

A STUDY ON CONSUMPTION PATTERN AND INTENSITY OF  
POVERTY OF THE INFORMAL WORKERS OF INDIA

SYNOPSIS

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Indian labour market has not only been dominated by informal employment but also the incidence of informal employment has enhanced strikingly in the post reform period (Marjit et al., 2007; Sanyal et al., 2008 and Narayana, 2015). What is much more disheartening is that, there has been rapid proliferation of informal employment not only in the informal sector but also in the formal sector during this period (Sanyal et al., 2008). Besides, informal sector also consists of large number of self-employed (SE) workers (Mukhopadhyay, 1998). Thus, informal employment is vastly heterogeneous in nature (Unni, 2005; Sahoo et al., 2016). In this scenario, the thesis aims to address five important aspects of the informal employment such as consumer pattern of the informal workers, poverty and wage-income inequality among them and lastly expenditure on health and education among them. The first three chapters of the thesis deal with the introduction, literature review, and research objectives respectively.

In this research work, we have considered those workers as informal workers who are engaged in remunerative works (i.e. both self-employment and wage employment) that is not registered, regulated or protected by existing legal or regulatory frameworks. Besides, informal workers hardly get secure employment contracts, work benefits, social protection or workers' representation (17<sup>th</sup> ICLS at the ILO, 2003). Informal sector is a group of production units comprising of unincorporated enterprises owned by households, including informal own-account enterprises and enterprises of informal employers (typically small and non-registered enterprises). (15<sup>th</sup> ICLS at the ILO, 2000). In our research work, the heterogeneity of the informal workers are taken care of by classifying informal workers into three major types- 1) Self Employed Workers (SE) 2) Employees of Informal Sector (EIS) 3) Informal Workers in the Formal Sector (IEFS)

#### **Chapter four: Consumption Nature of Indian Informal Workers: Engel's Law Revisited**

Since Indian labour market comprises most of informal workers, it is very important to investigate the nature of consumption among informal workers and determine the budget

share among them. We are hardly confronted with plethora of literature discussing this aspect among the informal workers of India. Hence, the research objectives of the fourth chapter of the thesis are given below-

### **Research Objectives**

1. comparing the budget share of food and non-food items between formal workers and informal workers in India as well as among different types of informal workers of India.
2. The pattern of consumption among the informal workers of India is investigated where all three different types of informal workers are considered separately. Here, we employ the help of Engel's law.

### **Sources of Data**

The investigation is based on 68<sup>th</sup> round NSSO data for Employment and Unemployment for the period 2011-2012. The excerpt only accommodates own account or self-employed (SE) workers, regular salaried workers and casual workers in the public and private sectors, indicating informal employees in the formal sector (IEFS) and employees in the informal sector (EIS). In order to do so, we have deducted those samples whose activity statuses (principal) are listed as employer (they represent formal workers), student, housewife, beggar, retired and handicapped.

### **Comparative analysis of budget share on food and non-food items among formal and informal workers in India as well as Across Different types of Informal Workers of India**

During 2011-2012, budget share of food items among the informal workers have been more than the formal workers indicating the former have been more poverty stricken than the latter. During the same time, budget share of food and non-food items among different types of informal workers have been more or less same. However, budget share of food items have been marginally highest among SE and lowest among IEFS.

### **Consumption pattern between Food and Non-Food items among Different Types of Informal Workers of India**

We have tried to identify whether a particular good is necessary or luxury among the informal workers of India. To do this, we consider the Working-Leser model. The Working-Leser form was discussed by Working (1943) and further popularized by Leser (1963); Leser (1976). It has been further applied in studies by Angus Deaton and Muellbauer (1980) and Majali and Habashneh (2014). One of the most important advantages of this model is that it is

a good fit for cross-sectional data in a wide range of circumstances. Thus, this model is expected to provide a very reliable result because the data in use is cross-sectional. The Working-Leser model can be expressed in the following way:

$$W_{ji} = \alpha_j + \beta_j \ln Y_i + \mu_i \quad (1)$$

Here,  $W_{ji}$  is the average monthly budget share of the  $j^{\text{th}}$  commodity of the  $i^{\text{th}}$  individual.  $Y_i$  is the average total monthly expenditure of the  $i^{\text{th}}$  household. During the time of calculation of the budget share of any particular commodity of an informal household, the total monthly expenditure of that household is used as a proxy of the total monthly income of that household. Here,  $\alpha_j$  and  $\beta_j$  are estimated for each commodity 'j' consumed by that particular type of informal worker separately. Using the quadratic model of the above equation proposed by Banks, Blundell, and Lewbel (1997), we investigate how the nature of consumption of a particular commodity change to luxury from necessary with the change in total expenditure. But here, the consumption nature of the informal workers will be investigated where a large percentage of them are economically poor and living just above the poverty line (Roy & Kundu, 2020). To investigate the consumption nature of the informal workers of India, they are divided into three types for the comparative analysis, so household characteristics are not considered in Equation 1.

Equation 2 presents the expenditure elasticity of demand of the  $j^{\text{th}}$  commodity of each type of informal worker (denoted as 'k') in the context of the Working-Leser form. It is explained as:

$$e_{jk} = 1 + \beta_{jk} / W_{jk} \quad (2)$$

Here, k implies SE, IEFS, and EIS separately. The results are given in Table 1.

## Findings

Using Working Leser model our findings are that the estimated values of  $\beta$  for all the food and non-food items are significant, except for the therapeutic apparatus, which is insignificant. All food items are necessary goods irrespective of the type of informal workers. Fuel and light and addictive items are also necessary goods. Surprisingly, expenses on entertainment, including cinema, picnics, sports, club fees, video cassettes, and cable chargers, among others, are also necessary goods for all three groups. Durable goods are luxury items for all three types of informal workers. Non-food items are mostly luxury for all three types of informal workers. Health and educational expenditures are luxury items.

## **Chapter five: An analysis of poverty among the informal workers of India**

In the fourth chapter we have proved that budget share of food items has been higher among the informal workers compared to the formal workers. Hence it is very important to estimate the percentages of poverty-stricken informal workers across various types. The period of economic reforms witnessed opening up of the economy, privatisation, wage cut and increase in casual and contractual employment. There has been contrast in opinion among the economists and policy makers regarding the effect of economic reforms on the economic condition of the informal workers. A school of economists opined that post reform period enhanced poverty among the informal workers (Sundaram, 2008; Papola (2008); Heintz et al. (2007)). Another school of economists pointed out that the period of economic reforms brought new avenues and job opportunities along with it. So, incidence of poverty declined among them (Marjit et al., 2009; Marjit et al., 2007; Marjit, 2003)). Furthermore, economic demonetisation (November, 2016) adversely affected the informal workers most because they mostly transact in cash (Jawed et al.,2019). Our research thus aims to uncover the incidence of poverty among the informal workers of India during 2011-2012 and also uncover long term effect of economic demonetisation among them.

### **Research Objectives**

1. To investigate the percentages of poor across different types of informally employed people of India and whether the percentages of poor informal workers have enhanced or not from 2011-2012 to 2018-2019 during the post demonetisation era.
2. To investigate the acuteness of poverty across different types of poor informal workers and how demonetisation have impacted the acuteness of poverty among them.
3. To investigate the possible factors responsible for the incidence poverty of the informal workers as well as determinants of acuteness of poverty across poor informal workers. The determining factors are investigated only for the 2011-2012.

### **Sources of Data**

The investigation is based on 68<sup>th</sup> round NSSO data for Employment and Unemployment for the period 2011-2012 and Periodic Labour Force Survey for the period 2018-2019.

### **Calculation of poverty Line**

We have tried to compare incidence of poverty among the informal workers across different states of India for the period 2011-2012 and 2018-19. We have measured incidence of poverty on the basis of the poverty line as provided by Tendulkar Committee for the period

2011-12 for respective states, union territories and sector. For the year 2018-2019, we have tried to find out the poverty line estimates of respective states and union territories by multiplying the poverty line estimates of 2018-2019 with the consumer price index<sup>1</sup>.

### **Discussion of Poverty Across Different Types of Informal Workers**

We find that percentages of poverty-stricken informal workers have reduced over time both for the rural and urban area. Moreover, incidence of poverty has been higher in the rural area compared to the urban area. In the rural sector, incidence of poverty has been highest among IEFS during the former period and among EIS during the latter period. On the other hand, in the urban sector, incidence of poverty has been highest among the SE in the former period and EIS in the latter period.

