent variable is binary (if the worker's primary activity is in the rural non-farm sector, 1, otherwise = 0). The independent variables are a mix of qualitative and quantitative variables. A simple logit model is used to estimate the impact of factors associated with a worker's selection of non-farm sector employment. The logistic regression model is given by

$$\text{RNFE}\ (k) = \text{Ln}\left[\frac{p}{1-p}\right] = \beta_0 + \sum \beta_i Z_i + u_i \tag{1}$$

where p is the probability that a person (worker) derives its major source of income from non-farm employment, β_i refers to the regression coefficients to be estimated, Z_i represents a vector containing the worker's socio-economic and demographic characteristics (age, gender, education (both general and technical), household size, caste, and farm size), RNFE_i assumes a value of 1 if the primary activity of the ith person belongs to the non-farm sector and 0, otherwise, k indicates the subset of RNFE_i that includes "SE", "CL", "REG" and "ALL", depending on the type of dominant non-farm activity that the person engages in, RNFE (SE) indicates self-employed in the non-farm sector, RNFE (CL) indicates casual labour in the non-farm sector, RNFE (REG) denotes regular salary/wage earner employment in the non-farm sector, and RNFE (ALL) denotes all non-farm employment.

In the second stage, the impact of non-farm employment on expenditure is assessed by fitting an expenditure function:

$$\text{MPCE}_i = \alpha + \delta d(k) + \gamma X_i + \varepsilon_i \tag{2}$$

where MPEC_i denotes MPCE of the ith person and (dk_i) is a dummy variable indicating participation in RNFE that takes the value of 1 in the respective cases as varies from SE to ALL and 0 otherwise.

In Eq. (2), (k) is likely to be endogenous as participation in non-farm employment may not be random and may be determined by unobserved factors such as entrepreneurial tendency and ability, family lineage, or peer group pressure.

Hausman's test results suggested endogeneity. Hence, instrumental variable regression is implemented. An ideal instrumental variable should not be correlated with the dependent variable in Eq. (2), but it should be correlated with (k), the

variable representing RNFE, and it must satisfy the exclusion criterion of an instrumental variable such that there must be at least one variable in Z_i in Eq. (1) that is not in X_i in Eq. (2).

Based on a similar study (Lahoti and Swaminathan 2016), it is hypothesised that a peer group significantly influences a household's participation in non-farm employment. Here, a "peer group" is constituted of the households in the same social group in a neighbourhood, an idea suggested by Fontaine and Yamada's (2011). Accordingly, the proportion of households in the same employment group and village engaged in non-farm occupations are selected as the instrumental variable. Depending on the value of k in the regression, four variants of this variable have been tried. This variable is not likely to be directly related to household expenditure so as to satisfy the necessary condition of an instrument.

4 Rural Non-Farm Employment Diversification: General Trends

The pattern of rural farm and non-farm employment is assessed using the NSSO data on employment in India and eastern India corresponding to the periods 1993–1994, 2004–2005, and 2011–2012. Based on the self-reported principal industry of activity, which a person chooses out of the various heads of activities as their major source of income, the workforce is divided into farm and non-farm.[1] The employment share of the rural non-farm sector, which includes secondary and tertiary sector employment, increased from 22% in 1993–1994 to 36% in 2011–2012 in India and from 22% in 1993–1994 to 37% in 2011–2012 in eastern India.

In 1993–1994, over 78% of the households depended on the farm sector as their primary source of income; this percentage declined in 2004–2005 to 73% in India and 72% in eastern India and in 2011–2012 to 64% in India and 63% in eastern India. This transformation from farm to non-farm employment was brought about by the diversification in rural employment, but its impact and drivers and the heterogeneity within sectors need to be analysed.

The changing nature of RNFE over the years is examined by distributing non-farm workforce across three types of employment: self-employed, regular salary/wage earner, and casual labour (Table 2). Here, the self-employed operate their own enterprises; their remuneration comprises a non-separable combination of reward for their labour and profit of their enterprise. Regular salary/wage earners receive regular salary or wage based on a long-term contract which does not require daily, weekly, or monthly renewal. Casual labour requires daily or periodical renewal of work contract.

