

# AUGMENTING SMALL FARMERS' INCOME THROUGH RURAL NON-FARM SECTOR: ROLE OF INFORMATION AND INSTITUTIONS

Meenakshi Rajeev\* and Manojit Bhattacharjee\*\*

## Abstract

*Low level of income of farmers is a critical concern in India in the backdrop of which the current Union Government promised to double farmers' income by 2022. As the land size of the small and marginal farmers, who constitute 80 percent of farmer population in India is limited, reducing farmers' distress and doubling of farmers' income through farm sector alone is almost impossible. In this regard, the non-farm sector can not only absorb the excess labour from agriculture but also generate additional income for the farm households. Further, the sector can help in mitigating risks for the farmers and check migration to urban areas. The non-farm sector, however, has not received its due importance in the country and in this back drop, the current paper discusses the nature and extent of non-farm activities in India using India Human Development Survey unit record data. An exercise carried out to understand the determinants of income from non-farm activities using a Tobit regression model, shows that the households who could avail larger size loans (for any purpose including agriculture) or insurance from financial institutions and have access to information and networks are the ones who could get higher non-farm income. As the credit for non-farm activities per say is rather limited, it can be inferred that higher level of credit for even farm activities can help non-farm sector as well possibly through production linkages.*

**Key words:** Nonfarm sector, Linkage effects, Accessibility to Credit, Small and marginal farmers

## Introduction

As observed in case of many progressing countries, the Indian economy too experienced a decline in the share of agricultural output in gross domestic product with the growth of the economy, where the share of agriculture and allied activities in the gross domestic product reduced from 58 percent in 1950-51 to around 18 percent in 2014-15. However, the decline in the share of the farm sector output in GDP has not kept parity with the share of the sector in total employment, implying that a large percentage of farmer households (around 50 percent) remain dependent on a small part of income. In addition to low income, the agricultural sector is facing frequent supply side shocks, causing fluctuations in its growth rates with instances of even negative growth. For example, the growth rate of the agricultural sector was 1.5 percent in 2012-13, 4.2 per cent in 2013-14, and (-) 0.2 percent in 2014. Such trends create enormous uncertainty in the minds of the farmers, 80 percent of whom operate in marginal and small landholdings and have meager savings. In this backdrop, the rural nonfarm sector has the potential to alleviate the agrarian distress of the farmers by providing avenues for generating additional income as well as acting as a risk mitigating device.

While the farm sector includes activities like crop production, animal husbandry, plantation and forestry, the non-farm sector includes all other economic activities including small food/ agro-processing units, retailing, wholesaling, storage-related activities, house-based cottage industries (bamboo or say

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\* Professor, CESP, Institute for Social and Economic Change, Bangalore – 560 072. Email: [meenakshi@isec.ac.in](mailto:meenakshi@isec.ac.in).

\*\* Assistant Professor, St. Joseph's College, Bangalore. Email: [manojit850@gmail.com](mailto:manojit850@gmail.com).

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cane based), weaving and so on. As a result, the products of agriculture and allied activities often enter as an input for the non-farm sector and help generate additional income and employment. In other words, the complementary relationship that often exists between the farm and non-farm sectors is important and it allows for diversification within the farms.

Potential positive impacts of developing non-farm sector are not only confined to the small and marginal farmers. It can be especially useful to the landless tenant farmers, who cannot otherwise sustain a livelihood through agriculture (cultivation). Further, an expansion of the non-farm sector can lessen unemployment through an increase in labour demand and thereby help to raise wages in the rural labour markets. This contributes to a more equitable income distribution and a stable demand for agrarian goods through consumption linkage (Lanjouw *et al*, 2001). Given such beneficial impacts of non-farm activities for ensuring sustainability for the small and marginal farmers, including the tenant farmers, it is necessary to examine the factors that determine the development of the sector. It is indeed important to concentrate on the small and marginal farmers' category for whom these additional income generating activities are essential for escaping poverty and can act as risk mitigating devices. In the case of less developed economies, many a times we notice that lack of information regarding possible activities and funding act as major impediments (Rajeev *et al*, 2015) and hence we consider it necessary to examine the role of these factors in the development of the non-farm sector. On the other hand, large farmers usually get fully involved in agriculture activities and if they wish to get engaged in non-farm activities, both information and funds do not become constraining factors.