### **The Econometric Investigation**

Using 68<sup>th</sup> round NSSO data for Employment and Unemployment we consider both household specific and individual specific factors. But here we want to identify the factors which are responsible for the incidence of poverty among the informal workers only. Hence there may be some quantitative or qualitative factors responsible for a factor to be informal in nature according to our definition. So, for this investigation we have to take the help of Heckman 2 step regression model to tackle the sample selection bias situation. We have to consider two equations simultaneously; the original equation and the selection equation. In the original equation, the dependent variable  $y_i^*$  is taking binary values 1 and 0 where 1 indicates that the informal worker is poor while 0 indicates that the informal worker is non-poor<sup>2</sup>. However, statistical analysis based on non-randomly selected samples consisting of informal workers only can lead to erroneous conclusions and poor policy. Thus, we use Heckman corrections which is a two-step statistical approach provides a means of correcting the non-randomly selected samples and sample selection bias. As said earlier we have subdivided informal employment into three major types viz. SE, EIS and IEFS and would like to focus on the determinants of poverty among these three types of informal workers.

$$y_i^* = F(\text{techedu}_i, \text{age}_i, \text{hh}_i, \text{caste}_i, \text{finan}_i, \text{satisfied}_i, \text{rural}_i, \text{informal workers types}_i)$$

(Eq. 3)

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<sup>1</sup>For the rural area we have multiplied consumer price index of 2011-12 of each state and union territory with consumer price index of the rural workers and for the urban area, we have multiplied consumer price index of 2011-2012 of each state and union territory with consumer price index of the industrial workers.

<sup>2</sup>Here poor and non-poor is identified on the basis of Tendulkar Committee Report for respective states, union territories as well as sector.

Here "techedu<sub>i</sub>" represents the technical education among the i<sup>th</sup> informal worker. It is treated as dummy variable. Incidence of poverty of a technically educated people may be less because technical education helps a prospective worker to work as a skilled formal worker in his working age and earn better wage.

"age<sub>i</sub>" is the age of the i<sup>th</sup> informal workers. Considered as a proxy of experience, is found to have a negative relationship with the poverty.

"Hh<sub>i</sub>" represents household head of the i<sup>th</sup> informal worker. We create its dummy variable. This chapter thus aims to investigate the influence of poverty among the i<sup>th</sup> female-headed household, where male headed household is the reference group.

"Caste<sub>i</sub>" represents the social group of the i<sup>th</sup> informal worker. Three dummy variables are separately constructed for scheduled tribe (ST), scheduled caste (SC) and other backward classes (OBC). General category worker is in the reference group.

"Finan<sub>i</sub>" represents financial inclusion of the i<sup>th</sup> worker.

"Satisfied<sub>i</sub>" represents the i<sup>th</sup> informal workers who hardly seek for alternative job whereas "Unsatisfied"<sup>3</sup> worker is the reference group.

"Rural<sub>i</sub>" represents rural sector in which the i<sup>th</sup> informal worker works. Urban area is the reference group. Since there are lesser employment opportunities in the rural area, incidence of poverty is presumed to be higher in the rural area. This chapter thus aims to investigate incidence of poverty among the i<sup>th</sup> informal worker who lives in the rural area compared to that of the urban area.

"Informal workers types<sub>i</sub>" represents of types of informal employment of the i<sup>th</sup> informal worker. We have constructed dummy variables each for SE and IEFS whereas EIS is the reference. Since informal worker is not homogeneous, incidence of poverty among different groups of informal workers may vary a lot.

Now we present the selection equation that helps to identify the determining factors for the workers to join informal employment. The selection equation is given by

$$I_i^* = F(\text{Edu}_i, \text{rel}_i, \text{voc}_i) \quad (\text{Eq. 4})$$

Where  $I_i^*$  represents type of employment (i.e. formal/informal) of the i<sup>th</sup> worker which is dummy in nature. Here  $I_i^*$  is the dependent variable which is taking binary values 0 and 1. Here, 0 indicates that the worker is a formal worker and 1 indicates that the worker is an informal worker.

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<sup>3</sup>Whenever a worker is ready and available for alternative job that means he is unsatisfied with his present work.

Here "Edui" represents years of education among the  $i^{\text{th}}$  worker. "reli" represents religion of the  $i^{\text{th}}$  worker. "voc<sub>i</sub>" represents vocational training of the  $i^{\text{th}}$  worker.

Initially we have to estimate the selection equation on the basis of Probit model, On the basis of the estimation, we can have estimated value of Inverse Mill's ratio represented by  $\lambda_i$  of each sample 'i'. In the Heckman two step estimation, this  $\lambda_i$  is to be treated another explanatory variable of the original Equation, mentioned in Model-1, Model-2, Model-3. If it is observed that the parameter estimates of  $\lambda_i$  is statistically significant, then we can become sure that Heckman two step estimation procedure is appropriate to address our research problem.

### **Results and Discussion**

It is found that compared to EIS, IEFS and SE face significantly less probability of being poor. Furthermore, technical education, reduces the chance of being poverty-stricken. Moreover, compared to the workers without bank account and unsatisfied workers,  $i^{\text{th}}$  workers with financial inclusion as well as that of satisfied workers have significantly lower chances of remaining poverty-stricken respectively. Besides, compared to that of the general workers,  $i^{\text{th}}$  workers with all other social groups have significantly higher chances of remaining impoverished. STs are the most deprived social groups followed by SCs and OBCs. Furthermore, it is also found that compared to that of the urban area,  $i^{\text{th}}$  informal workers residing in rural areas have lower chances of being poor. This is undoubtedly due to the lack of sufficient income earning opportunities in the rural area.

### **Analysis of the depth of poverty among the poor informal workers**

Our next objective is to investigate the causes of poverty gap (acuteness of poverty) among the poor informal workers. In order to do so, we deal with the poor informal workers only. Initially we have deleted all non-poor informal workers from our samples. Poverty gap for  $i^{\text{th}}$  individual residing in any particular state 's' ( $G_{is}$ ) is defined as the difference between the official estimates of poverty line ( $p_s$ ) for that state minus MPCE for  $i^{\text{th}}$  individual residing in states ( $MPCE_{is}$ ). Clearly  $G_{is}$  shows the depth of poverty of the  $i^{\text{th}}$  worker residing in  $s^{\text{th}}$  state. Clearly,  $G_{is}$  is positive for all the poor informal workers because  $MPCE_{is} < p_s$ . Higher the value of  $G_{is}$ , higher is the acuteness of poverty among the poor informal workers.

### **Mean poverty gap among the poor informal workers**

Unlike incidence of poverty, acuteness of poverty among the poor informal workers has been much higher in the urban area as compared to the rural area and there has been enhancement of the same over the years from 2011-2012 to 2018-2019. Acuteness of poverty has been

highest among rural and urban IEFS workers for the latter period and rural IEFS workers and urban SE workers during the former period.

### **The Econometric Analysis of Acuteness of Poverty**

With the objective of identifying possible factors for determining acuteness of poverty among the poor informal workers, initially we have used OLS for finding out the determinants of  $G_{is}$  among the informal workers of India. Here, the dependant variable is  $G_{is}$  and all the explanatory variables are almost same of the previous model. However, unlike the previous model this regression also considers a quadratic relationship between age and depth of poverty. The model of OLS is given below:

$$G_{is} = F(\text{edu}_i, \text{age}_i, \text{age}_i^2, \text{hh}_i, \text{caste}_i, \text{finan}_i, \text{satisfied}_i, \text{rural}_i, \text{informal workers types}_i) \text{ (Eq. 5)}$$

As there has been wide disparity of  $G_{is}$ , the effectiveness of a certain policy variable will not create equal influence on  $G_{is}$ . That is the poor informal workers whose MPCE is far below the official estimates of poverty line may be regarded as chronic poor while some of the poor workers whose MPCE is just below the poverty line may be regarded as marginal poor. On the other hand, the poor informal workers who MPCE is between the marginal poor as well as chronic poor may be regarded as medium poor. Thus, our analysis would be incomplete if we aim to investigate the determinants of  $G_{is}$  for all the poor informal workers as a whole. Rather we can get a complete picture of  $G_{is}$  if we separately discuss the determinants of  $G_{is}$  for marginal, middle and chronic poor informal workers. The reason is that the policy variables which are required to reduce  $G_{is}$  might significantly create different types of influence across marginal, medium and chronic poor people. Hence, we use "Quantile Regression"<sup>4</sup> to detect whether the partial effect of a regression on the conditional quantiles is same for all quantiles and differ across quantiles. We use Quantile regression for 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> quantiles respectively. Clearly 25<sup>th</sup> quantile represents marginal poor, 50<sup>th</sup> quantile represents middle poor and 75<sup>th</sup> quantile represents chronic poor. Actually, this regression allows the possibility that how important predictors may be different depending on the quantiles of the outcome variables i.e.  $G_{is}$ . It is also to be remembered that mean of the  $G_{is}$  has been consistently above than that of the median  $G_{is}$ , which undoubtedly indicates that the distribution of poverty gap has been rightly skewed. Hence, there has been an absolute necessity to investigate changes in  $G_{is}$  at different points of the distribution. It is easily understandable that it would not be enough to investigate the changes in mean when the

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<sup>4</sup>The Quantile Regression model estimates the differential effects of the covariates on full distribution.

entire shape of the distribution changes dramatically. This chapter therefore provides empirical estimation  $G_{is}$  at 25th, 50th and 75th quantiles.

$$y_i = \alpha_\theta + \beta_\theta \text{edu}_i + \delta_{\theta 1} \text{age}_i + \delta_{\theta 2} \text{age}_i^2 + \gamma_\theta \text{hh}_i + \epsilon_\theta \text{caste}_i + \eta_\theta \text{finan}_i + \lambda_\theta \text{satisfied}_i + \epsilon_\theta \text{rural}_i + \mu_\theta \text{informal types}_i + u_i \quad (\text{Eq.6})^5$$

Where  $i = 1, \dots, N$  ( $N$  being total number of informal workers lying below poverty line),

$\theta = .25, .50, 0.75$  quantiles where  $\theta \in (0,1)$ .