[1] Employment status, defined on the basis of usual principal and subsidiary (usual) status, is determined by worker activity in the 365 days preceding the survey. Principal status is when the worker spent most of their time either employed or looking for jobs. Activity other than the principal status constitutes a worker's subsidiary status. Usual status workers include principal status workers and subsidiary workers who spent part of their time working or looking for jobs in the 365 days preceding the survey. Farm and non-farm are calculated on the basis of reported industry, occupation, and employment status by estimated proportions from unit-level data.

Table 2 Changes in non-farm jobs in rural eastern India

	% Change			Annual growth rate in non-farm workforce (%)	
	1993–1994	2004–2005	2011–2012	1993–1994 to 2004–2005	2004–2005 to 2011–2012
Self-employed	58.60	59.64	49.39	4.67	1.29
Regular salary/wage earner	22.14	15.69	15.88	1.28	4.24
Casual labour	19.26	24.67	34.72	6.88	9.26
Total	100	100	100	4.50	4.06

Source: Author's calculations based on NSSO data

From 1993–1994 to 2011–2012, the percentage of casual labour in the non-farm sector increased, but the percentage of self-employed and regular salary/wage earners decreased. Only 22% of the non-farm workforce had salaried or wage employment in 1993–1994 (Table 2). From 1993–1994 to 2004–2005, regular salary/wage employment grew slower than casual labour and self-employment. From 2004–2005 to 2011–2012, the growth rate in regular salary/wages accelerated, but the absolute level of wage was still less than in the other two categories. The share of regular salary or wages in total non-farm employment, which offers high and stable income, fell to nearly 16% by 2011–2012.

A deceleration in growth brought down the share of self-employed activity in eastern India from nearly 59% in 1993–1994 to 49% in 2011–2012. The residual, last-resort option is non-farm self-employment, which includes unpaid family labour, wage work under different forms of contracting out tasks, and high-return activities depending on the skill and capital available for deployment (Himanshu et al. 2013). Growth was higher in casual labour in non-farm sectors, the least preferred non-farm activity, than in other types of employment; it accelerated from 2004–2005 to 2011–2012 and its share in RNFE increased from 19.26% in 1993–94 to nearly 35% in 2011–2012 in eastern India.

Table 3 presents worker distribution (usual status) by sub-sector and growth rate in rural workforce in the eastern India. Agriculture and allied sectors were the predominant employer (78.42%) of rural households in eastern India in 1993–1994, but the share fell to 63.46% in 2011–2012. The agriculture workforce grew annually at 1.34% from 1993–1994 to 2004–2005, but declined later at 1.74%. This decline in the absolute workforce is a recent, unprecedented change in the history of Indian agriculture. Though the share of the agriculture and allied sectors has declined over time, it is still large in rural employment. The share of agriculture in rural output at the national level, however, is much lower at 36% (Chand et al. 2017). To correct this structural defect in the economic transformation of rural areas, growth in non-farm employment needs to be accelerated.

The manufacturing sector's share in the non-farm workforce (7.29%) was the highest in 1993–1993, but it decreased to 3.48% in 2011–2012 due to slower growth in employment. Growth in the construction sector was the highest among non-farm sectors, and it has become the major absorber of the incremental workforce in rural

Table 3 Rural employment in eastern India, trends by sub-sector (1993–1994 to 2011–2012)

	1993–1994	2004–2005	2011–2012	CAGR (%) 1993–1994 to 2004–2005	CAGR (%) 2004–2005 to 2011–2012	CAGR (%) 1993–1994 to 2011–2012
Agriculture, etc.	78.42% (64,931,727)	72.18% (75,1515,763)	63.46% (66,453,415)	1.34	− 1.74	0.13
Mining and quarrying	0.53% (436,610)	0.4% (412,519)	0.48% (498,634)	− 0.51	2.75	0.74
Manufacturing	7.29% (6037,443)	8.44% (8,792,341)	9.49% (9,938,496)	3.48	1.77	2.81
Electricity, water, etc.	0.17% (138,496)	0.09% (93,068)	0.07% (73,731)	− 3.55	− 3.27	− 3.44
Construction	1.41% (1,168,021)	4.46% (4,647,200)	10.24% (10,727,577)	13.38	12.69	13.11
Trade, hotels, and restaurants	5.66% (4,690,237)	7.2% (7,491,465)	7.78% (8144,783)	4.35	1.20	3.11
Transportation, etc.	1.39% (1,148,698)	2.29% (2,382,238)	2.74% (2,865,258)	6.86	2.67	5.21
Other services	5.13% (4,248,275)	4.94% (5,147,861)	5.74% (6,015,799)	1.76	2.25	1.95
Total	100.00% (82,799,507)	100% (104,118,455)	100% (104,717,693)			

