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I would like to extend my whole-hearted thanks to the Editorial team, the Publisher, and all who have helped in the publication process, and especially the office bearers of Bangiya Arthaniti Parishad for their kind endeavours to make this issue of **Artha Beekshan** viable and **Kolkata Mudran** for bringing out the present issue.

Editor in Chief

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## **Economisation of Consumption: A Study in Indian States**

**Dr. Debottam Chakraborty<sup>1</sup> and Dr. Niladri De<sup>2</sup>**

### *Abstract*

*During the period of last decade India has experienced a lot of changes in different spheres ranging from production and employment to growth and welfare. This change brings changes in the consumption habits of the people. Also the household size and composition have been changed in Indian society. In this paper, the impact of household size on the consumption pattern has been studied at all India level and four states from the four regions of the country separately in rural and urban areas. The changes in habits of consumption has been tried to capture in terms of sharing tendencies of different consumption items among the members of the same household over the last decade. This sharing tendency has been termed as economization of consumption. This economization effect is mostly observed in case of non-food items and different states observed it in diversified pattern, which indicates varied pattern of changes in level of living.*

**Key words: Economisation of Consumption, Household Size, Engel Household Elasticity.**

**JEL Classification Code : P46**

### **I. Introduction**

A group of persons living together and sharing a common kitchen for consumption of food constitutes a household. This means that temporary visitors are excluded but temporary stay-away is included. Accordingly, a son or daughter living outside the household of his or her parents is excluded, but the servant or the paying guest residing in that house is included in the measurement of household size.

In case of a person taking food with his family but sleeping elsewhere (say, in a shop or a different house) due to space shortage, the household formed by such a person's family members is taken to include the person also. In case of a mess, hotel, boarding and lodging house or hostel each member is considered as an household; so as many of the number of the persons residing there, they form that number of single member household. But if a family

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residing in a hotel, they will be considered as one household. The size of a household is the total number of persons in that household.

Different income classes are having different household size. Household size influences the consumption basket of the people. Large household size enhances demand for some particular items on the one hand and economises the use of other items on the other. The household size is an important determinant of the consumption basket of the people. For some of the food items like cereals and pulses per capita consumption remains same with the increase in the household size. Again for some of the nonfood items like clothing and fuel their per capita consumption expenditure falls with the increase in the household size (Houthakker 1957).

Changes in consumption due to changes in the size of the family<sup>3</sup> depend on a number of factors. For nonfood items, indivisibility of the items becomes important. For a family of three one car is required for traveling. But if the car is five-seated, a five-member family can also use the same car, which, in effect, reduces the per capita consumption of car. Again, for food items a family with more members would purchase bulk quantities of goods, which enables the family to enjoy discount rates, which again reduces the per capita consumption.

The pattern of consumption depends also on the composition of the family. The age-sex characteristics of the family determine the consumption basket of a household. If there are many children in the family, or if there are more female members in the household, the demand for food items does not increase much, but probably the demand for the nonfood items may increase. Again, another important factor, which influences the consumption basket is relationships among the household members. The pattern of consumption basket is different for a household where there is a couple and a child from the pattern of consumption of another household where two couples are living together (David 1962).

It is also important to note that the influence of the household size on the per capita consumption is not same across different expenditure classes. In case of per capita consumption of housing space, the effect to economise consumption is more pronounced in case of the lower expenditure class. Again the practice of consumption varies in different places as per the local customs (David, 1962). So, it is important to find out the changes in consumption pattern with respect to different locations and different expenditure classes. The household size generally falls as income of the household increases. It is invariably observed in case of rural as well as urban areas. In rural areas the practice of joint family is more pronounced than in case of urban areas. So, in rural areas it may be found out that the household size is comparatively high even in case of upper expenditure groups.

As the household size changes, the per capita consumption of an item changes as a result of change in per capita total expenditure. Thus the household size does have an impact on

the per capita consumption of an item. To assess this impact it is required to take the household size as a separate independent variable. This exercise has been done in this paper to find out the impact of changes in household size on per capita consumption of different items. As household size increases, the per capita consumption of some items falls and for some items it increases. The items which show the falling tendency are said to have the economisation effect with respect to household size. The more the economization effect, the less the “effective” per capita expenditure on the item and consequently the more the level of living manifested through the economization effect of household size. In this paper we would attempt to find out the items which are having economisation effect of the household size.

Households are distinguished by (a) the size and (b) the composition of a household. The composition is again distinguished by age, sex and interrelationships of the members of the households. Using some conversion rates the household composition can be standardised (Houthakker, 1957 and Nelson, 1988). But in reality detailed *consumption-wise* data according to age-sex of members are not available in India. So, the standard family size is not computable. Therefore, the head-count measure of the family size is most often used in estimation. We have used this measure.

There are numerous studies, both national and international, available on the effects of household size on consumption. To mention a few Tobin (1950), Houthakker (1957), David (1962), Iyengar, Jain & Srinivasan (1967), Nelson (1988), Figini (1998), Deaton & Paxson (1998), Meenakshi & Ray (1999 and 2000), Horowitz (2002), Blow (2003), Tasciotti (2007) are cited. Most of the studies have taken the headcount number of the family members as the household size. But in Houthakker’s and in Nelson’s studies the equivalent scale has been used to determine the family size. In our study we have used the headcount measure of family size. NSSO data of different rounds (55<sup>th</sup> round in 1999-2000, 61<sup>st</sup> round of 2004-05 and 68<sup>th</sup> round of 2011-12) has been used in the estimation.

In this paper we attempt to determine out the affects of household size on consumption. (a) In fact we have tried to determine the economisation effects of household size on consumption depending upon nature of the good. (b) Specifically, we attempt to single out the consumption items which have the economization effects of household size. (c) As household size varies across regions and over time, it is also of interest to find out the change in the consumption behaviour across states and over time in India.

In this paper we have compared four states – Kerala, Maharastra, Punjab and West Bengal – from different regions of the country<sup>4</sup>. Section 2 describes the model used in estimation. Estimates are analysed in section 3. Section 4 presents concluding remarks.

## II. The Model

The following model is used in estimation. The model is due to Iyengar, Jain and Srinivasan (1967-68). Suppose that  $X_i^h$  is the expenditure on item  $i$  by household  $h$ ,  $X^h$  is the total expenditure of household  $h$ , and  $N^h$  is the total number of family members of household  $h$ .

Then the specific expenditure function is

$$X_i^h = f(X^h, N^h) \quad \text{—————(1)}$$

In estimation we may take the logarithmic form or any other form of (1)

We take here the logarithmic form:

$$\ln X_i^h = \beta_0 + \beta_1 \ln X^h + \beta_2 \ln N^h + u^h \quad \text{—————(2)}$$

where  $u^h$  is the random error spherically distributed.

By OLS we estimate (2) to get  $\hat{\beta}_0$ ,  $\hat{\beta}_1$  &  $\hat{\beta}_2$

But the problem of estimation is that  $\ln X^h$  and  $\ln N^h$  are directly related. Multicollinearity problem appears in the estimation. Precision of estimates is reduced, it is no doubt a serious problem. However, if one can tolerate such problem, one can get the effects of total expenditure and family size on specific expenditure. However, to overcome the problem, we assume that the specific expenditure function is one degree homogenous in  $X^h$  and  $N^h$ .

$$f\left(\frac{X^h}{N^h}, \frac{N^h}{N^h}\right) = \frac{1}{N^h} f(X^h, N^h) = \frac{X_i^h}{N^h} = x_i^h$$

Using this assumption we get,

$$x_i^h = \varphi(x^h, 1) = \varphi(x^h) \quad x_i^h = \varphi(x^h, 1) = \varphi(x^h)$$

$$\text{Hence } x_i^h = \varphi(x^h, 1) = \varphi(x^h) \quad \text{—————(3)}$$

As before we take the logarithmic form:

$$\ln x_i^h = \alpha_0 + \alpha_1 \ln x^h + u^h \quad \text{—————(4)}$$

which is the specific expenditure function in terms of per capita variables, in contrast to the earlier one where total variables are used. This form does not contain, explicitly, the family

size variable ( $N^h$ ). But  $N^h$  is implicitly used in per capita terms. OLS estimates are  $\hat{\alpha}_0$  and  $\hat{\alpha}_1$ .