### Results and Discussion

The results of 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> quantile regression and ordinary regression differs a lot which indicates that acuteness of poverty has not been homogeneous across marginal, medium as well as chronic poor workers. It is found that in all the three situations of Quantile regression, increase in the years of education is associated with lower depth of poverty among the  $i^{\text{th}}$  worker. More specifically, with the increase of education, depth of poverty among the  $i^{\text{th}}$  worker is reduced in a greater extent among the higher quantiles i.e. among the chronic poor. Overall depth of poverty also falls with the increase in years of education. It is also observed that age of the informal worker is a cause of his/her acuteness of poverty. Illiterate workers have significantly higher depth of poverty among the  $i^{\text{th}}$  marginal poor, chronic poor and overall poor. Compared to the male-headed household, depth of poverty has been significantly higher among the  $i^{\text{th}}$  middle poor informal workers coming from female-headed households. Compared to the general workers, depth of poverty among the  $i^{\text{th}}$  poor is significantly higher among all other castes. Furthermore, it is also found that compared to that of the urban area, depth of poverty among the  $i^{\text{th}}$  poor has been lower in the rural area among all types of poor informal workers. Lastly, compared to the EIS,  $i^{\text{th}}$  SE face significantly lower acuteness of poverty among the middle, chronic as well as overall poor. But the result is insignificant among the marginal poor workers. Not only is that, compared to that of EIS, depth of poverty among the IEFs is also insignificant. Therefore, these significant determining factors may be treated as important policy variables to reduce the acuteness of poverty.

### Chapter six: Recent Trends of Wage-Income and its Inequality among Informal Workers in India

No one can deny the fact that there has been dramatic increase in overall inequality in consumption expenditure in India (Tapalova, 2008). It is easily understood that wage inequality has been an important component of income inequality. Just like income

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<sup>5</sup> We have analysed this model by using 2011-2012 data only.

inequality, wage inequality also increases rapidly during the new economic policy regime in India (Dutta, 2005, Das, 2012 & Abraham, 2017). The wage differential is quite prominent in India across various sectors and groups of workers. Besides, temporary workers are significantly ill-paid compared to their counterparts in permanent employment. (Das,2012). Thus, it is extremely crucial to examine wage inequality among the workers working in various sectors, and types of employment in order to understand the extent of deprivation among the workers. Moreover, given the differences in the wage income and standard of living across states, the requirement of calculating wage inequality across states can hardly be ignored.

### **Research Objectives**

- i) To establish the dominance of informal workers in the Indian labour market.
- ii) To compare the mean wage income over the years among the informal workers.
- iii) To provide a comparative analysis and recent trend of the wage-income inequality among informal workers across gender, rural and urban sector in recent time periods across the State and Union Territories of India. Gini coefficient of wage-income among different types of informal workers will be calculated for each State and Union territories.

### **Sources of Data**

The investigation is based on 68<sup>th</sup> round NSSO data for Employment and Unemployment for the period 2011-2012, Periodic Labour Force Survey for the period 2018-2019.

### **Comparing Male and Female Informal Workers**

Employment share among the male and female informal workers during the period 2011-2012, 2018-2019 as well as 2019-2020 have been estimated. It is found out that informal labour market is absolutely dominated by male workers across all the three periods. Not only that, the dominance of male informal workers increases over the years. Not only that, male informal workers earn higher amount of both money wages as well as real wages compared to their female counterpart.

## **Comparative Analysis of Money Wages and Real Wages among the Informal Workers Over the Years**

We have provided the comparative analysis of the money wages as well as real wages<sup>6</sup> of the informal workers for the period 2011-2012, 2018-2019 as well as 2019-2020. We find that there has been increase in money wages over the years across male as well as female informal workers. However, increase in money wage is hardly an indicator of well-being of the informal workers. Hence, we have calculated real wages among them. We find that real wages have reduced from 2011-2012 to 2018-2019 for both male and female informal workers. However, compared to 2018-2019, we find that there has been increase in real wages among them.

### **Wage Inequality as Measured by Gini Index**

Wage-income inequality among informal workers is calculated with the help of the Gini index (GI). GI is a very useful tool to measure income inequality because it allows negative values of income and wealth<sup>7</sup>.

Here wage income inequality among informal workers in India is considered. To know the cause of wage income inequality across states the decomposition exercise of the Gini index is extremely important. Conventionally in the economic literature, the Gini index is decomposed into various subcomponents like the contribution of within-group inequality ( $G_w$ ), the contribution of between-group inequality ( $G_b$ ) and the contribution of group overlap inequality ( $G_o$ ) (Das, 2012). The importance of  $G_o$  appears when  $G_w$  and  $G_b$  fail to capture the extent of inequality. In that case, a researcher has to depend on the third component of the Gini coefficient  $G_o$  which occurs when a portion of one group of workers coincides with another group of workers.  $G_o$  helps to identify whether there exists any cause<sup>8</sup> of wage inequality (for eg. working conditions, sector, educational qualification, caste and so on). Higher values of  $G_o$  indicate that factors like working conditions, sector, educational

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<sup>6</sup>To get the value of the real wage income of the overall informal workers of India, for the period 2018-2019 we have to consider, (Nominal mean wage income in 2018-19 X 100) /139.6, for the rural area (Nominal mean wage income in 2018-19X 100) / 141.3 and for the urban area. (Nominal Mean wage income in 2018-19 X 100)/137.7. Similarly, for the period 2019-2020, to get the mean real wage income of overall informal workers, we have to consider (Nominal mean wage income 2019-20/146.3) X 100 for the rural area and (Nominal mean wage income 2019-20 /147.3) X 100 and for urban areas (Nominal Mean Wage Income 2019-20 X 100) / 145.1. Since in both the above cases, 2011-2012 is the base period, therefore the mean wage in the base period is kept nominal.

<sup>7</sup> According to many scholars, GI gives better results compared to General Entropy measures (GE).

<sup>8</sup>The most important determinants of wage inequality is nothing but the important factors affecting wage inequality in the economic literature. Das (2012) reveals that educational qualification, technical skill and experiences are the factors of wage inequality. Sengupta et al.(2021) also reveals that higher wage inequality exists among scheduled caste and scheduled tribes compared to higher caste.

qualification etc. do not play any major role in determining the overall wage inequality (Costa, 2016). Thus, the overlapping analysis provides a very important conclusion regarding the discussion of wage inequality. In this study, we have used the Gini index (Gini, 1912)<sup>9</sup> as a summary measure of wage income inequality among informal workers both within and between groups of workers across rural and urban India.

We consider G as the Gini coefficient of wage income inequality and the population subgroups are indexed by  $k=1,2,\dots,36$ .

$$G = G_B + \sum_{k=1}^{36} a_k G_k + R \dots (7)$$

Here  $G_B$  is nothing but between-group inequality.  $G_B$  is defined as the one which can be obtained if every wage income in every subgroup can be replaced by the mean of the relevant subgroup. Here ‘ $a_k$ ’ is the product of population share and wage-income share corresponding to each subgroup  $k$ .  $G_k$  is the Gini coefficient for wage income within subgroup  $k$ .  $R$  is the residual whose value will be zero when the subgroups of the wage income hardly overlap. According to Lambert et al. (1993), the residual part is nothing but group overlap inequality. Thus we can say that  $G$  can be decomposed into three components Within-group inequality ( $G_w$ ), Between-group inequality ( $G_b$ ) and Group overlap inequality ( $G_o$ )<sup>10</sup>. Here the extent of wage inequality among informal workers across states will be addressed. Here, a state is considered a “group”. It is found the overall wage inequality among informal workers across states. To do that wage income inequality of the informal workers within a particular state as well as wage income inequality among the informal workers between two or more states are considered. The third component, the overlap inequality of wage income among informal workers across states has also been found. Since the characteristics and wage patterns of informal workers vary a lot across states, it is required to find out the extent of wage inequality across states.

Hence  $G = G_w + G_b + G_o \dots \dots \dots \text{Eq.8}$

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<sup>9</sup>Associated with Lorenz (1995)

<sup>10</sup>The aim of inequality decomposition is related to the identification of relevant factors determining the inequality structure. Gender, working conditions, education level, and area of residence are the possible factors which may possibly influence the wage-income inequality. But if high value of overlapping factor is observed in the value of the Gini coefficient after decomposition, then it can be said that the above indicated possible factors slightly contribute to total wage-income inequality. The decomposition of Gini index and its interpretation has been vividly done in *Lambert et al. (1993)* has further been used in Das (2012).