A large number of studies that focus on the non-farm sector have looked into the *linkages* between farm and non-farm activities and informal business in rural areas and an exhaustive review of literature is beyond the scope of this paper. A few scholars (von Braun and Pandya-Lorch, 1991) have argued that the relation between farm and non-farm employment is inverse in the sense that underdeveloped agriculture leads to the development of the non-farm sector in a region, implying that the rural nonfarm activities arise mainly because of certain push factors. In other words, the general conclusion of these papers is that if agriculture is incapable of generating enough employment, it leads to the growth of RNFS (Bhaumik, 2002). There are also studies which claim that growth of farm and non-farm sectors are complementary in nature. Mellor and Lele (1973) for instance argued that the growth in agriculture increases the income of the farmer households and this, in turn, raises demand for rural non-farm goods and services, thereby developing non-farm sector through consumption linkages. Recent studies, however, have accepted coexistence of both; for example, (Haggblade *et al*, 2007) maintain that nature of agricultural development in a state largely determines the nature of the nonagricultural sector. Several authors across the globe also focus on the trait that a household takes up multiple income-generating activities, which is termed as pluri-activity, to enhance their economic condition. Reardon *et al* (2007) provide a summary of certain studies (Barrett, *et al*, 2001; 2005), which show that Chinese households and households and communities in Kenya, Ivory Coast, and Rwanda follow development paths that comprise adoption of alternative income generating activities in the farm and non-farm sectors. On the other hand, more Latin American households specialize in one activity (Reardon *et al*, 2007).

While the rural non-farm sector is developing in India over the years, extent of pluri-activity and the factors that persuade a small farmer to take up these activities is not addressed adequately, and this research attempts to fill this gap by focusing, among other factors, on the role of information and networking and financial institutions. Our initial analysis of data reveals that most of the non-farm enterprises are own-account enterprises meaning that they have no hired labour. They are also seen to have low levels of gross value added. One of the reasons for not being able to go beyond such subsistence enterprises is, as mentioned above, due to lack of knowledge about profitable production possibilities and marketing opportunities (Rajeev *et al*, 2015). Networking and education may help to overcome such shortcomings. In addition, institutional factors such as lack of access to credit or risk-mitigating instruments like insurance through financial institutions may also impact the development of the non-farm sector. However, the role of these factors has not been rigorously tested in the existing literature.

In this background, the current paper unfolds in 4 sections. The next section describes the data source and examines the nature and extent of non-farm business among small and marginal farmers. Section 3 then examines using a Tobit regression model the role of information and funding opportunities in the development of the rural nonfarm sector, especially for the small and marginal farmers. A concluding section is presented at the end.

### **Data Sources and Certain Basic Indicators**

The paper is based on data collected through India Human Development Survey (IHDS), carried out in 2011-12 through a joint research endeavor of the University of Maryland, the USA, and the National Council of Applied Economic Research, India. The survey was conducted in two rounds known as IHDS-I (2004-05) and IHDS-II (2011-12) and in this study, we use the more recent database (2011-12). It is a multi-topic survey covering 42,152 households and includes 1,503 villages and 971 urban neighborhoods across India. The data is collected under two categories. The first of which is related to the households under which enquiry has been made about household income, expenditure, remittances etc. The second category considers institutional aspects which cover information about village-level infrastructure such as health, education and so on.

From IHDS-II survey, we have isolated data for small and marginal farmers (including the tenant farmers) and an analysis has been carried out using the unit record household-level data. A marginal farmer is defined as a farmer cultivating land below 1 hectare while the small farmers are the ones who cultivate between 1 to 2 hectares of land.

A land size-wise analysis of farmer households in rural areas shows that 75.1 percent of farmers in major states are small while the marginal farmers comprise about 15.1 percent totaling to about 90 percent of farmers in the small and marginal category. These numbers are however not free from regional disparities. For example, in terms of share of small and marginal farmers, West Bengal (91.7%) ranks the highest followed by Bihar (86.9%) and Uttar Pradesh (86.5%) while Maharashtra (52%) ranks the lowest.

Analysing major occupational activities of small and marginal farmer households (Table A.1 in the Appendix) it is observed that cultivation continues to be the main activity for a majority, across

India. An interesting observation, however, is the relatively low share of cultivation (less than half) in states like West Bengal, Uttar Pradesh and Tamil Nadu which have very high percentage of small-farmer households. These are also the states with the highest percentage of households engaged as wage labourers (agricultural and non-agricultural). Apart from cultivation, wage labour (both agriculture and non-agriculture) is found to be the second major occupation with an exception of Punjab, Haryana, and Assam. Salaried occupation forms a significant head in states like Assam and Haryana where wage labour engagement is low. Apart from this, farmers are engaged as artisans, petty shopkeepers but the fraction of households having them as the main occupation is pretty low (Table A.1 in the Appendix).

If we consider the main occupation of the sample households, only 8 percent of small and marginal farmers are involved in a non-farm business as a principal activity. However, if we look at non-farm business both as a principal activity as well as a subsidiary occupation, then this percentage naturally increases (to around 14 percent) but not to a substantial level (Table A.2 in the Appendix). As far as returns from non-farm activities are concerned, our analysis based on IHDS data shows (Table A.3 in the Appendix) average earnings of more than ₹ 60000 per annum for the small and marginal farmers which is a non-trivial amount in the light of what they earn from farm sector<sup>1</sup>. However, in the absolute sense, this is not a substantial amount and Table A.3 also reveals that only a small percentage of farmers are engaged in non-farm activities. Thus it is important to see what factors act as a deterrent to take up or enhancing nonfarm activities.