Here multicollinearity is avoided, but family size effect on specific expenditure is not explicitly determined.

However, we can proceed further. We go back to the original functional form (2):

$$\begin{aligned} \ln X_i^h &= \beta_0 + \beta_1 \ln X^h + \beta_2 \ln N^h + u^h \\ \Rightarrow \ln X_i^h &= \beta_0 + \beta_1 \ln X^h + \beta_1 \ln N^h - \beta_1 \ln N^h - \ln N^h + \ln N^h + \beta_2 \ln N^h + u^h \\ \Rightarrow \ln X_i^h - \ln N^h &= \beta_0 + \beta_1 \ln X^h - \beta_1 \ln N^h + (\beta_1 + \beta_2 - 1) \ln N^h + u^h \\ \Rightarrow \ln\left(\frac{X_i^h}{N^h}\right) &= \beta_0 + \beta_1 \ln\left(\frac{X^h}{N^h}\right) + (\beta_1 + \beta_2 - 1) \ln N^h + u^h \\ \Rightarrow \ln x_i^h &= \beta_0 + \beta_1 \ln x^h + (\beta_1 + \beta_2 - 1) \ln N^h + u^h \text{ ----- (5)} \end{aligned}$$

This contains the family size variable explicitly and other variables in per capita terms.

Comparing (5) with (4) we observe that (5) gives more information than (4). Here, the effect of family size together with the effect of total per capita expenditure is estimated and multicollinearity problem seems to have been minimised. Engel expenditure elasticity in form (4) is  $\alpha_1$  which is different from obtained from the Engel function (5). Is  $\alpha_1 \leq / \geq \beta_1$ ? Theoretically if  $\beta_1 + \beta_2 - 1 = 0$ , i.e., if the Engel function is homogeneous of degree 1, then  $\alpha_1$  coincides with  $\beta_1$ . That is, when  $\beta_1 + \beta_2 - 1 = 0$  the form reduces to (4), which is one degree homogeneous. Thus, we can test the hypothesis,  $H_0 : \beta_1 + \beta_2 - 1 = 0$ , against the alternative hypothesis  $H_1 : \beta_1 + \beta_2 - 1 \neq 0$  in the form (5) and determine whether the original form is one degree homogeneous.

So, to examine whether the household size affects consumption or not, we must test the hypothesis  $H_0 : \beta_1 + \beta_2 - 1 = 0$  against the hypothesis  $H_1 : \beta_1 + \beta_2 - 1 \neq 0$ . If  $H_0$  is true, we can infer that the household size does not have any effect on consumption of the i-th item; otherwise the household size affects positively or negatively the consumption of the i-th item, depending on the sign of  $(\beta_1 + \beta_2 - 1)$  (positive or negative). If  $H_1$  is true and  $\beta_1 + \beta_2 - 1 < 0$ , then the household size will have an economization effect on consumption:

consumption rises (falls) with fall (rise) in household size. On the other hand, if  $H_1$  is true with  $\beta_1 + \beta_2 - 1 > 0$ , no economization effect is generated by the household size. The form (5) may be called the *household-size augmented Engel function* in contrast to the traditional or basic Engel function (form 4). In estimation we have used the form (5).

### III. Estimates

#### Inter-state variations in Household Size

In Table 1 the household size data have been provided for rural and urban areas separately, for all the three years. The statewise ranks of household size in the descending order are given in the parenthesis. At the all-India level in **rural areas**, the household size has decreased from 4.936 in 1999-2000 to 4.809 in 2004-05 and again decreased to 4.559. Uttar Pradesh (5.543), Haryana (5.456) are the few states which were in the top positions in 1999-2000 in rural areas. Uttar Pradesh (5.528), Rajasthan (5.323), and Bihar (5.184) are among the top few states in 2004-05 in rural areas. The highest household size has been seen in Uttar Pradesh (5.358) and Bihar (5.181) in 2011-12. In 2011-12 Andhra Pradesh (3.542) and Tamil Nadu (3.674) have shown the lowest household size in rural areas. In 1999-2000 West Bengal has shown the household size greater than the national average; but in 2004-05 and in 2011-12 the state has fallen below the national average in terms of household size.

At the all India level in urban areas, the household size has declined from 4.461 in 1999-2000 to 4.312 in 2004-05, and again to 4.022 in 2011-12. In 1999-2000 Bihar (5.000) Rajasthan (4.995) and Madhya Pradesh (4.982) were among the top few states in urban areas. In 2004-05, Madhya Pradesh (4.960), Uttar Pradesh (4.950), Bihar (4.82) have occupied top places and Tamil Nadu (3.623), Assam (3.843), Andhra Pradesh (3.928) have occupied the bottom places in terms of household-size in urban areas. Bihar (4.986) and Uttar Pradesh (4.823) are the top two states in terms of household size in urban areas in 2011-12.

It follows from the above that states have different household size and the household size varies over time. The household size has steadily declined during 2000-12 in both rural and urban India.

To assess the extent of inter-state variation in household-size we have computed the coefficient of variation (CV) for all three years for both rural and urban areas. The coefficient of variations of household size among the states has been increasing over the years in rural as well as urban areas. It has increased from 10.13% to 11.944% in rural areas and from 8.44% to 11.549% in urban areas during 2000 – 2012.

### **Augmented Engel Function:**

#### **a) Engel Expenditure Elasticity**

The estimates of the household size augmented Engel function for different food and non-food items in different states are presented in Tables 2 to 16. In almost all the states per capita total expenditure variable has shown a positive relationship with consumption of a particular item. In case of household size in many cases it has shown a negative relationship.

The coefficient of per capita expenditure in the household-size augmented Engel function is the Engel expenditure elasticity. It has been observed that for the overall food basket the Engel elasticity is positive and less than unity in both rural (0.547) and urban areas (0.236) in 2011-12. Also for the overall non-**food** basket it is less than unity in both rural (0.874) and urban areas (0.518) in the same year at the all-India level. Interestingly the elasticity for food item is less than that of non-food items. In 2004-05, Engel elasticity of the overall food basket was smaller than unity in both rural areas (0.657) and urban (0.486) areas, but for the non-food items it was greater than unity in both rural (1.284) and urban (1.218) areas. So, it can be said that, at the all-India level the overall non-food basket has become necessary from luxury good.

#### **b) Engel household size elasticity**

The coefficient of  $\ln N^h$  in form (8.5) is the Engel household-size elasticity. Our estimate shows that the null hypothesis  $H_0 : \beta_1 + \beta_2 - 1 = 0$  is rejected and the alternative hypothesis  $H_1 : \beta_1 + \beta_2 - 1 \neq 0$  is accepted indicating that the household-size ( $\ln N^h$ ) has become a significant variable (i.e., the household size having sign impact) at the all-India level for the following goods:

- I. 1999-2000
  - i. in rural areas: cereal; pulses; milk; egg, meat & fish; food; pan, tobacco & intoxicants; clothing; nonfood items,
  - ii. in urban areas: fuel & light; nonfood items.
- II. 2004-05
  - i. in rural areas: non-food,
  - ii. in urban areas: none.
- III. 2011-12
  - i. in rural areas: none,
  - ii. in urban areas: none.