### **Recent trend of Wage income (weekly) Inequality among different types of Informal Workers in India:**

We have estimated the values of Gini index for the informal workers across sector and gender. Gini index is an inequality indicator which shows that higher value of the same denotes higher level of inequality. Unfortunately, Gini index has been very alarming among the informal workers irrespective of sector and gender. During 2011-2012, Gini index has been more than 70 percent among the informal workers. During 2018-2019, the values of Gini index has increased by at least 10 percent while during 2019-2020, the values of Gini index has further enhanced by 10 percent.

It is found that the overall value of GI increases over time among male and female workers in the rural as well as urban sectors. Among the rural and urban workers in most of the states have witnessed an increase in GI during 2018-2019 compared to 2011-12. Compared to the rural male informal workers, overall weekly wage inequality reflected in terms of GI is higher among the rural females during all three time periods.

Compared to the rural male informal workers, it is found that overall wage inequality as measured by GI among the urban male workers has been less during 2011-2012 and higher during 2018-2019 and 2019-2020. Among the urban male informal workers, most states have witnessed an increase in the estimates of GI from the period 2018-2019 to 2019-2020 except Arunachal Pradesh where the reverse is witnessed.

GI is also measured separately among female informal workers in the urban sector. It is found that the overall wage inequality as measured by GI has been higher among males as compared to that of the females in the urban sector during the former period. While this estimate has been higher among females during 2018-2019 and 2019-2020.

Furthermore, the decomposition results of GI again provide the same inference. Out of total GI, the contribution of  $G_0$  has been the highest followed by the contribution of  $G_b$  and the least contribution comes from  $G_w$  for rural males, rural females, urban males as well as urban female informal workers. This is true for all the three-year period. This undoubtedly indicates that the contribution of the factors determining wage inequality is very negligible. Enhancement of  $G_0$  over the years also indicates that contribution of these factors reduces overtime.

Various studies suggest that enhancing educational qualification is capable of reducing income inequality (Lee et al.,2018). However, Roy et al. (2022) suggests that education has

been luxury commodity among the informal workers. That is informal workers tend to spend lesser proportion of their income on education. This supports the reason behind the high value of  $G_0$ .

**Changes in wage-income inequality among the informal workers in India in the last decade.**

It has already been proved that in the Gini Coefficient of wage-income among any type of informal worker, the contribution of  $G_0$  i.e. group overlap inequality is always highest in all the concerned time periods. To investigate whether there is any decrease in wage income inequality among a particular group of informal workers in India over time the following equation is considered.

$$G_{jit} = \beta_0 + \beta_1(\text{Time}) + \varepsilon_{jit} \dots \dots \dots \text{Eq. 9}^{11}$$

$G_{jit}$  indicates the value of the Gini coefficient of the  $j^{\text{th}}$  type of worker (described in Table 6.8) of the  $i^{\text{th}}$  state in the  $t^{\text{th}}$  time period. Time will take the value 0 for any state in the baseline period and 1 for the end-line period. If the value of the parameter estimate of  $\widehat{\beta}_1$  in Eq.3 becomes statistically significant and negative, then only one can claim that wage income inequality among the informal workers in India has decreased between the base-line period and the end-line period. But if the estimated value is positive, then it is obvious that the wage income inequality among the informal workers has increased between the concerning time periods. Initially, we consider 2011-12 as the baseline period and 2018-19 as the end-line period. Next, we consider 2018-19 as the baseline period and 2019-20 as the end-line period. According to the Periodic-Labour Force survey report of 2018-19, the samples of the urban workers were collected during the lockdown period but that is not happening for the rural workers. Here exercises are done separately for rural, urban, rural male and female workers and urban male and female workers. It is found that the estimate of  $\widehat{\beta}_1$  has been positive and significant in all the cases, meaning that wage-income inequality of all types of considered workers has increased significantly over the years from 2011-2012 to 2018-2019.

Next, it is required to investigate whether there is any enhancement in wage income inequality among informal workers due to the first phase of the pandemic. Here 2018-19 is

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<sup>11</sup>Here  $G_{jit}$  is the value of the Gini Co-efficient of the  $j^{\text{th}}$  type of worker of the  $i^{\text{th}}$  state in the  $t^{\text{th}}$  time period. ‘Time’ is considered as Dummy variable who takes the value 1 for all considered states at the end-line period and ‘0’ in the baseline period.

considered the base period where there is no pandemic and 2019-20 will be considered as the end-line period. Unlike the former case, we do not find significant results in all the cases between 2018-19 to 2019-20. Significant and positive results of  $\widehat{\beta}_1$  are found among the overall informal workers, urban workers, urban male as well as urban female workers. This means that in the case of overall informal workers and specifically urban informal workers (including males and females), there has been a significant increase in wage-income inequality during the concerned time period when the pandemic covers the end-line period for urban informal workers. But for the rural informal workers, the result of  $\widehat{\beta}_1$  has been insignificant indicating no change in wage-income inequality during that period.

### **Results and Discussion**

The result shows that there has been significant increase in wage inequality from 2011-12 to 2018-2019 among the informal workers irrespective of sector and gender. The maximum enhancement of wage-income inequality between 2011-12 to 2018-19 is observed among urban female informal workers while the minimum enhancement of wage-income inequality is observed among rural male informal workers. However, during the latter period significant increase in wage inequality has been observed only among overall informal workers and urban informal workers but not among rural informal workers.

### **Chapter seven: Determinants of Health Expenditure Among the Informal Workers of India: Is it always Catastrophic?**

The period of economic reforms not only witnessed enhancement of poverty as well as wage inequality among the informal (Papola, 2008; Unni, 2005), but also privatisation of the health sector and other government sectors. These workers are forced to work in unhealthy environment for long hours. Hence, vulnerability of the informal workers has increased many times during this time because on the one hand earning possibilities among them reduced and on the other hand, health system has become much costlier. Additionally, Roy et al. (2022) found out that health has been luxury good among them because they tend to spend lower proportion of their income on health. Hence, it would not be unwise to investigate the extent expenditure among them as well as determinants of health expenditure. In this chapter we endeavour to do so.

## **Research Objectives**

i) To investigate the mean health expenditure across different types of informally employed people of India and also to find out the determinants of health expenditure among the informal workers in India.

ii) To find out whether the health expenditure is catastrophic among the informally employed workers in India or not and to identify the possible factors responsible for the incidence of catastrophic health expenditures among the informal workers of India.

## **Sources of Data**

The investigation is based on 68<sup>th</sup> round NSSO data for Employment and Unemployment.

## **Estimation of the Health Expenditure among the Informal workers**

We have compared estimates of mean out-of-pocket health expenditure among the formal as well as informal workers as well as across different types of informal workers of India. We find that mean expenditure among the informal workers have been considerably lower compared to the formal workers. Across different types of informal workers out-of-pocket health expenditure has been highest among EIS and lowest among SE. Next, we have tried to put some light on the out-of-pocket mean health expenditure as a percentage of total expenditure across different types of informal workers of India. This ratio has been more or less same across different types of informal workers. Further we have also provided estimates of CV as well as CI which will provide us the information regarding unequal distribution of health expenditure. The values of CV are greater than one and CI is positive which indicates that health expenditure is unequally distributed.

## **Determinants of Health Expenditure Among the Informal Workers of India**

Here we consider both household specific and individual specific factors. Sample is drawn from the NSSO 68th round where we have the information of both formal and informal workers. But here we want to identify the factors play crucial role in the extent of health expenditures among the informal workers only. Hence there may be some quantitative or qualitative factors responsible for a factor to be informal in nature according to our definition.

So, for this investigation we have to take the help of Heckman two step regression model in order to tackle the problem of selectivity bias<sup>12</sup>. In order to do this, we have to consider two equations simultaneously; the original equation and the selection equation. In the original equation the dependent variable  $y_i^*$  which is the yearly health expenditure. However, statistical analysis based on non-randomly selected samples consisting of informal workers only can lead to erroneous conclusions and poor policy. Thus, we use Heckman corrections which is a two-step statistical approach provides a means of correcting the non-randomly selected samples and sample selection bias.

Our original equation is given below-

$$Y_i^* = F(\text{age}_i, \text{assets}_i, \text{hh}_i, \text{caste}_i, \text{young}_i, \text{old}_i, \text{Edu}_i, \text{informal workers types}_i) \quad (\text{Eq.10})$$

Here "age<sub>i</sub>" is considered as age of the  $i^{\text{th}}$  informal worker. As age increases, health expenditures are supposed to increase because age increases morbidity and illness.