This led us to concentrate on a possible major constraint viz., access to funds for investment in a non-farm business. Examining accessibility to credit from the unit record data, we observe that at an aggregate level, the share of households that have received loans from all sources in the last five years is around 65 percent (Table A.4 in the Appendix). A state-wise analysis displays more or less similar figures, with acute exceptions in Assam (18.9%), Gujarat (31%) and Haryana (43%). This is a matter of serious concern as these are also the states which have the highest fraction of marginal farmer households.

As far as access to loans from formal institutors is concerned, it is observed that at the national level only 27.7 percent of households have received credit. It is also observed that around 3 percent of small and marginal farmers who applied were rejected by a formal institution and 69.3 percent of households did not apply for a loan (Table A.5). The households that did not apply for a loan can be risk rationed in the sense that the fear of not being able to repay led them to avoid taking a loan. This is where lack of information and financial illiteracy may have played a negative role.

In the next section, we discuss some of these possible factors that may have impacted the development of rural non-farm sector amongst the small and marginal farmers who are in need of additional income for their sustenance.

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<sup>1</sup> Rajeev and Vani (2011.) shows that about 70 percent of the marginal farmers net profit from farm sector is close to zero.

## Understanding the Determinants of Non-farm Income

### 1. Variables for the Analysis: Dependent Variable

The dependent variable considered for the study is non-farm business income of the household. We have considered the small and marginal farmers as per the land they cultivate (below 2 hectares). The land may be owned by the farmer or s/he may be a tenant farmer. It is important to note that around 85 percent of small and marginal farmer households in the sample were not having any non-farm business. For these households, non-farm business income was assigned as zero. 1706 households in the sample had positive business income and nine households had negative business income. For the regression analysis, we have considered these 9 households to earn zero income (to avoid the problem of outliers).

### 2. Explanatory Variables

The explanatory variables included in our analysis comprise a set of variables that pushes a small or marginal farmer household to adopt a non-farm business and also the variables that may create a conducive atmosphere to take up non-farm activities (pull factors). Both these factors can be idiosyncratic in nature or can be common region specific factors.

#### 2.1. Push Factors

The farm households are 'pushed' into non-farm activities primarily because of uncertainty in farm income or owing to their poor economic status, which may result either due to possessing smaller sized land holdings or lower agricultural yield rate in a region. Non-farm business in these situations generally acts like an insurance.

Thus the economic condition of a household is an important push factor which can be indirectly captured through land holdings. In order to identify the effect of land holdings on non-farm business income, we have included the size of cultivated land as an explanatory variable. However, sometimes farm households have other sources of income, such as regular salary or wage income. In these cases, push effect may not occur even though agricultural income may be low. The effect of alternative sources of income, too, is captured in our model by considering two variables, namely, salary and wage incomes of the households. These two factors are not combined to form a single variable because of their distinguishing characteristics such as larger and regular in nature of salaries compared to that of wage earnings.

Since the agricultural sector is characterized by the presence of uncertain shocks, farmer households need to insure themselves against risks and non-farm activities can act as a risk mitigating instrument. There are generally three kinds of risk that farmers face, namely, production risk, price risk and input risks (Rajeev *et al* 2015, 2016). To protect against these risks, a farmer household may attempt to save more as saving can act as a risk-mitigating device. Sometimes insurance can be indigenous and informal in nature, such as in the form of sharecropping, where the farm household is a tenant who gets an assurance of help from the landlord in case of a distress situation (Braido, 2003). Access to credit can also be considered as an indicator which helps to shield against adversities. In addition, there are formal insurance schemes pertaining to life, crop or health. The presence of any of

these risk-mitigating devices may deter a household from taking up additional income-generating activities in the form of non-farm activities to shield against possible risks. One may also argue on the contrary that the households having insurance may make a higher investment in the non-farm sector since they need to maintain lower precautionary savings. Insurance may also provide a cushion and induce a household to take additional risk in some cases. Thus the role of insurance in case of enhancing non-farm activities needs to be empirically tested. We have considered dummy variables for sharecroppers, and also for the households that have availed formal insurance schemes such as life insurance, health insurance or crop insurance and households which have access to credit. A discussion on access to credit is provided in the next section.

## **2.2. Pull Factors**

Non-farm activities are not always distress driven. As already mentioned, non-farm jobs may arise with a rise in the agricultural surplus and the resulting income earning investment opportunities in the non-farm sector. The economic status of households captured by land size, salary or wage earnings thus can also act as pull factor as a household with higher income has resources for investment in nonfarm activities.