Clearly for all those items the household size augmented Engel function has not been one degree homogeneous. This indicates that the household size has become an important explanatory variable in Engel function. But what's about the nature of the effect of household size? We consider the sign and the magnitude of the estimated coefficient. (a) If sign the term  $(\beta_1 + \beta_2 - 1)$  (co-efficient of the term  $\ln N^h$  in (8.5)) is negative, we say that there is an economization effect on per capita consumption of the item. This means that as the number of members in a household increases, the per-capita expenditure on the particular item (for which the term is negative) falls and vice-versa. (b) The magnitude of  $(\beta_1 + \beta_2 - 1)$  will determine the nature of elasticity of per capita consumption with respect to household-size.  $|\beta_1 + \beta_2 - 1| < 1 (> 1)$  indicates that per capita consumption is inelastic (elastic) with respect to household-size. The economization effect is observed in the following goods at all-India level:

- I. in 1999-2000, in both rural and urban areas: nonfood items
- II. in 2004-05, in rural area: non-food; in urban area: none
- III. in 2011-12, in both rural and urban areas: none

It thus follows that the economization effect was operative at the all India level in 1999-2000 in case of the overall non-food basket in both rural and urban areas and in 2004-05 only in rural areas for non-food items. In 2011-12 it is not at all operative neither in rural nor in urban areas. The magnitude of  $|\beta_1 + \beta_2 - 1|$ , on the other hand, indicates that up to 1999-2000, the economization for non-food item was more strong in rural areas than in urban areas, as the absolute value of coefficient of the term  $\ln N^h$  in (5) is greater in rural areas than in urban areas.

Now let us look at the state level, to examine whether the economization effect has been operational in different states. Our estimate shows that the household size has brought about the effect of economization in the following states:

**Kerala:**

1999-2000. In rural areas: none and in urban areas: clothing; non-food items

2004-05. In rural areas: cothing and in urban areas: egg, meat, fish

2011-12. In rural areas: cothing and in urban areas: egg, meat, fish

**Maharastra:**

1999-2000. In rural areas: non-food and in urban areas: none

2004-05. In rural areas: milk; food; fuel & light and in urban areas: none

2011-12. In rural areas: milk; food; fuel & light and in urban areas: none

**Punjab:**

1999-2000. In rural areas: none and in urban areas: milk; fuel & light

2004-05. In rural areas: clothing and in urban areas: non-food

2011-12. In rural areas: none and in urban areas: none

**West Bengal:**

1999-2000. In rural areas: pulses and in urban areas: milk; egg, meat, fish; fuel & light; non-food

2004-05. In rural areas: cereal; pulses; milk; egg, fish, meat; food; fuel & light and in urban areas: pulses; milk; egg, fish, meat; food; fuel & light, clothing, non-food

2011-12. In rural areas: fuel & light and non-food and in urban areas: none

**IV. Concluding Remarks**

The household size has steadily declined during 2000-12 in both rural and urban India. The variations of household size among the states have been increasing over the years in rural as well as in urban areas. At the all-India level the overall non-food basket has become necessary from luxury good. This indicates an improvement in level of living.

With the rise in household size nonfood items are relatively more prone to economization of consumption. The economization effect has been on the wane over time, meaning that the tendency of sharing the non-food items with other family members in a household has been changing over time and every person of a household tends to have separate arrangement for themselves. This is probably due to the fact that the number of earning members of a household is increasing as household size increases and so each member tends to spend more on non-food items. It is definitely indicative of improvement in levels of living.

**Table 1: Average Household Size in Different Indian States**

States	1999-2000		2004-05		2011-12	
	Rural	Urban	Rural	Urban	Rural	Urban
<b>Andhra Pradesh</b>	4.080 (14)	4.177 (12)	3.918 (14)	3.928 (13)	3.542 (15)	3.447 (15)
<b>Assam</b>	5.412 (4)	4.034 (14)	5.125 (4)	3.843 (14)	4.951 (3)	3.997 (8)
<b>Bihar</b>	5.141 (7)	5.000 (1)	5.184 (3)	4.82 (3)	5.181 (2)	4.986 (1)
<b>Gujarat</b>	4.886 (9)	4.443 (7)	4.637 (10)	4.535 (5)	4.763 (6)	3.89 (10)
<b>Haryana</b>	5.456 (3)	4.591 (5)	5.023 (6)	4.351 (6)	4.92 (4)	4.222 (5)
<b>Karnataka</b>	4.795 (10)	4.377 (8)	4.619 (11)	4.140 (10)	4.357 (9)	3.903 (9)
<b>Kerala</b>	4.512 (13)	4.337 (10)	4.267 (13)	4.097 (11)	4.05 (13)	3.743 (11)
<b>Madhya Pradesh</b>	5.199 (6)	4.982 (3)	5.123 (5)	4.960 (1)	4.621 (8)	4.495 (4)
<b>Maharastra</b>	4.670 (11)	4.470 (6)	4.559 (12)	4.336 (8)	4.205 (10)	4.066 (6)
<b>Orissa</b>	4.571 (12)	4.339 (9)	4.683 (8)	4.351 (7)	4.127 (12)	3.652 (13)
<b>Punjab</b>	5.339 (5)	4.245 (11)	5.007 (7)	4.334 (9)	4.751 (7)	4.064 (7)
<b>Rajasthan</b>	5.564 (1)	4.995 (2)	5.323 (2)	4.685 (4)	4.896 (5)	4.559 (3)
<b>Tamil Nadu</b>	4.021 (15)	3.873 (15)	3.762 (15)	3.623 (15)	3.674 (14)	3.453 (14)
<b>Uttar Pradesh</b>	5.543 (2)	4.966 (4)	5.528 (1)	4.950 (2)	5.358 (1)	4.823 (2)
<b>West Bengal</b>	5.012 (8)	4.051 (13)	4.657 (9)	3.933 (12)	4.156 (11)	3.717 (12)
<b>All India</b>	4.936	4.461	4.809	4.312	4.559	4.022
<i>Coefficient of Variations(%)</i>	10.130	8.440	10.540	9.450	11.944	11.549

Figures in ( ) indicates ranks. Source: Author's calculation based on NSSO data

**Table 2: Estimates of Engel Function with Household Size: Kerala 1999-2000**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.650* (9.616)	0.508* (2.188)	0.936	0.993* (5.079)	1.602* (3.358)	0.894
Pulses	1.903* (6.460)	2.490* (2.462)	0.846	1.556* (4.314)	1.845* (2.096)	0.922
Milk & Milk Products	2.134* (14.303)	1.653* (3.227)	0.970	1.331* (4.734)	0.361 (0.526)	0.975
Egg, Meat & Fish	1.144* (16.164)	0.621* (2.556)	0.978	1.215* (5.654)	1.056* (2.014)	0.968
Food	0.896* (22.047)	0.209 (1.496)	0.990	1.051* (10.572)	0.791* (3.264)	0.992
Pan, tobacco & Intoxicants	0.719* (3.845)	-0.386 (-0.601)	0.797	1.124* (2.859)	0.940 (0.980)	0.890
Fuel & Light	0.697* (15.374)	0.101 (0.649)	0.980	0.916* (5.842)	0.577 (1.508)	0.977
Clothing	0.960* (26.476)	0.152 (1.221)	0.993	0.407* (6.085)	-1.288* (-7.889)	0.998
Nonfood	1.135* (27.323)	-0.224 (-1.570)	0.994	0.960* (12.258)	-0.796* (-4.165)	0.998

Figure in the () indicates t value. \* indicates significant at 95% confidence interval.