Source: Author's calculations based on NSSO data

Figures in parentheses are estimated numbers

eastern India, but employment grew less from 2004–2005 to 2011–2012 than from 1993–1994 to 2004–2005. The employment share of trade, hotels, and restaurants, 5.66% in 1993–94, grew to around 8% in 2011–12, as did other services, from 5.13% in 1993–1994 to 5.74% in 2011–2012.

The lowest expenditure quintile group depends more heavily than higher quintile groups on agriculture and allied sectors, and employment in the non-farm sector is higher among higher quintile groups. But the rate of increase is continual and higher in the service sector, which includes trade, hotels, and restaurants and transportation and other services. The share of secondary sector employment increases among higher income quintile groups, but at a diminishing rate, because service sector activities require higher skills and resources. In eastern India, 37% of people with at least secondary school education are in the highest quintile and only 10% are in the lowest quintile (NSS 2011–2012). The opposite is true for the agricultural sector as poorer households concentrate on the low-pay, free-entry agricultural labour market (Table 4).

The secondary sector includes mining and quarrying, manufacturing, electricity, water, and construction activities. From 2004–2005 to 2011–2012, the secondary sector's percentage share in employment increased from 13% to about 20%. The service sector shows the same trend over the subsequent period in each quintile group in eastern India. The growth rate is higher for construction activities in each quintile group over time.

Table 5 presents the distribution of workers (usual status) across farm size groups[2] in rural eastern India. For small to medium farms, the percentage of workers in agriculture and allied sector increases as farm size increases. Owners of large farms are less inclined towards agriculture. Non-farm activities are more concentrated in small and large farms. Non-farm activity has a negative relation with employment participation, but the relation is more continual in the secondary sector than in the service sector. From 1993–1994 to 2011–2012, the negative relationship between employment and farm size was sharper in the non-farm sector, but employment in most secondary and service sector activities in large farms increased.

Most of the poor and deprived states of the nation are in eastern India. Differences in population, literacy, prevailing wage rate, and geography in the seven states considered in this article result in disparities in farm/non-farm employment. The regional heterogeneity in the employment participation rate is analysed for the seven states and compared with the all-India figure (Table 6). In 2011–2012, farm sector employment in eastern India was 63.46% and non-farm employment 36%. Chhattisgarh had the highest farm sector employment (85.12%) in eastern India; non-farm employment was 14.88%. Non-farm diversification is high in Assam, Bihar, and Odisha, and it is the same in eastern India and all-India rural sectors.

Literacy has a direct relationship with employment. The distribution of the rural workforce in eastern India is analysed by sub-sector and education (Table 7).

[2] The farm size groups are marginal (< 1 ha), small (1–2 ha), semi-medium (2–4 ha), medium (4–10 ha), and large (> 10 ha).

Table 4 Employment participation rate (usual status) by sector and expenditure quintile in rural eastern India (1993–1994 to 2011–2012)