In addition, if a region (here district) is economically advanced (captured through the median value of monthly per capita consumption expenditure of the respondents, MPCE) it can generate better demand for non-farm products. Some part of the demand may be for consumption purposes while the other may be for intermediary goods for carrying out production activities in the rural manufacturing or services sector. Since there are many districts in which the total number of households surveyed was less than 20, taking the median value has helped us in removing the effect of outliers. Agriculture yield could have been another variable to capture economic status of a region or a household. We have used median MPCE instead of agricultural yield because yield may vary from one year to another based on agricultural shocks that a region faces. India is geographically vast and different regions face different climatic conditions at any given point of time. It is possible for a developed agricultural region to face a relatively low yield, while a less developed region may not have an agricultural crisis in the year of survey. Temporary shocks have less impact on MPCE due to the presence of consumption ratchet effect. Finally the state specific dummy variables are introduced in the model to capture other regional factors.

Access to credit for nonfarm activities, which can provide the necessary capital to invest in the sector, can be an important pull factor. Access to credit for the farm sector can on the other hand boost agricultural productivity and surplus (Awotide *et al*, 2015) and thereby through such linkage effects can make resources available for investment in the nonfarm sector. On the basis of given data, we observe that accessibility to finances can be captured in two ways, namely, in terms of incidence of availing loans (number of loans within a specific time period) and extent or size of the loan. In the regression analysis, the incidence of availing loan is captured by including the number of times a household has availed loans in last 5 years. Incidence can positively impact the dependent variable only if the incidence does not imply perpetual indebtedness resulting from income below subsistence level. The extent of accessibility is captured by the largest size loan the household has availed in last 5 years.

Aside from the above-mentioned factors, access to information relevant for taking up profitable non-farm activities may have a positive impact on actual starting of a non-farm business, and to capture this effect, we have included two dummy variables, one relating to educational achievements and the other relating to access to media. Thus the first dummy variable was formed by assigning households having members with secondary education the value 1 and the rest as zero. Another dummy variable was formed where households that have regular access to radio, TV, and newspaper were assigned the value 1, the other households were assigned the value zero.

Social networking may impact non-farm business in a number of ways as it can provide necessary contacts for starting a business. Social contacts and networking can also aid access to low-cost inputs, market information etc. Households with more members are expected to have better social networking, as are households with members belonging organizations such as mahila mandal, SHGs, religious bodies, unions, caste associations, panchayat etc. Caste affiliations of households may affect social networking wherein generally higher caste households in India are expected to have such benefits. Each one of these factors is included in the regression analysis.

In addition to social networking, households with more members may have an additional advantage in the labour market as these households can perform a non-farm activity with family labour itself which reduces their costs as well as moral hazard problem. In the regression analysis, we have considered two variables to capture the number of household members. First, we have included teenagers and adult members (age between 14-60 years) and secondly, we have considered aged family members and children. This has been done because teenagers and adult members are expected to be more productive than children and older members.

**Table 1: Notations and Explanations of the Variables used in the Analysis**

Cultivated Land	Size of the cultivable land held by the farmer household
Wage Earnings	Wage Income of the Household
Salary Earnings	Salary Income of the Household
Forward Caste	Forward Caste = 1, others =0
Adult and Teenage Members	Number of adult and Teenage members of the household (age between 14-60 years)
Child and Old Members	Number of children (below 14 years) and old household members (above 60 years)
Secondary Education	Households with members having secondary education =1,others =0
TV/radio/Newspaper	If anyone is a regular user of TV, Newspaper or radio a value 1 is assigned, zero value is assigned otherwise
Social Connections	Households having membership in Mahila Mandal, SHGs, chit fund schemes, political party, religious groups, cooperatives clubs etc were assigned the value 1, rest = 0
Sharecropping	Sharecropper =1, rest = 0
Insurance	If the household has availed life, health or crop insurance =1, others = 0
Number of Loans	Total number of loans availed in last 5 years
Largest Loan Size	Largest size loan in last 5 year
District Median MPCE of farmers	Median monthly per capita consumption expenditure of small and marginal farmer households in a district
State Specific Dummy Variables	Represented by the respective names