**Table 3: Estimates of Engel Function with Household Size: Maharashtra 1999-2000**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.691* (7.863)	0.857* (2.960)	0.980	0.387* (2.892)	0.330 (0.908)	0.867
Pulses	0.987* (7.401)	1.427* (3.245)	0.972	0.395* (2.981)	0.024 (0.068)	0.931
Milk & Milk Products	2.446* (5.790)	2.692* (1.933)	0.967	1.039* (3.691)	-0.387 (-0.506)	0.965
Egg, Meat & Fish	1.653* (3.500)	1.448 (0.930)	0.928	0.651* (3.423)	0.118 (0.229)	0.942
Food	0.949* (9.443)	0.572 (1.727)	0.991	0.664* (7.770)	-0.161 (-0.691)	0.991
Pan, tobacco & Intoxicants	1.077* (4.892)	1.293 (1.781)	0.951	0.621* (2.428)	0.001 (0.002)	0.903
Fuel & Light	0.789* (4.316)	0.060 (0.100)	0.971	0.903* (16.449)	0.305* (2.041)	0.997
Clothing	1.042* (13.362)	0.774* (3.011)	0.995	0.721* (7.092)	-0.201 (-0.729)	0.990
Nonfood	1.105* (14.981)	-0.509* (-2.094)	0.998	1.251* (38.632)	-0.024 (-0.269)	1.000

**Table 4: Estimates of Engel Function with Household Size: Punjab 1999-2000**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.360* (8.395)	-0.092 (-0.603)	0.930	0.350* (3.947)	0.175 (0.858)	0.896
Pulses	0.807* (19.105)	0.687* (4.579)	0.980	0.585* (4.585)	0.045 (0.152)	0.945
Milk & Milk Products	1.491* (21.240)	0.714* (2.864)	0.985	0.811* (10.551)	-0.362* (-2.040)	0.993
Egg, Meat & Fish	0.805 (0.752)	-2.726 (-0.809)	0.913	2.015* (2.223)	0.192 (0.092)	0.798
Food	0.872* (32.677)	0.009 (0.092)	0.995	0.772* (29.657)	0.008 (0.139)	0.999
Pan, tobacco & Intoxicants	2.275* (7.982)	4.727* (4.669)	0.876	1.183* (2.412)	0.127 (0.112)	0.821
Fuel & Light	0.690* (8.980)	-0.296 (-1.084)	0.942	0.483* (6.109)	-0.364* (-1.995)	0.982
Clothing	1.346* (14.670)	0.774* (2.375)	0.969	1.127* (10.466)	0.110 (0.441)	0.989
Nonfood	1.170* (33.705)	0.049 (0.395)	0.995	1.180* (35.929)	-0.133 (-1.752)	0.999

**Table 5: Estimates of Engel Function with Household Size: West Bengal 1999-2000**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.632* (2.690)	0.543 (0.768)	0.883	0.100 (0.721)	-0.296 (-0.700)	0.823
Pulses	0.428* (2.613)	-1.036* (-2.101)	0.978	0.125 (0.512)	-1.229 (-1.649)	0.915
Milk & Milk Products	1.486* (2.939)	-1.229 (-0.808)	0.965	0.052 (0.145)	-4.060* (-3.710)	0.972
Egg, Meat & Fish	1.427* (5.331)	0.188 (0.234)	0.981	0.482 (1.819)	-1.607* (-1.994)	0.971
Food	0.860* (6.227)	0.163 (0.392)	0.985	0.791* (11.686)	0.088 (0.426)	0.997
Pan, tobacco & Intoxicants	1.164* (9.887)	0.824* (2.327)	0.991	0.922* (5.721)	0.097 (0.197)	0.986
Fuel & Light	0.677* (4.367)	-0.510 (-1.093)	0.983	0.428* (3.123)	-1.300* (-3.115)	0.989
Clothing	0.906* (8.012)	-0.162 (-0.476)	0.993	0.952* (8.255)	-0.060 (-0.171)	0.994
Nonfood	1.157* (8.036)	-0.504 (-1.163)	0.994	1.117* (14.153)	-0.539* (-2.243)	0.998

**Table 6: Estimates of Engel Function with Household Size: All India in 1999-2000**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.816* (10.198)	1.852* (6.625)	0.981	0.339* (2.408)	0.378 (0.886)	0.915
Pulses	1.413* (8.226)	2.422* (4.035)	0.985	0.577* (2.011)	0.225 (0.259)	0.934
Milk & Milk Products	3.492* (5.543)	5.534* (2.513)	0.972	1.238* (2.240)	0.332 (0.198)	0.950
Egg, Meat & Fish	1.821* (5.821)	2.354* (2.153)	0.980	1.242* (2.992)	1.301 (1.034)	0.947
Food	1.058* (12.082)	0.857* (2.797)	0.997	0.763* (5.873)	0.139 (0.353)	0.993
Pan, tobacco & Intoxicants	1.205* (10.772)	0.932* (2.384)	0.996	1.015* (5.732)	0.979 (1.822)	0.986
Fuel & Light	0.869* (6.587)	0.289 (0.626)	0.992	1.313* (7.304)	1.348* (2.474)	0.991
Clothing	1.087* (19.247)	0.728* (3.687)	0.999	0.853* (11.198)	-0.083 (-0.358)	0.998
Nonfood	1.007* (16.132)	-0.886* (-4.061)	0.999	1.184* (40.991)	-0.289* (-3.294)	1.000

**Table 7: Estimates of Engel Function with Household Size: Kerala 2004-05**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.629* (11.411)	0.618* (2.575)	0.945	0.360 (1.723)	0.063 (0.085)	0.773
Pulses	1.049* (8.534)	0.437 (0.817)	0.917	0.647* (2.862)	-0.387 (-0.487)	0.934
Milk & Milk Products	2.034* (15.739)	2.788* (4.958)	0.968	0.892* (2.313)	-0.720 (-0.530)	0.910
Egg, Meat & Fish	0.814* (23.963)	-0.004 (-0.028)	0.990	0.421* (3.300)	-0.941* (-2.094)	0.973
Food	0.800* (21.033)	0.292 (1.767)	0.985	0.564* (4.947)	-0.365 (-0.909)	0.977
Pan, tobacco & Intoxicants	0.999* (8.905)	0.884 (1.811)	0.915	0.635* (1.987)	0.264 (0.234)	0.798
Fuel & Light	0.659* (22.192)	0.099 (0.765)	0.988	0.494* (4.097)	-0.617 (-1.452)	0.975
Clothing	1.559* (4.774)	-3.163* (-2.226)	0.871	2.073* (4.017)	1.257 (0.691)	0.935
Nonfood	1.231* (45.672)	-0.197 (-1.677)	0.997	1.251* (47.077)	-0.055 (-0.588)	1.000

**Table 8: Estimates of Engel Function with Household Size: Maharashtra 2004-05**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.237* (2.396)	-0.547 (-1.282)	0.934	0.412* (4.134)	0.606 (1.748)	0.926
Pulses	0.249* (2.054)	-0.845 (-1.617)	0.933	0.624* (3.246)	0.966 (1.444)	0.877
Milk & Milk Products	0.527* (1.915)	-3.462* (-2.918)	0.960	1.088* (4.012)	0.184 (0.195)	0.968
Egg, Meat & Fish	0.555* (2.517)	-1.733 (-1.823)	0.951	1.029* (3.453)	1.190 (1.148)	0.919
Food	0.438* (4.340)	-1.107* (-2.546)	0.980	0.679* (7.280)	0.068 (0.209)	0.990
Pan, tobacco & Intoxicants	0.554* (2.309)	-0.326 (-0.315)	0.879	0.573* (2.634)	0.063 (0.084)	0.930
Fuel & Light	0.372* (2.565)	-1.530* (-2.445)	0.963	0.769* (9.449)	0.298 (1.051)	0.993
Clothing	2.104* (3.826)	-0.643 (-0.271)	0.947	1.467* (3.432)	-0.079 (-0.053)	0.961
Nonfood	1.422* (33.069)	0.449* (2.422)	0.999	1.249* (35.632)	-0.072 (-0.592)	1.000