	Agriculture	Mining and quarrying	Manufacturing	Electricity, water, etc.	Construction	Trade, hotel, and restaurant	Transportation, etc.	Other services
1993–1994								
LQ	84.31	0.33	6.49	0.08	1.40	3.13	1.11	3.15
SQ	82.24	0.49	7.24	0.06	1.63	4.09	1.10	3.15
TQ	79.09	0.38	8.17	0.15	1.35	5.46	1.35	4.05
FQ	76.32	0.53	7.89	0.15	1.52	6.75	1.44	5.40
FIQ	69.44	0.97	6.67	0.41	1.10	9.09	1.96	10.36
2004–2005								
LQ	75.69	0.51	8.68	0.01	5.43	4.64	1.95	3.09
SQ	73.80	0.16	9.25	0.06	5.25	5.60	2.29	3.59
TQ	71.99	0.47	9.67	0.07	5.04	7.12	2.44	3.19
FQ	72.20	0.40	8.00	0.10	4.00	8.40	2.40	4.60
FIQ	67.68	0.50	6.71	0.21	2.73	9.88	2.30	9.98
2011–2012								
LQ	68.15	0.32	9.99	0.01	11.86	4.72	1.90	3.06
SQ	65.45	0.97	9.53	0.04	11.28	6.40	2.52	3.81
TQ	64.66	0.22	9.45	0.10	11.15	7.95	3.14	3.33
FQ	64.20	0.10	9.50	0.00	9.50	8.50	2.80	5.30
FIQ	55.24	0.74	9.02	0.17	7.61	11.12	3.31	12.79
CAGR 1993–1994 to 2004–2005								
LQ	0.77	5.92	4.49	− 16.43	15.09	5.46	7.12	1.60
SQ	0.61	− 8.2	3.89	1.33	12.98	4.56	8.61	2.83
TQ	1.14	4.15	3.58	− 5.1	14.96	4.51	7.64	− 0.17
FQ	1.70	− 1.54	2.33	− 3.05	11.64	4.24	7.18	0.70
FIQ	3.04	− 2.82	3.34	− 2.84	12.15	4.06	4.80	2.92
CAGR 2004–2005 to 2011–2012								
LQ	− 0.43	− 5.58	3.13	− 6.06	13	1.31	0.72	0.92
SQ	− 1.62	29.47	0.51	− 6.49	11.65	2.01	1.45	0.92
TQ	− 2.31	− 10.84	− 1.12	4.27	11.1	0.77	2.81	− 0.21
FQ	− 1.65	− 14.17	2.49	− 11.2	13.13	0.22	2.05	2.21
FIQ	− 2.76	6.02	4.41	− 2.93	15.86	1.8	5.44	3.72

Source: Author's calculations, based on NSSO data

LQ lowest quantile, *SQ* second quantile, *TQ* third quantile, *FQ* fourth quantile, and *FIQ* fifth quantile

Non-farm employment is decreasing among the illiterate, but increasing among those with primary, middle, and secondary education. From 1993–1994 to 2011–2012, the positive impact of literacy on non-farm sector employment increased. The improvement in literacy has positively impacted non-farm

Table 5 Distribution of workers (usual status) by different sectors in rural sector of eastern India across farm size groups, 1993–1994 to 2011–2012 Employment participation rate (%).

Sector	1993–1994	2004–2004	2011–2012	CAGR (%) 1993–1994 to 2004–2005	CAGR (%) 2004–2005 to 2011–2012
Marginal (below 1.0 ha)					
Agriculture	74.23	66.98	58.42	2.27	− 1.00
Mining and quarrying	0.61	0.50	0.48	1.23	0.46
Manufacturing	9.19	10.45	11.31	4.44	2.11
Electricity, water, etc.	0.16	0.09	0.08	− 2.22	− 0.15
Construction	1.82	5.58	12.00	14.27	12.62
Trade, hotels, and restaurants	6.88	8.38	8.70	5.10	1.50
Transportation, etc.	1.65	2.70	3.13	7.93	3.09
Other services	5.45	5.34	5.88	3.02	2.37
Small (1.0–2.0 ha)					
Agriculture	89.21	89.13	87.52	0.75	− 3.67
Mining and quarrying	0.35	0.11	0.26	− 9.55	9.83
Manufacturing	2.54	2.40	1.72	0.25	− 7.90
Electricity, water, etc.	0.18	0.08	0.02	− 6.80	− 18.40
Construction	0.41	0.98	1.97	9.16	6.65
Trade, hotels, and restaurants	2.88	3.29	3.34	2.00	− 3.24
Transportation, etc.	0.58	0.96	0.97	5.48	− 3.33
Other services	3.85	3.05	4.20	− 1.36	1.09
Semi-medium (2.0–4.0 ha)					
Agriculture	91.85	89.73	88.14	− 0.39	− 4.96
Mining and quarrying	0.23	0.03	0.08	− 16.17	6.90
Manufacturing	1.48	1.24	0.82	− 1.76	− 10.20
Electricity, water, etc.	0.04	0.14	0.00	11.27	− 41.56
Construction	0.16	0.73	1.50	14.43	5.56
Trade, hotels, and restaurants	1.98	3.52	3.37	5.19	− 5.32
Transportation, etc.	0.4	0.77	0.57	5.90	− 8.66
Other services	3.85	3.83	5.52	− 0.23	0.39
Medium (4.0–10.0 ha)					
Agriculture	91.31	87.66	78.3	− 3.05	− 9.10
Mining and quarrying	0.3	0.03	1.84	− 21.33	67.50
Manufacturing	1.19	2.02	1.81	2.11	− 9.05
Electricity, water, etc.	0.03	0.03	0.08	− 2.97	5.10
Construction	0.1	0.2	1.45	3.54	22.60
Trade, hotels, and restaurants	2.5	2.55	4.41	− 2.51	− 0.13
Transportation, etc.	0.33	0.98	1.41	7.43	− 2.61
Other services	4.24	6.53	10.7	1.21	− 0.88