**Table 2: Mean and Standard Deviations of the Variables used in Regression**

Variable	Obs	Mean	Std. Dev.	Min	Max
Nonfarm Business Income	12181	8972.049	58134.48	0	2457000
Cultivated Land	12181	1.273837	1.346881	0	50
Wage Earnings	12181	18398.42	28555.1	0	308500
Salary Earnings	12181	13825.64	54201.47	0	1080000
Forward Caste	12181	0.24177	0.428173	0	1
Adult and Teenage Members	12181	3.5823	1.627976	0	16
Child and Old Members	12181	2.107134	1.684304	0	19
Average Age of Head	12181	47.79017	11.89173	17.5	89
Secondary Education	12181	0.358099	0.479461	0	1
TV/radio/Newspaper	12181	0.432723	0.495474	0	1
Social Connections	12181	0.623594	0.484504	0	1
Sharecropping	12181	0.154092	0.361052	0	1
Number of Loans	12165	2.069955	3.059471	0	60
Largest Loan Size	12164	43153.06	143058.8	0	7500000
Insurance	12099	0.31358	0.463967	0	1
District Median MPCE of farmers	12181	17435.89	5965.188	6401.33	48373.34
Tamil Nadu	12181	0.021098	0.143718	0	1
Andhra Pradesh	12181	0.055578	0.229115	0	1
Karnataka	12181	0.127822	0.333905	0	1
Maharashtra	12181	0.094574	0.292637	0	1
Gujarat	12181	0.03998	0.195921	0	1
MP	12181	0.121172	0.326341	0	1
Orissa	12181	0.079714	0.270862	0	1
West Bengal	12181	0.048518	0.214867	0	1
Assam	12181	0.023972	0.152967	0	1
Bihar	12181	0.048929	0.215728	0	1
Uttar Pradesh	12181	0.154667	0.361602	0	1
Rajasthan	12181	0.105492	0.307199	0	1
Haryana	12181	0.046794	0.211206	0	1

**Note:** average salary income is less than average wage income because there are more number of wage earners in the sample than salary earners.

State specific dummy variables included in the analysis are expected to capture several regional fixed effects. Table1 provides explanations for the variables used in the analysis, and subsequently, Table 2 presents the related descriptive statistics.

### 3. Econometric Model

The dependent variable used here is the per capita non-farm business income of small and marginal farmer households<sup>2</sup>. It is important to note that the dependent variable assumes the value zero for a

<sup>2</sup> We exclude the wage income, if any and take purely nonfarm income.

large number of observations because non-farm businesses are not carried out by all households. Under this circumstance, one may think of a Probit model, which is generally used when a distribution is censored either from below or from above. In other words, the model is used when the actual dependent variable is not observed below or above a particular value. However, under circumstances in which the optimal choice for some individuals is itself a corner solution i.e.  $y = 0$ , the literature suggests the use of a Tobit model (see Wooldridge 2002).

The structural equation in the Tobit model is:

$$y_i^* = X_i \beta + \varepsilon_i \dots (1)$$

$\varepsilon_i \sim \mathcal{N}(0, \sigma^2)$  and  $y_i$  is a latent variable that is continuous for values greater than 0. The observed  $y$  is defined by the following measurement equation

$$y_i = y_i^*, \text{ if } y_i^* > 0 \qquad y_i = 0, \text{ if } y_i^* \leq 0$$

The Tobit model is estimated using the maximum likelihood procedure and the likelihood function takes the following form

$$L = \prod_i^N \left[ \frac{1}{\sigma} \phi \left( \frac{y_i - X_i \beta}{\sigma} \right) \right]^{d_i} \left[ 1 - \Phi \left( \frac{X_i \beta}{\sigma} \right) \right]^{1-d_i}$$

The parameters in this model i.e.  $\beta$ s and  $\sigma$  are estimated from the log likelihood function.

### Endogeneity and other concerns

There is a possibility of an endogeneity problem between non-farm business income and size of the loan in our analysis and consequently a Durbin-Wu-Hausman test was carried out in order to identify this. The test procedure is carried out in two steps: First, loan size was regressed on all exogenous variables and the estimated value of residual was obtained. In the second step, the residual term was included in the regression analysis. However, the test did not support the presence of endogeneity as the coefficient of the residual term was insignificant.

Another problem faced in any cross-sectional analysis is the presence of heteroscedasticity and the Robust Standard Error option was used to deal with this. We have also used four regressions to show the robustness of the model. Most of the coefficients did not change sign and significance with a change in model specification.

## **Results**

Four regressions carried out to understand the impact of different agriculture and other related (push and pull) factors on non-farm income are presented in Table 3. The first regression included a set of idiosyncratic socio-economic variables, the second regression included variables which capture household's access to credit and insurance as well as information and social networking related variables. The third model considers the impact of region specific variables on the dependent variable.

The last model is an incorporation of all the variables. We have considered those variables as significant which are significant in all the regressions<sup>3</sup>.

Sign of the regression coefficients of the major variables can be summarized as follows. The size of the cultivable land, and wage and salary earnings show a negative relation with the dependent variable in all the regressions. Variables capturing access to credit and information possess a positive relation with non-farm business income. As far as insurance is concerned, formal insurance has a positive impact on non-farm business income while insurance or security which may be provided through sharecropping has no significant impact on the dependent variable. The coefficient of the caste variable is also not statistically significant. The number of adult and teenage members of the household has a positive impact on non-farm income. The total number of old aged and children members is not statistically significant in the first regression. District Median MPCE bears a positive statistically significant sign related to the dependent variable (table 3).