**Table 9: Estimates of Engel Function with Household Size: Punjab 2004-05**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.281* (3.443)	0.290 (0.770)	0.878	0.165* (2.021)	0.068 (0.266)	0.680
Pulses	0.847* (4.011)	1.087 (1.116)	0.895	0.121 (1.332)	-0.515 (-1.798)	0.863
Milk & Milk Products	1.307* (6.181)	0.864 (0.886)	0.965	0.615* (2.859)	-0.360 (-0.531)	0.883
Egg, Meat & Fish	0.889 (0.771)	-4.304 (-0.883)	0.825	0.806 (1.205)	-1.064 (-0.505)	0.654
Food	0.724* (9.212)	-0.125 (-0.344)	0.989	0.578* (6.308)	-0.109 (-0.378)	0.967
Pan, tobacco & Intoxicants	1.612 (1.500)	-0.528 (-0.116)	0.835	0.750* (1.909)	0.272 (0.220)	0.662
Fuel & Light	1.215* (4.907)	1.757 (1.538)	0.922	0.459* (4.098)	-0.432 (-1.225)	0.948
Clothing	0.091 (0.123)	-7.544* (-2.408)	0.926	1.437* (2.756)	-0.788 (-0.480)	0.873
Nonfood	1.321* (22.205)	0.095 (0.346)	0.998	1.196* (61.289)	-0.205* (-3.338)	1.000

**Table 10: Estimates of Engel Function with Household Size: West Bengal 2004-05**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.029 (0.256)	-1.587* (-3.492)	0.944	0.063 (1.077)	-0.333 (-1.585)	0.838
Pulses	0.027 (0.136)	-3.139* (-3.906)	0.963	0.194* (2.030)	-0.980* (-2.850)	0.946
Milk & Milk Products	0.001 (0.002)	-7.393* (-4.901)	0.975	0.618* (3.361)	-2.376* (-3.584)	0.972
Egg, Meat & Fish	0.381* (1.893)	-3.026* (-3.773)	0.981	0.647* (5.772)	-0.951* (-2.353)	0.980
Food	0.302* (3.295)	-1.609* (-4.404)	0.989	0.518* (11.095)	-0.423* (-2.510)	0.993
Pan, tobacco & Intoxicants	0.230 (0.819)	-1.530 (-1.368)	0.883	0.541* (3.110)	-0.988 (-1.573)	0.941
Fuel & Light	0.194 (1.694)	-2.049* (-4.501)	0.984	0.471* (10.179)	-1.027* (-6.152)	0.995
Clothing	1.430* (6.784)	-1.411 (-1.682)	0.991	1.096* (5.226)	-2.055* (-2.717)	0.979
Nonfood	1.562* (24.682)	0.732* (2.903)	0.999	1.244* (45.327)	-0.431* (-4.358)	0.999

**Table 11: Estimates of Engel Function with Household Size: All India in 2004-05**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.378* (3.109)	0.451 (0.853)	0.931	0.201 (1.313)	-0.059 (-0.110)	0.926
Pulses	0.692* (3.431)	0.515 (0.587)	0.955	0.369 (1.162)	-0.160 (-0.144)	0.913
Milk & Milk Products	1.638 (1.804)	0.419 (0.106)	0.882	0.799 (1.163)	-0.708 (-0.294)	0.929
Egg, Meat & Fish	0.954* (2.832)	-0.542 (-0.370)	0.964	0.691 (1.736)	-0.039 (-0.028)	0.950
Food	0.657* (3.747)	-0.234 (-0.307)	0.977	0.486* (2.688)	-0.549 (-0.868)	0.987
Pan, tobacco & Intoxicants	0.732* (2.824)	-0.273 (-0.243)	0.960	1.405* (11.065)	2.909 (0.548)	0.993
Fuel & Light	0.592* (3.712)	-0.263 (-0.379)	0.977	0.530* (3.077)	-0.615 (-1.020)	0.990
Clothing	1.563* (3.386)	-1.285 (-0.641)	0.977	1.656* (2.773)	0.471 (0.225)	0.976
Nonfood	1.284* (15.629)	-0.202* (-5.564)	0.999	1.218* (19.766)	-0.278 (-1.287)	1.000

**Table 12: Estimates of Engel Function with Household Size: Kerala 2011-12**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.689* (7.497)	0.874* (2.545)	0.960	0.460 (1.964)	0.083 (1.568)	0.953
Pulses	3.078* (6.494)	0.567 (0.864)	0.965	0.787* (7.759)	-0.987 (-0.546)	0.984
Milk & Milk Products	3.234* (13.347)	1.641* (2.659)	0.973	0.972* (2.873)	-0.850 (-0.560)	0.926
Egg, Meat & Fish	0.814* (23.963)	-0.004 (-0.028)	0.990	0.421* (3.300)	-0.941* (-2.094)	0.973
Food	0.780* (19.033)	0.272 (0.737)	0.905	0.674* (5.849)	-0.475 (-0.937)	0.937
Pan, tobacco & Intoxicants	0.969* (7.985)	0.774 (1.751)	0.925	0.678* (2.997)	0.284 (0.224)	0.828
Fuel & Light	0.879* (16.172)	0.139 (0.775)	0.928	0.544* (6.767)	-0.657 (-0.422)	0.935
Clothing	3.589* (5.674)	-4.163* (-3.296)	0.771	3.123* (3.457)	1.257 (1.671)	0.785
Nonfood	2.981* (36.792)	-1.197 (-0.643)	0.977	3.251* (39.987)	-0.534 (-0.672)	0.989

**Table 13: Estimates of Engel Function with Household Size: Maharashtra 2011-12**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.347* (4.366)	-0.417 (-1.135)	0.894	0.543* (6.946)	0.676 (1.738)	0.959
Pulses	0.249* (2.054)	-0.845 (-1.617)	0.933	0.624* (3.246)	0.966 (1.444)	0.875
Milk & Milk Products	0.872* (2.562)	-4.462* (-3.988)	0.986	3.658* (3.075)	0.124 (0.155)	0.923
Egg, Meat & Fish	0.671* (3.687)	-1.543 (-1.343)	0.934	1.982* (4.725)	1.543 (1.262)	0.971
Food	0.341* (5.679)	-2.537* (-8.543)	0.943	0.872* (5.882)	0.848 (0.285)	0.983
Pan, tobacco & Intoxicants	0.744* (3.879)	-0.366 (-0.385)	0.882	0.753* (2.862)	0.123 (0.944)	0.987
Fuel & Light	0.765* (5.946)	-1.677* (-3.476)	0.980	0.756* (6.341)	0.258 (1.461)	0.912
Clothing	2.094* (4.251)	-0.613 (-0.633)	0.945	1.949* (2.970)	-0.289 (-0.873)	0.993
Nonfood	1.145* (26.879)	0.339* (2.772)	0.999	1.423* (28.322)	-0.892 (-0.902)	0.997