Table 5 (continued)

Sector	1993–1994	2004–2004	2011–2012	CAGR (%) 1993–1994 to 2004–2005	CAGR (%) 2004–2005 to 2011–2012
Large (10.0 and above)					
Agriculture	64.31	69.07	61.27	− 8.45	9.23
Mining and quarrying	0.63	0.27	1.59	− 15.76	42.98
Manufacturing	12.82	7.2	6.52	− 13.69	9.56
Electricity, water, etc.	0.58	0.09	0.05	− 23.40	2.70
Construction	2.42	4.47	12.45	− 3.83	28.61
Trade, hotels, and restaurants	7.63	8.38	8.42	− 8.26	11.18
Transportation, etc.	3.19	3.05	2.96	− 9.39	10.62
Other services	8.41	7.46	6.73	− 10.02	9.49

Source: Authors' calculations, based on NSSO data

Table 6 Workers (usual status) by rural sector and state (%, 1993–94 to 2011–12)

States	1993–94		2004–05		2011–12	
	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm
Assam	79.31	20.69	74.28	25.72	62.03	37.97
Bihar	86.05	13.95	77.97	22.03	67.58	32.42
Chhattisgarh	91.49	8.51	86.15	13.85	85.12	14.88
Eastern Uttar Pradesh	79.28	20.72	72.64	27.36	64.15	35.85
Jharkhand	79.16	20.84	70.00	30.00	60.56	39.44
Odisha	81.04	18.96	69.04	30.96	62.25	37.75
West Bengal	63.53	36.47	62.72	37.28	53.21	46.79
Eastern India	78.42	21.58	72.18	27.82	63.46	36.54
All India	78.43	21.57	72.65	27.35	64.10	35.90

Source: Authors' calculations, based on NSSO data

diversification in eastern India; as literacy improves, the tendency towards non-farm sector employment increases.

5 Non-Farm Diversification: Determinants and Impact on Household Expenditure

Tables 8 and 9 report the results of the 2SLS regression (first stage and second stage), which explain the association between alternative forms of non-farm employment RNFE (ALL), RNFE (SE), RNFE (RSE), and RNFE (CL) and various other socio-economic and demographic factors that determine a person's livelihood choice. The results of the 2SLS model pertain to the observations pooled from

Table 7 Rural workforce by sub-sector and education (%, 1993–94 to 2011–12)