"hh<sub>i</sub>" represents household head of the  $i^{\text{th}}$  informal worker. We create its dummy variable. Gupta et al., (2013) provides us the information that health expenditure is considerably higher among the males compared to that of the females. By contrast, in Nigeria female headed household tend to spend more on health services compared to male headed household (Ogundari et al., 2014). This chapter thus aims to investigate the extent of health expenditures among the workers with female head where the reference group is male headed household.

"assets<sub>i</sub>" represents total amount of assets possessed by the  $i^{\text{th}}$  informal workers. According to Gupta et al., (2013), there has been a positive relationship between the economic status of the people and that of health care expenditures. The workers possessing large amount of assets can be said to be possessing greater economic status. Thus, the workers with large amount of assets are expected to have larger health expenditures.

"Caste<sub>i</sub>" represents the social group of the  $i^{\text{th}}$  informal worker. This er thus seeks to investigate the extent of health expenditure among different social groups. Three dummy variables are separately constructed for scheduled tribe (ST), scheduled caste (SC) and other backward classes (OBC). General category worker is in the reference group. SC, ST and OBC s are widely considered as vulnerable social groups in India (Sengupta et al.,2008) and thus we intend to investigate the extent of health expenditures among them.

"Young<sub>i</sub>" represents the workers with dependents less than 15 at household level. Workers with higher number of young dependents is expected to spend more on health.

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<sup>12</sup>This is necessary because in NSSO data set we observe both informal and formal workers simultaneously.

“Old<sub>i</sub>” represents the workers with dependents greater than 60 at household level. Workers with senior dependents is also expected to spend larger amounts on health (Gupta et al., 2013).

Here "Edu<sub>i</sub>" represents years of education among the i<sup>th</sup> worker. It is assumed that workers with less academic qualification are less likely to spend on health expenditures (Gupta et al., 2013).

“rural<sub>i</sub>” represents i<sup>th</sup> worker in the rural area. People in the rural areas are less intended in seeking healthcare compared to that of the urban areas (Gupta et al., 2013).

"Informal workers types<sub>i</sub>" represents of types of informal employment of the i<sup>th</sup> informal worker. We have constructed dummy variables each for EIS and SE whereas IEFS is the reference. Since informal worker is not homogeneous, extent of health expenditure among different groups of informal workers may vary a lot.

The selection equation is given by

$$I_i^* = F(\text{tech}_i, \text{voc}_i, \text{rel}_i) \dots\dots(10)$$

Where  $I_i^*$  represents type of employment (formal/informal) of the i<sup>th</sup> worker which is dummy in nature. Here “tech<sub>i</sub>” represents technical education of the i<sup>th</sup> worker. “Voc<sub>i</sub>” represents vocational training of the i<sup>th</sup> worker. “rel<sub>i</sub>” represents religion of the i<sup>th</sup> worker.

Initially we have to estimate the selection equation on the basis of Probit model, On the basis of the estimation, we can have estimated value of Inverse Mill’s ratio represented by  $\lambda$  of each sample ‘i’. In the Heckman two step estimation, this  $\lambda$  is to be treated another explanatory variable of the original Equation, mentioned in the model above. If it is observed that the parameter estimates of  $\lambda$  is statistically significant, then we can become sure that Heckman two step estimation procedure is appropriate to address our research problem. However, the value of  $\lambda$  in Heckman two step model has been non-significant even at 10 percent level of significance <sup>13</sup> and thus proves the non-existent of selectivity bias in our model. Thus, we conduct OLS model to find out the determinants of health expenditure. The models of the OLS are same as that of the Heckman---

### **Discussion of the Result**

The results indicate that the co-efficient of EIS as well as SE have been significantly higher compared to IEFS which is the reference group. Thus, it can be inferred that health

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<sup>13</sup>The coefficient of  $\lambda$  is -75002.22 and 74862.01 for MODEL 1, MODEL2 and MODEL3 respectively and all are statistically insignificant.

expenditures have been significantly highest among EIS followed by SE and the least expenditure has been incurred among IEFS. Furthermore, it is found that there has been a positive relationship between health expenditures of the informal workers and that of presence of young and old dependents and age of the respondent. In fact, the presence of old dependents in the family enhances yearly health expenditure three times more than that of the young dependents. Apart from that, health expenditures significantly enhance with the increase in asset holding. Compared to general caste, health expenditure has been significantly lower among the vulnerable social groups like SC, ST as well as OBC workers. The least expenditure on health is observed among the STs. Increase in the years of education increases the expenditures on health significantly. Lastly, compared to that of the male headed household, workers coming from female headed families tend to spend less on health. All these results are compatible with the theory.

#### **Incidence of Catastrophic Health Expenditure among the Informal workers of India.**

If a household has to reduce its basic expenses over a certain period of time, sell assets, or accumulate debts to pay the medical bills of one or more of its members, then the family is said to incur catastrophic payments. There are no universally accepted cut-off values or thresholds for defining the catastrophic nature of healthcare payments. Catastrophic headcount has been defined here as the percentage of households spending more than a 5-25% of their total consumption expenditure on healthcare. However, empirical studies confirm that 10% of total expenditure is widely accepted as the standard, as this represents an approximate threshold at which the household is forced to cut down on subsistence needs, sell productive assets, incur debts or be impoverished (van Doorslaer et al, 2006 and Ghosh, 2011).

Doorslaer (2005) found out that there is heavy reliance of out-of-pocket financing of healthcare in Asia which is one of the major causes in the deterioration of standard of living. The increased out-of-pocket financing for healthcare can only be accommodated through diversion of resources from other consumption items. The excessive spending on healthcare is explained by the author as negative welfare cost or “catastrophic expenditure” which increased impoverishment among the low-income countries. Ghosh (2011) found out that new economic policies have significantly enhanced not only the incidence of catastrophic health expenditure but also impoverishment in India. Gupta et al. (2013) found that incidence of catastrophic health expenditure is found to be concentrated among high consumption

expenditure households in India. Households from SCs are more likely to incur catastrophic health expenditure from households of general category (Pal,2012).

We use the methodology of calculating the catastrophic payments for healthcare following Wagstaff and van Doorslaer (2003). An OOP payment for healthcare is considered “catastrophic” when the payment exceeds some threshold ( $Z_{cat}$ ), defined as a fraction of total household consumption or non-food consumption. If  $T$  represents OOP payments for healthcare,  $x$  represents total household expenditure and  $f(x)$  stands for food expenditure, then a household is said to have incurred catastrophic payments when  $T/x$  or  $T/[x-f(x)]$  exceeds a specified threshold,  $Z_{cat}$ . The approach used to measure catastrophic payments for healthcare involves analyzing the incidence of catastrophic payments – that is, the percentage of households that spend more on healthcare than the threshold, which can be measured by the headcount (HC). HC is the fraction of the sample whose expenditures as a proportion of total income exceed the threshold  $Z_{cat}$ .  $HGi$  is the “catastrophic overshoot”, which equals  $T_i/x_i - Z_{cat}$  if  $T_i/x_i > Z_{cat}$  and zero otherwise. The catastrophic overshoot captures the average degree by which payments (as a proportion of total expenditure) exceed the threshold  $Z_{cat}$ . If we let  $E_i = 1$  if  $HGi > 0$  and  $E_i = 0$  otherwise, then the headcount is given by expression (15):

$$HC = (1/N) \sum E_i = \mu E, \quad (\text{Eq.11})$$

where  $N$  is the sample size and  $\mu E$  is the mean of  $E_i$ , while HC captures only the incidence of any catastrophes occurring and  $O$  captures the intensity of the occurrence as well.

We have again calculated concentration index of  $E_i$  in order to determine whether poor households incur more catastrophic payments than rich households. If value of CI for  $E_i$  is positive, then there is a greater tendency rich household to exceed the threshold, while negative values indicate a greater tendency for poor households to exceed the threshold.

The estimates of HC are calculated on the basis of 10% threshold only as it is widely accepted as standard. Across different types of informal workers, HC has been highest among informal employees in the formal sector (IEFS) followed by employees of informal sector (EIS) and the lowest among self-employed workers (SE). However, we find that HG has been same across SE and EIS and lower among IEFS. Concentration index of HC (CE) is positive for all types of informal workers indicating that there is inequality in the spending of yearly health expenditure. Concentration index for HG (CEG) is also positive for all types of informal workers excepting IEFS which reflects that inequality in HG has been lower among them. We also find that catastrophic expenditure has been more or less 30 percent irrespective of different types of informal workers. Furthermore, we find that catastrophic expenditure has been unequally distributed.