**Table 14: Estimates of Engel Function with Household Size: Punjab 2011-12**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.287* (3.783)	0.280 (0.730)	0.887	0.187* (2.262)	0.098 (0.566)	0.809
Pulses	0.958* (6.901)	1.647 (1.646)	0.835	0.145 (1.782)	-0.315 (-1.468)	0.854
Milk & Milk Products	1.546* (6.732)	0.674 (0.626)	0.956	0.654* (2.872)	-0.376 (-0.587)	0.862
Egg, Meat & Fish	0.767 (0.784)	-4.865 (-0.833)	0.898	0.886 (1.245)	-1.894 (-0.095)	0.784
Food	0.874* (13.212)	-0.185 (-0.394)	0.954	0.567* (6.987)	-0.659 (-0.332)	0.984
Pan, tobacco & Intoxicants	1.972 (1.956)	-0.568 (-0.196)	0.832	0.879* (2.989)	0.272 (0.298)	0.892
Fuel & Light	1.879* (4.998)	1.987 (1.438)	0.982	0.679* (4.928)	-0.672 (-1.283)	0.845
Clothing	0.893 (0.187)	-8.837 (-1.229)	0.876	1.647* (2.762)	-0.748 (-0.470)	0.933
Nonfood	0.921* (26.205)	0.075 (0.356)	0.978	0.196* (47.967)	-0.745 (-0.733)	0.899

**Table 15: Estimates of Engel Function with Household Size: West Bengal 2011-12**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.189 (0.877)	-1.987 (-0.673)	0.965	0.325 (1.655)	-0.873 (-1.429)	0.988
Pulses	0.987 (0.456)	-6.139 (-0.933)	0.993	0.432* (2.262)	-0.966 (-0.462)	0.943
Milk & Milk Products	0.043 (0.087)	-6.983 (-0.761)	0.955	0.765* (4.854)	-2.654 (-0.653)	0.935
Egg, Meat & Fish	0.456* (1.534)	-3.451 (-0.563)	0.881	0.687* (5.342)	-0.871 (-0.313)	0.946
Food	0.242* (3.735)	-1.967 (-0.522)	0.896	0.658* (14.905)	-0.673 (-0.576)	0.863
Pan, tobacco & Intoxicants	0.560 (0.455)	-1.521 (-1.373)	0.843	0.556* (3.677)	-0.877 (-1.574)	0.982
Fuel & Light	0.234 (1.544)	-2.169* (-4.771)	0.844	0.671* (14.679)	-1.327 (-0.321)	0.990
Clothing	1.769* (6.344)	-1.234 (-1.643)	0.967	1.345* (8.224)	-2.437 (-0.817)	0.955
Nonfood	1.873* (25.342)	-0.544* (-2.889)	0.990	1.544* (47.887)	-0.331 (-1.358)	0.980

**Table 16: Estimates of Engel Function with Household Size: All India in 2011-12**

Commodities	Rural			Urban		
	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>	Expenditure Coefficient	Household Size Coefficient	R <sup>2</sup>
Cereal	0.268* (3.178)	0.467 (0.763)	0.987	0.651 (1.766)	-0.779 (-0.198)	0.896
Pulses	0.472* (3.871)	0.835 (0.575)	0.944	0.365 (1.212)	-0.870 (-0.764)	0.895
Milk & Milk Products	1.765 (1.765)	0.322 (0.656)	0.902	0.655 (1.176)	-0.733 (-0.114)	0.977
Egg, Meat & Fish	0.674* (4.872)	-0.992 (-0.450)	0.964	0.321 (1.876)	-0.657 (-0.766)	0.977
Food	0.547* (6.887)	-0.278 (-0.387)	0.976	0.236* (3.568)	-0.779 (-0.248)	0.945
Pan, tobacco & Intoxicants	0.755* (2.766)	-0.883 (-0.553)	0.990	0.565* (11.876)	2.679 (0.148)	0.956
Fuel & Light	0.341* (3.890)	-0.653 (-0.789)	0.987	0.450* (4.777)	-0.765 (-1.670)	0.995
Clothing	0.877* (3.906)	-1.895 (-0.331)	0.925	0.616* (2.893)	0.891 (0.455)	0.996
Nonfood	0.874* (17.878)	-0.892 (-0.354)	0.960	0.518* (14.876)	-0.368 (-1.587)	0.990

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## **GROWTH, BREAK AND FLUCTUATION IN PRODUCTIVITY IN TOTAL FOODGRAINS IN THREE BACKWARD DISTRICTS OF WEST BENGAL IN THE PERIOD 1960-61 TO 2014-15**

**Prof. Debasish Mondal<sup>1</sup> and Dr. Swarup De<sup>2</sup>**

### **Abstract**

*The present paper makes an attempt to estimate the nature of growth, break and fluctuation in productivity in total foodgrains in three backward districts (Midnapur, Bankura and Purulia) of West Bengal in the period 1960-61 to 2014-15. Breaks in the growth paths have been evaluated by the modified Bai-Perron methodology. By using modified Cuddy-Della Valle and modified Coppock methodologies fluctuations around the growth path have been decomposed into year to year fluctuation and cyclical fluctuation.*

**Keywords: Growth, Break, Fluctuation, Foodgrains, Productivity, Backward region**

**JEL Classification Codes: C22, Q11, R 19.**

### **I. Introduction**

“VandeMataram, Sujalang Sufalang ...”, - Bankim Chandra Chatterjee composed this famous song, in 1882, which in many ways symbolizes the beauty of Bengal. Bengal’s rich culture binds the population together through its unique unity in diversity. It also symbolizes the rich agricultural scenario of Bengal.

West Bengal is predominantly an agriculture driven state. The climate of West Bengal experiences great variation. The agricultural economy of the state is heavily dependent on the vagaries of monsoon with an average annual rainfall of 195.98 cm. However, floods, land erosion and other natural calamities often affect crop production (Anon., 2009a).

In West Bengal, nearly 72 per cent population lives in the rural areas and they are directly or indirectly related to the agriculture. So, agriculture is the backbone of the economy of the state, although the share of agriculture in the state GDP is recorded to have come down from about 34.37 percent in 1980-81 to about 18.7 per cent in 2009-10. In West Bengal, agriculture plays a very important role in contribution to the state’s GDP as well as

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its share in total employment. Although the state is said to have witnessed a structural transformation in recent years, as many as 45.6 percent of the total employees are absorbed in agriculture, thus positing the significance of agriculture in the State as a major source of livelihood (NSSO, 2006). Agriculture in West Bengal provide livelihood to about 65% of the population of the state living in villages with over 95% as small and marginal farmers.

## **II. Review of Literature**

In Indian agriculture, the nature of growth and fluctuations are very common and contradictory issues in the national level as well as state level. Saha and Swaminathan observed an accelerated growth in agriculture for the state of west Bengal during the eighties. With the help of standard curve fitting technique by Chattopadhy et al and found no statistical evidence in support of break in total foodgrain production in West Bengal in the eighties. Rawal and Swaminathan who have used deterministic trend of exponential form, concluded on the basis of time series data spanning about 50 years that West Bengal has experienced acceleration in growth during and after major changes in agrarian institution and land relations. Foodgrain dominates the cropping pattern in the state of west Bengal. According to Ghosh and Kuri in the state of west Bengal performance of foodgrain production is well but in the recent years there is an evidence of stagnancy in foodgrain production. Boyce has shown that the approach for the measurement of sub-period growth rates used so far suffers from “discontinuity bias”. To overcome this difficulty Boyce has introduced a new approach in which “kinked exponential model” is fitted for estimating sub-period growth rates In the Indian context, Dev found that besides variations in rainfall the differences in the extent and quality of irrigation were also important to explain interstate disparities in growth and stability. The growth performance of agriculture at the national level was splendid during the 1980s and its deceleration during the 1990s was attributed to the reduction in and/or stagnation of public expenditure on agricultural infrastructure, defunct extension services and economic reforms. Parikh argued that “though after 1980’s, India achieved self sufficiency in foodgrain production but there is no surety that this achievement would be sustained”. G. Bhala and G. Singh concluded that in the post reform period (1990-93 to 2003-06) the growth rate of crops yields as well as total agricultural output in most of the states have decreased than the pre reform period (1980-83 to 1990-93). R. P. S Mallik has found that the trend of growth of the agricultural production as well as the crops productivity has decreased after the adoption of liberalization policy. S K. Goyal and J. P. Singh have observed that the foodgrains production has increased during the period of 1960-1999.