	Illiterate			Primary		
	1993–1994	2004–2005	2011–2012	1993–1994	2004–2005	2011–2012
Agriculture	62.19	50.64	40.69	22.52	27.04	27.96
Mining and quarrying	66.88	49.02	41.91	17.12	30.76	27.15
Manufacturing	52.73	44.01	36.26	31.39	34.22	36.55
Electricity, water, etc.	30.57	9.16	13.07	24.30	22.94	26.45
Construction	49.72	45.34	39.39	33.80	32.45	34.12
Trade, hotels, and restaurants	33.94	24.26	19.99	33.75	32.90	27.82
Transportation, etc.	33.47	35.52	28.45	39.28	30.94	36.77
Other services	23.95	18.07	12.71	18.42	17.33	12.66
Total	57.33	45.94	36.57	23.96	27.93	28.75
	Middle			Secondary		
	1993–94	2004–05	2011–12	1993–94	2004–05	2011–12
Agriculture	8.76	12.31	15.43	6.53	10.01	15.92
Mining and quarrying	6.97	8.97	10.56	9.03	11.25	20.38
Manufacturing	9.88	14.15	15.04	6.00	7.62	12.14
Electricity, water, etc.	24.16	42.67	27.41	20.96	25.22	33.07
Construction	10.57	15.29	15.17	5.91	6.91	11.32
Trade, hotels, and restaurants	18.01	20.44	22.51	14.30	22.41	29.68
Transportation, etc.	13.30	18.69	17.29	13.95	14.84	17.49
Other services	16.74	13.43	13.98	40.89	51.17	60.65
Total	9.88	13.40	15.87	8.82	12.73	18.81

Source: Authors' calculations, based on NSSO data

three NSSO rounds (employment unemployment round of 50th (1993–94), 61st (2004–05), and 68th (2011–12)). These include the states in eastern India only. All the estimates include state fixed effects and time (year) fixed effects, and the standard errors are clustered at the first-stage sample, which is at the village level.

The coefficients of the variable household size are negative and significant for both RNFE (RSE) and RNFE (CL). The results suggest that a person from a smaller family has higher probability of choosing employment in a non-farm regular salary-/wage-earning job and is likely to choose casual labour as a primary activity. The household size variable is positive and significant in the case of non-farm self-employment, or a person from a bigger family in rural eastern India will likely choose non-farm self-employment.

The coefficient of the variable age is positive and significant in absolute terms except in RNFE (CL) and the square of age is negative and significant in all the four variants of RNFE. This suggests that with increasing age, a person will likely

Table 8 Impact of non-farm employment on household expenditure: instrumental variable regression, first stage

	Dependent variable: Primary activity of the household [RNFE (SE/CL/REG/ALL0 = 1, otherwise = 0)			
	RNFE (ALL)	RNFE (SE)	RNFE (RSE)	RNFE (CL)
Household size	−0.003 (0.001)	0.004** (0.001)	−0.009* (0.001)	−0.0032*** (0.001)
Square of household size	0.002 (0.005)	−0.001 (0.0001)	−0.001 (0.001)	0.001*** (0.001)
Age	0.009*** (0.004)	0.004*** (0.001)	0.006*** (0.001)	−0.001** (0.001)
Square of age	−002*** (0.001)	−0.001*** (0.001)	−0.001*** (0.001)	−0.001** (0.001)
Technical education of the person^	0.219*** (0.013)	0.017 (0.012)	0.215*** (0.014)	−0.110** (0.005)
Sex of the person (female = 1, male = 0)	−0.074*** (0.004)	−0.021*** (0.003)	0.004** (0.002)	−0.057*** (0.002)
Caste dummy (SC/ST = 1, other = 0)	−0.020*** (0.003)	−0.037*** (0.003)	0.003** (0.001)	0.013*** (0.002)
General education (illiteracy as base)				
Primary^	0.053*** (0.003)	0.044*** (0.003)	0.018*** (0.002)	−0.006** (0.002)
Secondary above^	0.157*** (0.004)	0.065*** (0.003)	0.144*** (0.003)	−0.045*** (0.002)
Land size (below 1.0 ha, or marginal, as base)				
1.0–2.0 hectare, small^	−0.162*** (0.004)	−0.103*** (0.003)	−0.015*** (0.001)	−0.038*** (0.001)
2.0–4.0 hectare, semi-medium^	−0.179*** (0.005)	−0.121*** (0.004)	−0.014*** (0.003)	−0.037*** (0.002)
4.0 hectare and above, or medium and above^	−0.110*** (0.006)	−0.082*** (0.005)	−0.009** (0.003)	−0.014*** (0.003)
Casual labour wage (low = 1, otherwise = 0)				0.085*** (0.005)
Instrumental variables				
Proportion of households engaged in RNFE (ALL)	0.009*** (0.003)			
Proportion of households engaged in RNFE (SE)		0.001*** (0.001)		
Proportion of households engaged in RNFE (RSE)			0.008*** (0.001)	
Proportion of households engaged in RNFE (CL)				0.001*** (0.001)
Constant	−0.165*** (0.011)	−0.989*** (0.009)	−0.178*** (0.006)	
Time fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Number of observations	197,961	197,961	197,961	197,961
R-square	0.290	0.21	0.19	0.25