## Determinants of Catastrophic Model

We want to look into the possible determinants of catastrophic health expenditure. Since selectivity bias hardly exist in our data, so we have used Probit model to find out the determining factors of the incidence of catastrophic health expenditure (yearly). The catastrophic health expenditure of 10% has only being considered in order to find out the determining factors. The dependent variable  $y_i^*$  is taking binary values 1 and 0 where 1 indicates that the  $i^{\text{th}}$  informal worker has to undergo catastrophic expenditure of 10% and above and 0 indicates otherwise. The dependent variable is thus a dummy variable and hence justifies our regression equation. Our model is given below

$$Y_i^* = F(\text{Edu}_i, \text{age}_i, \text{hh}_i, \text{caste}_i, \text{young}_i, \text{old}_i, \text{fuel}_i, \text{electr}_i, \text{land}_i, \text{assets}_i, \text{size}_i, \text{female lit}_i, \text{female edu}_i, \text{informal workers types}_i, \dots) \quad (\text{Eq. 12})$$

It is true that income is one of the most important explanatory variables. As income rises, the ability to pay for the healthcare without affecting the consumption of necessary goods will also rise. This lowers the incidence of catastrophic OOP health expenditure. Thus, there should be a negative relationship between worker's income and that of the ability to pay for OOP healthcare expenditures. However, information on income has been unavailable in our data. Wage of the workers might be considered as a proxy of income which is available in our data. Even then we have not considered wage because wage information is not available among the SE. Household assets might be considered as a proxy of income, and in turn considered as an important explanatory variable for calculating determinants of catastrophic health expenditure. "assets;" represents total amount of assets possessed by  $i^{\text{th}}$  informal workers. Land possessed<sup>14</sup> is also an important explanatory variable among the rural workers. "land;" is the total amount of land possessed among the  $i^{\text{th}}$  informal workers. Furthermore, cooking methods and access to household electricity can also be considered as important explanatory variable of the catastrophic OOP health expenditures. Access to cooking methods and electricity not only are an indicator of workers' wellbeing but also these possessions determine workers' health risks. Long-term exposure to solid cooking fuels enhances the chances of falling ill. The extent of exposure to health risk in turn determines the OOP health expenditures. "fuel;" represents the cooking methods and electricity used by  $i^{\text{th}}$  informal workers.

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<sup>14</sup>Information on land and assets have been given separately in our data set and multicollinearity hardly exist between them because they are completely unrelated to each other.

Apart from that, years of education are also considered as an important determinants of OOP catastrophic health expenditure. Education undoubtedly enhances individuals' care for health and thus catastrophic health expenditure among the individuals are likely to decline. education increases the opportunity cost of getting ill. Furthermore, it can also be said that as income increases, education also increases. Thus, increase in education reduces the likelihood of OOP health expenditure. Therefore, "Edu<sub>i</sub>" represents education of the i<sup>th</sup> informal worker. Female literacy also plays very important role in health expenditure and hence catastrophic health expenditure. So, the interaction dummy between education level and gender of the household head have been considered to check this hypothesis. Thus, the interactive dummy that is "female lit<sub>i</sub>" and "female edu<sub>i</sub>" represent female literacy and years of education of the female member respectively.

Apart from that presence of young family members and senior citizens in the family also enhances the health expenditures and in turn catastrophic health expenditure. Moreover, larger the household size means higher probability of being ill Thus, there has been a positive relationship between household size and catastrophic health expenditure. "Young<sub>i</sub>" represents workers with dependents less than 15. "Old<sub>i</sub>" represents workers with dependents greater than 60.

Just as the health expenditure, social background also plays very important role in determining catastrophic health expenditure. "Caste<sub>i</sub>" represents social group of the i<sup>th</sup> informal worker. Therefore, we use three different dummies to represent the deprived social groups. Those are scheduled tribe (ST), scheduled caste (SC) as well as other backward workers (OBC). Compared to the others (general), our objective is to investigate the extent of catastrophic health expenditures among the deprived social groups.

Age of the household head also play major role in determining the extent of catastrophic health expenditure. "age<sub>i</sub>" is considered as the age of the head of the family. Apart from age of the household head, gender of the household head also plays major role in determining catastrophic health expenditure. As explained in, female headed household have higher chance of facing catastrophic health expenditure compared to that of male headed household. "Hh<sub>i</sub>" represents household head of the i<sup>th</sup> informal worker. We have therefore calculated dummy variable for female headed household and would want to investigate whether catastrophic health expenditure is higher among the female compared to that of the male.

Besides, it would not be unwise to investigate how far catastrophic health expenditure is different across rural and urban area. So, we have created dummy variable for rural area in order to put some light on this matter in the rural area compared to that of the urban area.

Lastly, “size<sub>i</sub>” has been considered as an important explanatory variable representing size of the household. Just like the health expenditure, “Informal workers types<sub>i</sub>”, are also considered another important explanatory variable.

### **Results and Discussion**

We find that incidence of catastrophic health expenditures is significantly higher among the EIS but lower among the IEFS compared to that of SE. Age of the household head significantly enhances the probability of catastrophic health expenditures. Dummy of female headed household is negative and significant which highlights that the chance of catastrophic health expenditure is lower among them compared to the male headed household. In contrast to the existing theories, years of education are hardly statistically significant in determining catastrophic health expenditures. Not only that, the interaction dummies like female years of education and female literate workers also do not have any impact on catastrophic health expenditure. So far as the economic condition of the informal workers are concerned, we find that availability of assets and expenditure on fuel and electricity play significant role in determining yearly catastrophic health expenditures. However, possession of land hardly has any impact on the catastrophic yearly health expenditure. Apart from that number of senior members in the family increases the chance of yearly catastrophic health expenditures. Lastly, vulnerable social groups such as STs are less likely to consider expenditure on health as catastrophic health expenditure compared to the non-scheduled social group.

### **Chapter eight: Relevant Public Policies Required for Accumulation of Human Capital among Informal Worker Households of India**

With the rapid proliferation of informal employment and rise in income inequality, education is the only key by which informal workers can be saved from tremendous vulnerability and mishap. Hence, in this chapter we have tried to find out the extent of educational expenditure and determinants of the same among them.

#### **Research Objectives**

1. To put some light on the extent of investment in human capital among formal workers and different types of informal workers in India.
2. To investigate the determinants of expenditure on human capital formation among the households depending on informal workers for their livelihood in India.
3. To suggest public policies that may be undertaken by the government so that human expenditure among households working as informal workers can be increased.

## Sources of Data

The investigation is based on 68<sup>th</sup> round NSSO data for Employment and Unemployment.

## Educational Expenditure and Years of Schooling Among the Informal Workers of India

We have computed mean educational expenditure as well as years of schooling among. We find that mean educational expenditure of the formal workers is more than 3 times compared to the informal workers. Compatible with the educational expenditure, mean years of schooling has also been more than 3 times higher among the formal workers compared to the informal workers. Comparing different types of informal workers, we find that mean educational expenditure has been highest among EIS followed by IEFS and the least by SE. However, mean years of schooling has been highest among the IEFS and lowest among SE.

## Mean Share of Educational Expenditure as a Percentage of Total Expenditure Among the Informal Workers

Mean share of educational expenditure as a percentage of total expenditure has been more or less same among all types of informal workers. The values of CV and CI are also shown which has depicted how much unequal the expenditure on education. We find that educational expenditure has been highly unequally distributed.

## Determinants of monthly educational expenditure among the informal workers in India

We have used Heckman's Two-step estimation procedure where two equations are considered simultaneously. viz, the original equation as well as the selection equation. The dependent variable is  $\text{LnEXPHC}_i$  in the original equation which is nothing but the log of monthly expenditure on the education of the  $i^{\text{th}}$  informal workers. One can come to erroneous calculations and poor policy if the regression procedure is based on non-randomly selected samples containing only informal workers. As a result, using Heckman corrections is a two-step statistical approach which has the technique of correcting the sample selection bias problem of the NSSO data. Now the original equation can be expressed as:

$$\text{LnEXPHC}_i = F(\text{age}_i, \text{age}_i^2, \text{assets}_i, \text{caste}_i, \text{religion}_i, \frac{\text{children}}{\text{total family}}_i, \text{male child}_i, \text{head edu}_i, \text{poor family}_i, \text{bank}_i, \text{reason of school dropout}_i, \frac{\text{monthly transport expenditure}_i}{\text{monthly total expenditure}_i}, \frac{\text{monthly electrical expenditure}_i}{\text{monthly total expenditure}_i}, \frac{\text{monthly nutritional food expenditure}_i}{\text{monthly total expenditure}_i}, \frac{\text{monthly fuel expenditure}_i}{\text{monthly total expenditure}_i})$$

(Eq.13)

The selection Equation is here

$$I_i^* = F(\text{Voc}_i) \quad (\text{Eq.14})$$

In the original equation "age<sub>i</sub>" is considered as the age of the i<sup>th</sup> informal worker who is the head of the household. More age of the household head indicates better experience as an informal worker which helps him/her to earn a better wage or salary. This can help that household to spend more on education for their children. But when an informal worker gradually becomes older, then his/her productive capacity which mainly depends on his/her physical capability will decrease and that creates an impact on his/her earnings. Hence, Age<sup>2</sup> has also been considered as another explanatory variable.