**Table 3: Regression Results with Non-farm Business Income of the Household as Dependent Variable (TOBIT MODEL)**

Explanatory Variables	Coefficient	Coefficient	Coefficient	Coefficient
Cultivated Land	-11037.5** (4844.1)			-14387.2*** (5697.2)
Wage Earnings	-2.3*** (0.3)			-2.13 *** (0.28)
Salary Earnings	-0.4*** (0.1)			-0.53*** (0.11)
Forward Caste	1352.2 (6539.2)			-7551.6 (6903.97)
Adult and Teenage Members	34126.8*** (3921.1)			27438.45*** (3478.47)
Child and Old Members	874.7 (1862.8)			3796.251** (1934.70)
Average Age of Head	-1442.5*** (279.2)			-1384.55*** (277.3)
Secondary Education		54650.9*** (8156.6)		32790.59*** (6745.3)
TV/radio/Newspaper		30228.7*** (6005.7)		32207.89*** (6675.07)
Social Connections		3556.5 (5852.4)		10793.67* (6197.4)
Sharecropping		-5319.4 (7640.6)		-11967.6 (8742)
Number of Loans		2615.9*** (721.8)		1827.699** (752.09)
Largest Loan Size		0.1*** (0.034)		0.1028*** (0.03)
Insurance		45222.2*** (7697.6)		39640.1*** (7232.04)
District Median MPCE of farmers			5.07*** (0.909)	3.855*** (0.87)
Tamil Nadu			-171254 (28353.74)	-19093.2 (26218.28)

<sup>3</sup> We have also run a regression with per capital nonfarm income as dependent variable and arrive at qualitatively similar results.

Andhra Pradesh			-87576.3*** (22322.09)	-64963.8*** (20900.03)
Karnataka			56846.62*** (19881.33)	72952.11*** (20215.33)
Maharashtra			-5070.48 (20684.2)	-902.446 (19220.1)
Gujarat			-38381.87 (26166.28)	-28496 (25225.92)
MP			34362.9* (21320.6)	51951.59*** (20759.03)
Orissa			56204.59** (24721.6)	47738.42** (23581.11)
West Bengal			67630.58*** (24298.66)	71108.17*** (23303.47)
Assam			17075.56 (26074.82)	17928.67 (25481.32)
Bihar			60866.41** (26257.42)	58259.37** (25616.65)
Uttar Pradesh			66708.42*** (22519.93)	59754.26*** (21000.91)
Rajasthan			26042.34 (20696.31)	34923.31* (19565.17)
Haryana			2742.75 (21337.86)	-2431.87 (20151.75)
Constant	-226065.5*** (26736.09)	-283952.7*** (29568.64)	-347416.3*** (46609.73)	-357816*** (49931.9)
Number of observations	12181	12079	12181.0	12079
Uncensored observations	1688	1667	1688.0	1667
F	11.79	13.16	4.88	3.97
Log pseudo likelihood	-25518.229	-25316	-25742.6	-24982
sigma	189400.9**	190389.9**	197157.8**	181125.7**

**Note:** \*\*\* denotes significance at 1 percent, \*\* denotes significance at 5 percent and \* represents significance at 10 percent level. Figures in the parentheses are standard errors of the coefficients

The presence of a positive relation between median MPCE of farm households in a district and non-farm business income shows that non-farm businesses are adopted more often and generate higher income in agriculturally developed regions. This can perhaps happen either because of consumption linkage where farm surplus generates demand for non-farm goods and thereby augmenting non-farm income. Secondly, it may also happen because of agricultural surplus being invested in the non-farm sector (production linkage).

Institutional factors such as access to credit and insurance can also have a positive impact on the non-farm income. A farm household usually avails credit for farm activities as the supply of such credits are more due to priority sector lending norms while on the other hand credit for non-farm activities is comparatively less prevalent. But as mentioned above (Rajeev and Vani, 2011) credit to agriculture can enhance productivity and thereby create a surplus for non-farm activities. Similarly, access to insurance from formal institutions help farm households to reduce their precautionary savings and invest the surplus in non-farm activities.

One expects relatively large farmers (amongst the small and marginal farmers) and households having additional wage and salary income to generate higher agricultural surplus compared to the other

category. However, when we look at the relation that non-farm business income has with the size of cultivated land and wage and salary earnings, the regression reveals a negative relation, implying that farm households with relatively lower farm surplus are earning more from the non-farm business. One possibility as mentioned already in the previous section could be specialization of relatively larger farmers on farm business because of cultivating (comparatively) larger sized land by family members thereby facing a shortage of family labour for non-farm activities. Hiring labour can be considered as a possibility but the presence of higher supervision and labour cost may reduce returns from investments. In this context, a positive sign of the coefficient of the variable 'adult and teenage members' provides further support to this line of argument. The regression result shows that households having more adult and teenage members earn higher from non-farm activities, which to some extent proves the role played by family labour in generating nonfarm income. The argument of labour shortage for non-farm activities can also be considered for households having regular salaried and wage-earning members. There could be other reasons as well. For instance, higher earnings in farm sector or additional wage and salary earnings may lead to a backward bending labour supply curve for the non-farm sector since households with higher income may prefer leisure to work effort.