Source: Author's calculations, based on NSSO data

***, **, and * denote, respectively, at 1%, 5%, and 10% significance. Figures in parentheses are standard errors. ^ denotes dummy variables

to join the non-farm sector (but not as casual labour). However, after a certain age an increase in age has a negative relation with non-farm employment, implying that more older people may not get opportunities to choose non-farm employment as a primary activity.

The dummy variable representing a person's technical education is significant except in RNFE (SE). It suggests a greater tendency towards non-farm employment with the attainment of technical education, but a lower tendency towards non-farm casual labour. General education also positively impacts non-farm diversification except casual labour non-farm activity. As a person's education level increases, their chance of choosing non-farm activity (except in casual labour) increases.

Also, female workers in eastern India are likely to take regular salary-/wage-earning non-farm jobs (but not other non-farm employment). Females have more chances for joining non-farm regular salary-/wage-earning activity. The caste hierarchy in the non-farm sector is defined by a dummy variable. The Scheduled Classes and Scheduled Tribes, historically deprived social classes, are more likely to settle as casual labour in the non-farm sector and also in regular salary/wage earning partly due to the reservations for socially vulnerable groups in the organised sector. Land size is negatively related to the likelihood of a person choosing non-farm activity. Moreover, if the agricultural wage is low there are higher chances of choosing non-farm activity.

The instrumental variables included in the model are significant at 1% level, which indicates the importance of peer effect in the non-farm participation. The results of the second stage of the instrumental variable regression are presented in Table 9. Except RNFE (CL), the coefficients corresponding to the different non-farm employment [RNFE (ALL), RNFE (SE), and RNFE (RSE)] are positive and statistically significant, indicating a positive impact on MPCE.

Non-farm employment has no significant impact on the MPCE of casual labour with low education and skill because most of them usually find employment in low-pay, non-farm jobs, such as in the construction sector. The MPCE is assumed to be the proxy of household income; non-farm employment increases MPCE by 20% over farm employment. Similarly, the MPCE of the self-employed in non-farm employment increases by 16% over those in farm employment; regular, non-farm, salaried/wage employment raises MPCE by 50% over farm counterpart. Household size has a negative impact on MPCE; as the household size grows, the MPCE in non-farm sector employment also increases. Similarly, age has a negative impact on MPCE; but with growing age the impact on MPCE is positive, probably because experience and savings increase.

Both technical and general education has a positive and significant effect on MPCE. Females spend more on consumables than males as the MPCE is significant and positive. Scheduled Castes and Scheduled Tribes in non-farm employment spend less than other groups. Land size has a positive impact on MPCE. Casual labour wage has a negative and significant impact on MPCE, which is quite intuitive as low wage leads to low income.

Table 9 Impact of non-farm employment on household expenditure: instrumental variable regression, second stage