Here "assets<sub>i</sub>" represents the total value of assets possessed by the i<sup>th</sup> informal workers. Here the assets are valued in monetary terms. Unfortunately, in NSSO data, a researcher can not get household income. So, "assets<sub>i</sub>" may be represented as a proxy of the economic solvency of the sample household. It will be found out whether the families with higher-valued assets spend more on educational expenditures or not.

In order to put some light on the economic condition of the workers' families, we create a dummy variable on the poor family. "poor family<sub>i</sub>" represents the poverty situation among the i<sup>th</sup> informal worker. Our target is to investigate whether educational expenditure among households depending on informal work lying below the poverty line is lower than that of non-poor households depending on informal work which is the reference group<sup>15</sup>.

Household size can create impact the expenditure on the human capital of the family. Thus, the ratio of the number of children and total household members in the family of the i<sup>th</sup> informal worker is considered an explanatory variable.

In India, parents tend to spend more on expenditures on human capital for the male child compared to that of the female child. Here, "male child<sub>i</sub>" represents the number of male children in the family of i<sup>th</sup> informal worker.

"head edu<sub>i</sub>" represents educational qualification among the head of the household of the i<sup>th</sup> informal worker. It is expected that household heads with higher educational qualifications spend more on investment in human capital for their children.

"bank<sub>i</sub>" represents i<sup>th</sup> informal workers who are having a bank account. This chapter thus seeks to find out whether financial inclusiveness increases educational expenditure among informal workers in India or not.

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<sup>15</sup>Poverty line is considered exactly the same way as we have calculated in chapter 5.

dropout<sub>i</sub> is also considered another explanatory variable. This chapter seeks to investigate how far educational expenditure changes as a result of school dropout. Several reasons are mentioned behind the cause of school dropout. The causes are 'school never attended because school is considered too far', 'school never attended to supplement household income', 'school never attended because education is not considered necessary' and 'school never attended to perform household chores'. Here due to the strong theoretical background 'school never attended to supplement household income' and 'school never attended because education is not considered necessary' are considered as the dummy variable for the family of  $i^{\text{th}}$  informal worker. The first one reflects that parents send their children to the job market to work as child labour to supplement their family income as mentioned by Basu( ). This is an economic factor. The second one indicates that parents are not motivated enough to send their children to school as mentioned by Kundu and Dutta(2014) which is a psychological factor.

The ratio of monthly transport expenditure to the total expenditure of the  $i^{\text{th}}$  family is also considered another explanatory variable. We would like to investigate whether expenditure on human capital will be influenced by the decrease in the ratio for the  $i^{\text{th}}$  family. Due to the paucity of public transport in rural areas, many students drop out of school. The availability of household transport like cycle, scooter etc. help the students of poor families to easily go to school by travelling long distance in rural areas where public transport is not available. In this situation, the value of the ratio will decrease and it can be expected that a fall in the value of this ratio can help the households depend on informal work to invest more human capital for their children.

The ratio of monthly electrical expenditure to the total monthly expenditure of the  $i^{\text{th}}$  family is calculated. It is required to find out whether educational expenditure increases as a result of the decrease in this ratio in the case of the  $i^{\text{th}}$  informal worker. The availability of electrical appliances in the home enables the students to continue their education further. Most importantly the availability of computers and laptops provides greater support in taking up higher education courses and those will be functional only if electricity connection is available in the house at a subsidized rate.

The ratio of nutritional food expenditure to the total monthly expenditure of the  $i^{\text{th}}$  family is also considered another explanatory variable. The ratio can take a lower value only in the presence of a strong public distribution system. It is required to find out the relationship

between expenditure on human capital and this ratio in the case of the  $i^{\text{th}}$  family of the informal workers and the expected sign should be negative.

The ratio of expenditure on fuel to the total monthly expenditure of the  $i^{\text{th}}$  family is also considered. It is required to find out whether there has been a negative relation exist between educational expenditure and this ratio. It is expected that the availability of fuel in the house at a subsidized rate can reduce that ratio and enhance the chances of investing in education because subsidized fuel can reduce the budget share of a household on fuel which can help the household to spend more on education.

The last four explanatory variables can be considered policy variables which can enhance investment expenditure for human capital. The Summary Statistics table is presented in the Appendix. It is also observed total absence of multicollinearity among the explanatory variables and the value of VIF in all situations never exceeds 6.

Roy and Kundu (2020) had already proved that being an informal worker is not exogenous but endogenous. So here Heckman's two-step treatment effect model is applied to tackle the problem of selectivity bias. So on the basis of the results obtained by Roy and Kundu (2020), the following selection equation is considered that helps to identify the determining factors for the workers to join informal employment.

In the Selection Equation (Eq. 2)  $I_i^*$  represents the type of employment (formal/informal) of the  $i^{\text{th}}$  worker which is a dummy in nature. Here “ $\text{voc}_i$ ” represents the vocational training of the  $i^{\text{th}}$  worker. It is treated as a dummy variable which represents different kinds of specialized training including engineering training, leather and textile-related training, photography, childcare-related training and so on the training of the  $i^{\text{th}}$  workers<sup>16</sup>.

Firstly, we have estimated the selection equation following the Probit model. On the basis of the estimation, we have found out the estimated value of Inverse Mill's ratio for each sample ‘ $i$ ’ as  $\lambda$ . In the Heckman two-step estimation, we treat  $\lambda$  as an explanatory variable of the original equation, which we mentioned in the model. The results of this regression are represented in Table 7.

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<sup>16</sup>Years of Education of the head of the family is another determining factor which can influence the happening of informal or formal worker of a laborer as identified by Roy and Kundu (2020). But as this variable is considered in the original equation, it is dropped from the selection equation. Religion is another factor which can also determine the type of a labourer. But here also due to the same reason that is not considered in selection equation.

## Findings and Results

Here it is observed that the parameter estimate of  $\lambda$  is statistically significant, which proves that Heckman's two-step estimation procedure is appropriate<sup>17</sup> to address this research problem. A positive significant relationship exists between expenditure for the accumulation of human capital and the age of the informal worker who is also the head of the family. However, a negative relationship is found between age<sup>2</sup> and expenditure on human capital. It establishes the fact that with the increase in the age of the informal worker, he/she spends more on human capital for their children but that will increase at a decreasing rate with his/her age. It is proved that families with higher amounts of assets which represent economic solvency of the household also spend a higher amount for accumulation for human capital. Thus, it is easily understood that informal workers coming from poor families spend significantly lower amounts on education. Expenditure on human capital among the different castes is significantly different. The same among Christians is significantly higher than among the Hindus which is the reference group. Although the ratio of children to total household is insignificant, the number of male children present in the family significantly enhances the educational expenditure of the same. This establishes the significance of gender bias during the time of investment in human capital and the result once again proves that families tend to spend more on a boy child compared to that of a girl child. Furthermore, it is also no surprise that as the informal worker who is the household head becomes more educated, he tends to spend more on their children. Moreover, as the number of bank account holders increased in a family, educational expenditure also increased significantly. This establishes the importance of Jana Dhan Yojana for the accumulation of human capital among the children of informal worker households. It is found that monthly transport expenditure as a ratio to total monthly expenditure is significantly negatively related to the monthly educational expenditure of the family. This implies that if households can spend proportionately less on transport then that household can spend more on human capital generation within his/her household. Thus, the distribution of bicycles among school students mainly among girls enhances education among informal workers because that can reduce the above-mentioned ratio. The same situation with investment in human capital happens with expenditure on electricity, fuel and for nutritious food. Efficient distribution of public distribution system, supply of cooking fuel and electricity at a subsidized rate and can help households depend on informal work for their livelihood to spend more on human capital for

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<sup>17</sup>The reason is that selectivity bias exists in our research problem.

their children. Availability of cooking fuel at a subsidized rate is the most important factor if the government wants to enhance investment in human capital among the children of the informal worker households. This establishes the importance of the Pradhan Mantri Ujjala Yojana where LPG cylinders are supplied to poor households at a subsidized rate.

### **Overall Conclusions**

In this study, we have found out that informal employment captures the lion's share in Indian labour market. Again, within the informal labour market, the dominance of male informal workers is not only higher than female informal worker, but also male informal workers earn higher wages compared to the female counterpart during the last decade. During 2011-2012, informal workers spend larger proportion of their income in food items compared to the formal workers, thus according to Engel's law we can conclude that the former is more poverty stricken than the latter. Besides, using the Working Lesser model we have analysed consumption pattern of the food and non-food items among the informal workers. We find that most of the food items are necessary goods and non-food items are luxury goods. Besides, health and education are also luxury good to the informal workers.