If the hypothesis of a family labour shortage is accepted, then it implies that non-farm activities by farmer households are mainly explained by the existence of surplus labour in the family. From the data, it is observed that only 2.6 percent of the small and marginal farmer households involved in non-farm business incur expenditure on hiring labour for non-farm business. Thus non-farm activity is mainly carried out using family labour. However, this does not negate the argument of leisure labour tradeoff, particularly for regular salaried individuals who earn more than wage earners.

The other important variables that positively influence non-farm business incomes are access to education, regular access to newspaper, radio or television. These factors create 'pull' effects into the non-farm sector as noted above, driving investments to the sector so as to diversify income sources and safeguard against agricultural risks such as crop failure. Thus, our econometric exercise appears to reveal that there are significant pull factors that are promoting expansion in the non-farm sector, which further supports the hypothesis that non-farm activity is driven by excess labour supply in households, who might seek to utilize this labour to diversify incomes owing to income generating opportunities in the non-farm sector. The regression results also show the positive impact of insurance on non-farm business income, the channels of impact of which are explained in earlier sections.

## **Conclusions**

Given the importance of nonfarm income for the sustenance of the small and marginal farmers, this research is taken up with the primary objective of identifying the factors that induce a small or marginal farmer household to carry out non-farm business.

Our econometric exercise reveals that the factor that may deter a household to take up a non-farm business is the absence of family labour, as hired labour can be relatively expensive and may, in turn, make the business non profitable. Thus it was observed that non-farm business is carried out mainly with the help of family labour and lack of excess labour in the family tend to discourage a

household to invest in any non-farm business. This happens also due to the fact that non-farm activities are primarily petty businesses and earn a low return<sup>4</sup>.

It is observed that non-farm business is largely associated with the state of development of a region as one can expect that a relatively developed region generates higher non-farm business income to farmers through both consumption as well as production linkages. We also observed that access to finances and information through credit, insurance, education, and media has a positive role in non-farm business. Access to Credit may even be for farm business as due to the priority sector lending norms loans for agriculture are easier to avail in India. But financial assistance to agriculture can improve farm productivity and surplus and thereby help nonfarm sector through production linkages. Further, presence of insurance of any kind provides a shield against possible risks and hence funds can be utilized for non-farm investment rather than used as savings. Thus both funding opportunities and availability of cost-effective risk mitigation instruments can help households to take up non-farm activities.

However, we observe that only a small percentage of households are getting engaged in the non-farm activities. Lack of financial assistance for non-farm activities and better knowledge about possible profitable businesses opportunities definitely act as deterrents. Absence of knowledge about marketing is another major factor. To enhance adoption and income of the small and marginal farmers through nonfarm activities, these lacunas need to be addressed adequately.

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<sup>4</sup> This has been observed during our survey in various parts of the country. See Rajeev and Bhattacharjee (2017).

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## Appendix

**Table A.1: Distribution of Farmer Households (Small and Marginal) on the Basis of Main Occupation (Rows add up to 100)**

States	Cultivation	Agricultural Allied Activities	Agricultural wage labour	Non-agricultural wage labour	Artisans	Petty shop	Organized Business	Salaried	Profession	Pension/Rent etc.	Others
Punjab	48.0%	.6%	2.1%	13.1%	.3%	5.7%	.2%	14.7%	.2%	6.3%	8.8%
Haryana	57.5%	1.4%	1.7%	8.3%	.2%	4.9%	1.0%	16.7%	.5%	5.5%	2.3%
Rajasthan	52.5%	.6%	1.6%	25.0%	.5%	5.2%	.2%	9.0%	.5%	3.0%	2.0%
Uttar Pradesh	46.8%	.7%	7.7%	24.9%	.5%	5.8%	.2%	7.0%	.4%	2.4%	3.5%
Bihar	51.8%	3.7%	10.7%	13.3%	.4%	5.2%	.8%	6.6%	.3%	3.0%	4.0%
Assam	68.6%	.1%	.4%	7.7%	1.8%	5.4%	.1%	12.2%	0	3.2%	.5%
West Bengal	43.0%	.5%	20.5%	13.5%	.2%	6.8%	.2%	8.0%	.6%	3.8%	2.9%
Orissa	51.4%	.1%	6.7%	22.8%	1.5%	4.0%	1.1%	6.5%	.6%	3.9%	1.3%
Madhya Pradesh	59.4%	1.2%	6.5%	19.0%	.1%	5.5%	.1%	4.3%	.2%	2.2%	1.7%
Gujarat	65.2%	4.7%	14.0%	6.9%	.8%	1.8%	.2%	5.0%	0	1.2%	.1%
Maharashtra	71.3%	1.2%	12.9%	3.3%	.6%	1.5%	.2%	3.4%	.1%	4.0%	1.6%
Andhra Pradesh	49.2%	.7%	31.6%	7.0%	1.5%	2.3%	.3%	6.1%	0	.6%	.7%
Karnataka	58.0%	.7%	22.9%	5.1%	1.1%	4.1%	.4%	5.1%	.1%	2.0%	.5%
Tamil Nadu	41.1%	9.5%	17.1%	15.4%	0	4.6%	.6%	5.5%	0	1.6%	4.5%
All Major States	53.0%	1.5%	11.9%	15.8%	.7%	4.7%	.4%	6.8%	.3%	2.7%	2.4%