An instability measure has mainly been evolved as a related issue to the growth measurement in agriculture. In regard to the measurement of in stability in Agricultural production we set broadly two technique, summary measure and trend measure. The summary measure of instability was adopted by Barker et al. Other attributed that instability in agriculture

production had increased with the adoption of new technology. Ray found that the pattern of growth and instability was due to an increase in the variability of rainfall and prices. Likewise, Rao et al concluded that instability in agriculture production had increased in the post green revolution period on account of rise in the sensitivity of output to variations in rainfall which was traceable to high complementary of new seed-fertilizer technology with water and inadequate expansion of irrigation facilities. But Dev reported progressive but marginally declined instability in food grain production at the all India level and mixed result as state level. All these studies covered the initial phase of the green revolution technology (late 1970s or mid 1980s). Larson et al concluded that the green revolution has been instrumental in increasing production of food grain and other crops in India but this has come at a cost of greater instability in production and yield, he covered a longer post green revolution period. Sharma et al attributed that the production of individual crops and total food grains had become more stable during 90's compared to 80's. The study by Sharma et al, started from year 1980-81; it did not cover the initial phase of green revolution nor did cover the pre green revolution period. According to Ramesh et al variability in yield of foodgrains as well as that of non-foodgrains was much lower in the first phase of green revolution period. Deviation of observed yield from trend witnessed decline during 1989-2007.

The above study of literature reveals that no comprehensive study has so far been made for measuring growth, break and fluctuation in agricultural productivity at the state or the national level.

Therefore, the present work is done keeping in mind the following these objectives.

- To calculate the growth rate in productivity in total foodgrain throughout the period and also for different regimes created through external and internal breaks and to find out the difference between growth rates in different regimes.
- To examine the extent of instability using both Residual base Index and Coppock index, for the whole period and also for different regimes.
- To estimate the length of cyclical fluctuation with the help of Coppock index and Residual base index.

### **III. Methodology**

Growth and fluctuations are two common elements of time series. A uniform growth rate for the whole period is generally calculated from the log-linear regression  $\ln X_t = a + rt$ . ( $r$  being the rate of exponential growth) and fluctuations are generally calculated by the residuals obtained from the above regression. In majority of time series we observe different growth rates in different sub periods leading to breaks in the growth path. We get break in trend or growth path due to policy changes and this break in trend is normally estimated by separate

regressions for different sub periods or by a single regression with dummy variables for different sub periods or different policy regimes.

For a data set of T years,  $t = 1, 2, \dots, T$ , if we have two regimes as  $1, 2, \dots, k$  and  $k+1, k+2, \dots, T$ , we can estimate two growth rates from a single regression with dummy variables  $D_1$  and  $D_2$  such that  $D_1=1$  and  $D_2=0$  for the first sub period and  $D_1=0$  and  $D_2=1$  for the second sub period. The regression equation can be taken in the form,

$$\ln X_t = a + r_1 D_1 t + a_2 D_2 + r_2 D_2 t$$

Here  $D_1 t$  and  $D_2 t$  are slope dummies for two sub periods and  $D_2$  is the intercept dummy for the second sub period. In the 1<sup>st</sup> sub period when  $D_1=1$  and  $D_2=0$  the equation reduces to  $\ln X_t = a + r_1 t$ , implying that  $r_1$  is the growth rate of the first sub period. In the second sub period when  $D_1=0$  and  $D_2=1$  the equation reduces to  $\ln X_t = (a+a_2) + r_2 t$ , implying that  $r_2$  is the growth rate in the second sub period.  $D_2$  is accommodated or  $a_2$  is estimated to adjust the change in the intercept with a break in between two sub periods. Intercept dummy  $D_1$  for the first sub period cannot be used. When both  $D_1$  and  $D_2$  are used in the same model as  $D_1+D_2$  is always equal to 1 we shall be caught into a dummy variable trap because of perfect multi-collinearity between  $D_1$  and  $D_2$ .

We can reformulate the model by totally avoiding  $D_1$  (Many econometricians suggest to use dummy variable one less in number from the number of sub periods present). The new model takes the following form,

$$\ln X_t = a + r_1 t + a_2 D_2 + r_2 D_2 t$$

where  $D_2$  is the intercept dummy for the second sub period and  $D_2 t$  is the slope dummy for the same. In the first sub period the equation reduces to  $\ln X_t = a + r_1 t$  as before. But in the second sub period it reduces to  $\ln X_t = (a + a_2) + (r_1 + r_2)t$ . Thus  $(r_1 + r_2)$  is now the growth rate for the second sub period or  $r_2$  is the difference between the growth rates of two sub periods. The advantage of this second model over the first is that in this second model we are able to test the significance of  $r_2$ , the difference between growth rates in two sub periods.

The problem with both of the above two models is that they may create discontinuity between the two growth paths estimated. To overcome this, restriction for continuity or kink is posed for the double dummy model as,  $a + r_1 k = (a + a_2) + r_2 k$  or  $a_2 = (r_1 - r_2)k$ . The model now reduces to,

$$\ln X_t = a + r_1 D_1 t + (r_1 - r_2)k D_2 + r_2 D_2 t$$

$$\text{or, } \ln X_t = a + r_1 (D_1 t + k D_2) + r_2 (D_2 t - k D_2)$$

$$\text{or, } \ln X_t = a + r J_1 + r_2 J_2$$

Where,  $J_1 = D_1t + kD_2$  and  $J_2 = D_2t - kD_2$

This model will henceforth be called the J-Model.

In the same way restriction for continuity in the single dummy model is  $a + r_1k = (a+a_2) + (r_1+r_2)k$  or  $a_2 = -r_2k$ . The model now reduces to,

$$\ln X_t = a + r_1t - r_2kD_2 + r_2D_2t$$

$$\text{or, } \ln X_t = a + r_1t + r_2(D_2t - kD_2)$$

$$\text{or, } \ln X_t = a + rH_1 + r_2H_2, \quad \text{where, } H_1 = t \text{ and } H_2 = D_2t - kD_2$$

This model will henceforth be called the H-Model.

In this way we can formulate dummy variable models for calculating growth rates of three or more sub periods and for comparing growth rates between two consecutive sub periods or between two sub periods leaving one or two small sub periods in between them.

In case of measurement of fluctuation in a time series  $X_t$ , fluctuation is frequently interpreted in terms of fluctuation around the trend line. Fluctuation around the trend is generally estimated by the deviation of observed values from the estimated values in the regression mentioned above and it is denoted by  $e_t$ . The fluctuation index is obtained through the residuals sum square (RSS)  $= \sum e_t^2$  in the following way.

$$I_{\text{RSS}} = \sqrt{\frac{1}{T} \sum e_t^2 / \overline{\ln X_t}}$$

The numerator of the above expression is the SD of  $e_t$  and the denominator is the mean of  $\ln X_t$ . It is a measure very close to coefficient of variation of  $e_t$  multiplied by the square root of  $(1-R^2)$  as proposed by Cuddy-Della Valle (1978).