Variable: Dependent variable: log (MPCE)	Second-stage regression coefficients			
	RNFE (ALL)	RNFE (SE)	RNFE (RSE)	RNFE (CL)
Primary activity				
RNFE (ALL)^	0.200*** (0.019)			
RNFE (SE)^		0.160*** (0.020)		
RNFE (RSE)^			0.503*** (0.047)	
RNFE (CL)^				−0.011 (0.028)
Household size	−0.078*** (0.006)	−0.07*** (0.006)	−0.077*** (0.006)	−0.078*** (0.0062)
Square of household size	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.004)	0.004*** (0.005)
Age	−0.001** (0.001)	−0.001 (0.001)	−0.003*** (0.001)	0.006 (0.005)
Square of age	0.001*** (0.001)	0.001*** (0.001)	0.001*** (0.001)	0.004*** (0.001)
Technical education of the person^	0.181*** (0.017)	0.231*** (0.017)	0.108*** (0.198)	0.234*** (0.017)
Sex of the person (female = 1, male = 0)	0.047*** (0.004)	0.034*** (0.004)	0.030*** (0.004)	0.030*** (0.017)
Caste dummy (SC/ST = 1, other = 0)	−0.122*** (0.001)	−0.121*** (0.005)	−0.133*** (0.004)	−0.128*** (0.004)
General education (illiteracy as base)				
Primary^	0.144*** (0.004)	0.149*** (0.004)	0.145*** (0.005)	0.155*** (0.004)
Secondary above^	0.318*** (0.006)	0.343*** (0.006)	0.268*** (0.009)	0.348*** (0.006)
Land size (below 1.0 ha, or marginal, as base)				
1.0–2.0 hectare, or small^	0.169*** (0.007)	0.147*** (0.006)	0.137*** (0.006)	0.119*** (0.006)
2.0–4.0 hectare, or semi-medium^	0.028*** (0.009)	0.265*** (0.009)	0.249*** (0.008)	0.231*** (0.008)
4.0 hectare and above, i.e. medium and above^	0.293*** (0.013)	0.280*** (0.0126)	0.269*** (0.012)	0.257*** (0.012)
Casual labour wage (low = 1, otherwise = 0)				−0.134*** (0.006)
Constant	7.161*** (0.031)	7.197*** (0.032)	7.28*** (0.032)	7.24*** (0.033)
Time fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Number of observations	197,961	197,961	197,961	197,961
R-square	0.700	0.710	0.710	0.710

Source: Authors' calculation, based on NSSO data

***, **, and * denote significance at, respectively, 1%, 5%, and 10%; figures in parentheses are standard errors. ^ denotes dummy variables

6 Conclusions

In investigating the association between non-farm employment and the economic well-being of the people in rural eastern India, this article takes monthly per capita income as a proxy for measuring the economic welfare of people. It uses a large, nationally representative sample and instrumental variables and finds statistically significant effects of non-farm employment on MPCE. However, some exceptionalities are noticed in non-farm casual labour, one of the most vulnerable classes among the working population.

The changes in the employment profile of eastern India's rural households during the past 15 years is discussed using three rounds (50th, 61st, and 68th) of NSSO data on employment and unemployment indicate a significant shift from farm to non-farm employment. Apart from the general trend towards rural non-farm employment, rural people's employment in non-farm casual labour is expanding more significantly than in self-employment or regular salary-/wage-earning jobs.

Employment participation has increased in both the secondary and tertiary sectors in eastern India and the share of construction activity has expanded considerably in rural employment. The trend in employment participation denotes a structural change; it is broadly similar across quintile groups and farm sizes, but there are some variations. As per capita expenditure increases, participation in non-farm employment rises; however, the effect of higher per capita expenditure is more on the service sector than on the secondary sector. Owners of small and large farms tended to seek non-farm employment. The pace of non-farm diversification was more significant during the 15-year period in Bihar, Assam, and Odisha.

The 2SLS regression and multinomial logistic regression was used to assess the impact of rural non-farm diversification on average MPCE of the sample and the determinants of non-farm jobs. The first stage of the regression, which displays the relationship between non-farm diversification and other variables, reveals that the variables such as age, household size, gender, technical and general education, and caste significantly impact non-farm diversification in eastern India. Young people and better educated males prefer non-farm employment, but better educated people working as casual labour do not prefer the non-farm sector. People from large families in rural eastern India are likely to choose self-employed non-farm activity, but not non-farm, regular salary/wage jobs or casual labour activity. Non-farm employment—self-employment and regular salary/wage jobs—improve consumption expenditure, but casual labour non-farm employment affects it negatively.

This article highlights that the degree of non-farm diversification varies quite significantly across the types of rural employment. However, the positive impact of this diversification is noticed in self-employment and regular salary/wage earners, but the casual labour non-farm activity is proved to be vulnerable as mostly the deprived section tendency towards this casual activity is higher. Although at different levels, the casualisation is being highlighted, it should also be specifically highlighted in policy discourse to solve it in the rural non-farm sector.

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