We have tried to investigate the extent of poverty across different types of informal workers during 2011-2012 as well as 2018-2019. We find that incidence and acuteness of poverty has been highest among IEFS followed by EIS and the least among SE in the rural area while in the urban area these are highest among SE followed by EIS and the least among IEFS during 2011-12. During 2018-2019, incidence of poverty has been highest among EIS, followed by SE and the least among IEFS in the rural and urban area. During this time, acuteness of poverty has been highest among IEFS in both the rural and urban area while this is lowest among EIS in the rural area and SE in the urban area. Chhattisgarh and Nagaland have been the most poverty-stricken states during 2011-2012 and 2018-2019 respectively. Determinants of poverty are age, caste of the worker quality of employment, financial inclusion, satisfaction of the workers, educational qualification as well as technical qualification and so on. Moreover, depth of poverty also depends on educational qualification, technical qualification and sectors are the determinants of depth of poverty. Moreover, we find that incidence of poverty is higher in the rural area but acuteness of poverty is higher in the urban area. Although incidence of poverty has declined over the years but acuteness of poverty has enhanced.

Determinants of poverty are quality of employment, educational qualification as well as technical qualification and so on. Moreover, depth of poverty also depends on educational qualification, technical qualification and sectors are the determinants of depth of poverty.

Female participation in Indian labour market as well as female wages has been lower than the male counterpart. There has been increase in wage income inequality among the informal workers as measured by GI estimates over the year around last decade. After decomposing overall estimates of GI across states, it is found that contribution of Go has been very high indicating that the factors determining wage inequality across states has been negligible. After doing regression analysis, we find that wage income inequality has enhanced significantly from 2011-2012 to 2018-2019 in both the rural and urban area. Compared to 2018-2019, there has been significant increase in wage inequality only in the urban area during 2019-2020.

We find that both health and educational expenditure among the informal workers has been many times lower than the formal workers during 2011-2012. Across different types of informal workers out-of-pocket health and educational expenditure are highest among EIS and IEFS respectively and least among SE during this time. Both health and educational expenditure has been unequally distributed among the informal workers. Moreover, we find that about 30 percent of the informal workers pay catastrophic health expenditure. Age, assets, caste, household head, number of dependents (both young and old), years of education and type of informal employment play crucial role in determining health expenditure. Age of the household head, number of old dependents, assets, use of fuel and electricity and type of informal employment are the determinants of catastrophic health expenditure. Age, age square, caste, religion, educational qualification of the household head, financial inclusion, number of male child, expenditure share of monthly transport, expenditure share on electrical goods, expenditure share on nutritious goods and expenditure share on fuel are the determinants of monthly health expenditure.

### **Policy Recommendations**

Government of India must spread various schemes like "Sarba Siksha Abhijan", "Kanyasree" so that the literacy rate and educational qualifications can be increased which will in turn help in reducing chronic poverty to a great extent. Provision of subsidized food in the form of ration, Sobujsthiprokolpo of West Bengal government are very fruitful policies which can enhance educational qualification of the informal workers. Besides, government must ensure better provision for nutritious food and electricity at cheap rate which can in turn enhance educational qualification of the informal workers. Moreover, kanyasree and Vivekananda

scholarship are another fruitful government policies to enhance educational qualification of the girl child. Consequently, marginal poverty and middle poverty can also be reduced by enhancing educational qualifications. Mid-day meal has been a very effective programme to reduce school drop-out and provide nourished among the children. There are various poverty alleviation programs that are implemented by our government from time to time to reduce poverty. There are various government policies like Ayushman Bharat, Aarogya Health Insurance Scheme, Central government Health Scheme help to reduce catastrophic health expenditure among the informal workers. Last but not the least government should necessary steps to ensure equal pay for equal work among men and women informal workers

## References

- Abraham, R. (2019), Informal Employment and Structure of Wages in India, *A Review of Trends, The review of Income and Wealth*, Vol. 65, No.1, pp-102-122.
- Banks, J., Blundell, R., & Lewbel, A. (1997). Quadratic Engel curves and consumer demand. *Review of Economics and Statistics*, 79(4), 527-539. Available at: <https://doi.org/10.1162/003465397557015>.
- Costa, M. (2016), "Overlapping component and inequality decomposition: A simulation study for the Gini index" <file:///C:/Users/SOURAV/Downloads/costa2016metron.pdf> on 01/12/2022.
- Das, P., 2012. Wage Inequality in India: Decomposition by Sector, Gender and Activity Status, *Economic and Political Weekly*, Vol. 47, No. 50, pp. 58-64.
- Deaton, A., & Muellbauer, J. (1980). An almost ideal demand system. *The American Economic Review*, Vol.70, No.3, pp 312-326.
- Doorslaer, E.V., O.O, Donnell, Rannan-Eliya, R.P., Somnathan, A. & Adhikari, S.R. (2006), Effect of payments for health care on poverty estimates in 11 countries in Asia: an analysis of household survey data, Vol. 368, No.9544 pp-1357-1364.
- Dutta, P.V., 2005. Accounting for Wage Inequality in India, *The Indian Journal of Labour Economics*, Vol. 48, No. 2, pp. 273-295.
- Ghosh, S. (2011), Catastrophic Payments and Impoverishment due to Out-of-Pocket Health Spending, *Economic and Political Weekly*, Vol. 16, No. 47, pp-63-70.
- Gupta, I. and Joe, W.(2013), "Refining estimates of catastrophic healthcare expenditure: an application in the Indian context", *International Journal of Health Care Finance and Economics*, Vol. 13, No. 2, pp-157-172.
- Jawed, M. S., Dhaigude, A. S., & Tapar, A. V. (2019), "The sectoral effect of demonetization on the economy: evidence from early reaction of the Indian stock markets" *Cogent Economics and Finance*, Vol.7 No.1. Seen at <https://doi.org/10.1080/23322039.2019.1595992> on 20/09/2023.
- Lee Jong Wha and Hanol Lee (2018); Human Capital and Income Inequality" *Journal of Asia Pacific Economy*, Vol.23, No.4 pp.554-583

- Leser, C. E. V. (1963). Forms of Engel functions. *Econometrica: Journal of the Econometric Society*, 31(31), 694-703.
- Leser, C. (1976). Income, household size and price changes 1953–1973. *Oxford Bulletin of Economics and Statistics*, 38(1), 1-10.
- Majali, K. A., & Habashneh, F. A. (2014). Estimating the Engel Curves for household expenditures in Jordan from 2010-2011. *European Scientific Journal*, Vol.10, No.2, pp 267-282.
- Marjit, S., & Kar, S. (2007). Urban informal sector and poverty—effects of trade reform and capita; mobility in India. PEP-MPIA Working Paper #2007-09, Canada.
- Marjit, S. and Kar, S., (2009): Urban Informal Sector and Poverty, *International Review of Economics and Finance*, No. 10, pp. 631-642.
- Marjit, S., 2003. Economic Reform And Informal Wage – A General Equilibrium Analysis, *Journal of Development Economics*, Vol. 72, No. 1, pp. 371-378.
- Naraynan, A. (2015). Informal employment in India: Voluntary choice or a result of labour market segmentation. *The Indian Journal of Labour Economics*, Vol. 58, No.1, pp 119-167.
- Mukhopadhyay, I., 1998. Calcutta's Informal Sector: Changing Pattern of Labour Use, *Economic and Political Weekly*, Vol. 33, No. 47/48, pp. 3075-3080.
- Papola, T. S. (2008). Employment challenge and strategies in India. ILO Asia Pacific Working Paper Series, International Labour Organization, Sub regional Office for South Asia, New Delhi.
- Pal, R. (2012), “Measuring incidence of catastrophic out-of-pocket health expenditure: with application to India”, *International Journal of Health Care Finance and Economics*, Vol. 12, No. 1, pp-63-85.
- Roy, R., & Kundu, A. (2020). An analysis of poverty among the informal workers of India. *Theoretical and Applied Economics*, 27(1), 87-104.
- Roy Rajyasri and Amit Kundu (2022): “ Consumption Nature of the Indian Informal Works: Engel's Law Revisited” *Asian Development Policy Review* Vol.10 No.4 pp. 307-316.
- Sahoo, B. K., & Neog, B. J. (2016). Heterogeneity and participation in informal employment among non-cultivator workers in India. *International Review of Applied Economics*, Vol.31, No.4, pp 437-467.
- Sanyal, K., & Bhattacharyya, R. (2009). Beyond the factory: Globalisation, informalisation of production and the new locations of labour. *Economic and Political Weekly*, 44(22), 35-44.
- Sundaram, K. (2008). Employment, wages and poverty in the organised and the unorganised segments in the non-agricultural sector, All-India, 2000-05. Working Paper No. 165, Centre for Development Studies, Delhi, India.
- Topalova, P. B. (2008). India: Is the Rising Tide Lifting All Boats? (SSRN Scholarly Paper No. ID 1112156). Rochester, NY: Social Science Research Network. Retrieved from <https://papers.ssrn.com/abstract=1112156>, Seen on 20/10/2020.
- Unni, J. (2005). Wages and incomes in formal and informal sectors in India. *The Indian Journal of Labour Economics*, Vol. 48, No, 2, pp 311-317.
- Working, H. (1943). Statistical laws of family expenditure. *Journal of the American Statistical Association*, Vol.38, No.221, pp 43-56.