Source: computed using IHDS II (2011-12)

**Table A.2: Percentage of Small and Marginal Farmer Households Having First Business, Second Business and Third Business**

States	First Business	Second Business	Third Business
Punjab	18.0%	2.0%	.2%
Haryana	13.9%	2.4%	.5%
Rajasthan	13.0%	1.4%	.0%
Uttar Pradesh	15.5%	1.0%	.0%
Bihar	12.9%	.5%	.3%
Assam	11.5%	1.2%	0
West Bengal	16.5%	1.3%	.2%
Orissa	11.8%	.7%	.1%
Madhya Pradesh	13.5%	.9%	.1%
Gujarat	7.1%	0	0
Maharashtra	9.3%	.8%	.2%
Andhra Pradesh	6.9%	.2%	0
Karnataka	17.6%	1.9%	.4%
Tamil Nadu	11.2%	.4%	0
All Major States	13.0%	.9%	.1%

Source: computed using IHDS II (2011-12)

**Table A.3: Distribution of Small and Marginal Farmers in Terms of Their Nature of Return from Nonfarm Business Activities (rows add up to 100)**

States	Positive Income From Business	Zero Income or Loss	No Business	Average Business income per household
Punjab	18.0%	0.0%	82.0%	120654.8
Haryana	13.5%	0.1%	86.3%	127730.5
Rajasthan	13.0%	0.0%	87.0%	78727.23
Uttar Pradesh	15.2%	0.2%	84.6%	49194.47
Bihar	12.6%	0.0%	87.4%	109965.8
Assam	11.9%	0.0%	88.1%	40962.44
West Bengal	15.5%	0.2%	84.2%	45780.59
Orissa	11.8%	0.0%	88.2%	53142.1
Madhya Pradesh	13.4%	0.0%	86.6%	31200.31
Gujarat	7.1%	0.0%	92.9%	63942.65
Maharashtra	9.3%	0.0%	90.7%	54386.71
Andhra Pradesh	6.7%	0.0%	93.3%	29808.27
Karnataka	17.3%	0.2%	82.6%	46400.13
Tamil Nadu	11.0%	0.2%	88.8%	98441.22
All Major States	12.8%	0.1%	87.1%	59842.76

Source: computed using IHDS II (2011-12)

**Table A.4: Percentage of Small and Marginal Farmer Households Who have Acquired Debt in the Last 5 Years**

Punjab	54.6%
Haryana	43.0%
Rajasthan	66.5%
Uttar Pradesh	71.8%
Bihar	66.4%
Assam	18.9%
West Bengal	56.1%
Orissa	53.7%
Madhya Pradesh	75.9%
Gujarat	31.9%
Maharashtra	52.0%
Andhra Pradesh	88.7%
Karnataka	83.3%
Tamil Nadu	70.7%
All Major States	65.2%

Source: computed using IHDS II (2011-12)

**Table A.5: Percentage of Small and Marginal Farmer Households having Debt from Formal Institutions in the Last 5 Years**

State	Received bank loan	Applied but did not receive	Did not apply
Punjab	30.6%	0.8	68.6
Haryana	25.1%	3.4	71.5
Rajasthan	29.7%	1.2	69.1
Uttar Pradesh	25.3%	1.7	73
Bihar	11.0%	3.9	85.1
Assam	9.9%	5.6	84.5
West Bengal	15.0%	2.4	82.6
Orissa	25.4%	9.3	65.3
Madhya Pradesh	28.7%	1.3	70
Gujarat	12.9%	2.8	84.3
Maharashtra	33.6%	3.2	63.2
Andhra Pradesh	60.9%	4.1	35
Karnataka	43.1%	2.7	54.1
Tamil Nadu	32.5%	2.4	65.1
All Major States	27.7%	2.9	69.3

Source: computed using IHDS II (2011-12)