Coppock (1962) has advocated an important methodology of measurement of fluctuation in a time series  $X_t$ . Coppock measurement of the index of fluctuation is given by  $I_{\text{coppock}} = \text{Exp}(\text{SD}(\ln(\frac{X_{t+1}}{X_t})))$ , this measurement is based on year to year fluctuation. Now, in case of comparison between the two above mention methods, we face a problem. The RSS base measure has a zero lower limit and it can go beyond one --- actually it has no upper limit. The coppock measure has a lower limit at one and it has no upper limit.

To overcome this difficulty, Mondal and Mondal Saha (2008) have proposed some adjustment to the above measures. The adjusted Coppock measure of fluctuation is given by  $I_{\text{coppock}}' =$

$\frac{SD(\ln(\frac{X_{t+1}}{X_t}))}{2(\ln\bar{X}_t)}$ . This index is comparable to the RSS base index. The length of cyclical fluctuation can be calculated by squaring the value of the ratio of residuals base index divided by adjusted coppock index and then it is multiplied by 2.

The entire research work is based on the secondary data of productivity of total foodgrain in three backward districts (Midnapur, Bankura and Purulia) of West Bengal, since 1960-61 to 2014-15, collected from “Directorate of Economics and Statistics”, Ministry of Agriculture, and different issues of Statistical Abstract, Govt. of West Bengal.

Many researchers, who are engaged in this type of research, use the same data set and take breaks at the dates of policy changes, e.g., introduction of green revolution, introduction of land reform policy and introduction of new economic policy etc. They do not examine whether the breaks are significant or not. For this type of work, a programme was developed by Bai and Perron (1998) to identify optimum break points in a time series data. They proposed a minimum length of a regime or sub period of at least 5 years. We have developed a programme, which is the modified version of Bai-Perron methodology. In this programme, keeping minimum length of regime at 5 years or so we have allowed truncated regime on two ends and short term fluctuations of one to two years in between two consecutive regimes. If policy changes actually create break then it will be automatically incorporated in our method.

#### **Iv.Result And Discussion**

##### **Midnapur District:**

The growth rate in productivity in total food grain for the district of Midnapur is represented in table 1.1. In Midnapur since 1960-61 to 2014-15, the growth rate in productivity in total food grain was 3.50% and it was significant at 1.55E-26 level of significance. During regime –I (1960-61 to 1980-81) i.e. during the pre land reform regime, it is observed that the growth rate in productivity in total food grain was very low (0.98%) and it was significant at 5% level of significance. Thus during the pre land reform regime the growth rate in productivity in total food grain was not impressive (less than one percent). During regime – II (1983-84 to 2001-02), it is noticed that the growth rate in productivity in total food grain significantly increased from 0.98% to 4.82% as compared to the previous regime. The difference between two regimes’ (I and II) growth rate (3.84%) was significant. Therefore, after the adoption of land reform policy in West Bengal the growth rate in productivity in total food grain increased significantly. In West Bengal Landholding Revenue Act was provided for key changes in the share of cropping system. During regime –III (2001-02 to 2014-15) i.e. in recent years, it is

found that the growth rate in productivity decreased from 4.82% to 2.01% and it was significant. The difference between two regimes (II and III) growth rate was also significant.

Table 1.2 depicts the nature and extent of fluctuation in productivity in total food grain for the district of Midnapur, it is observed that for the whole period (1960-61 to 2014-15), the fluctuation in total variation in productivity in total food grain amounted to 34% and out of this fluctuation year to year fluctuation was 53%, so the rest percentage fluctuation arose due to break in trend, due to cyclical or irregular fluctuation. During the regime – I, it is noticed that the fluctuation in productivity in total food grain amounted to 85% and out of this fluctuation year to year fluctuation was 76%, so rest percentage fluctuation arose due to cyclical or irregular fluctuation. During regime – II, i.e. after the adoption of land reform policy in West Bengal, it is found that the fluctuation from the growth path in productivity in total food grain amounted to 48% and it was lower than the previous regime. The year to year fluctuation out of fluctuation in total variation was 83%, so rest 17% fluctuation arose due to cyclical or irregular fluctuation. Therefore it is observed that after the adoption of land reform policy in Bengal the productivity in total food grain was much stable as compared to the pre land reform regime. It is also noticed that the length of the cycle in productivity decreased in comparison to the previous regime. Now, during the regime – III, it is found that the fluctuation in total variation as well as year to year fluctuation in productivity in total food grain increased as compared to the previous regime. Thus, the productivity in total food grain was more unstable as compared to the previous regime. It is also observed that during this regime the length of the cycle in productivity in total food grain marginally decreased.

**Table – 1.1 : Growth in productivity in total foodgrain for the district of Midnapur**

<b>Midnapur</b>			
<b>Regimes</b>	<b>GROWTH RATES (%)</b>	<b>T-VALUE</b>	<b>P-VALUE</b>
Full period (1960-61 to 2014-15)	3.50	20.18	1.55E-26
Regime – I (1960-61 to 1980-81)	0.98	2.15	3.64E-02
Regime – II (1983-84 to 2001-02)	4.82	10.42	5.03E-14
Regime – III (2001-02 to 2014-15)	2.01	2.98	4.48E-03

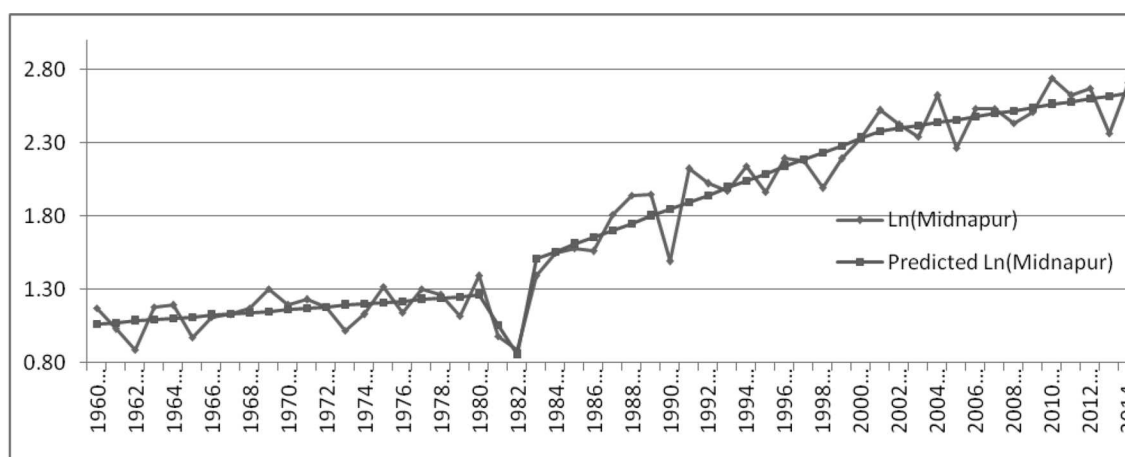
  

<b>Difference between regimes' growth rate (Midnapur)</b>			
<b>Difference</b>	<b>GROWTH RATES (%)</b>	<b>T-VALUE</b>	<b>P-VALUE</b>
Difference between Sub period-I & II	3.84	5.89	3.40E-07
Difference between Sub period-II & III	-2.81	-2.75	8.32E-03

**Table – 1.2 : Nature and extent of fluctuation in productivity in total foodgrain for the district of Midnapur**

Midnapur			
Regimes	Year to year fluctuation	Fluctuation from trend	Length of Cycle
Full period (1960-61 to 2014-15)	0.0606(52.68%)	0.1150(33.94%)	7.21
Regime – I (1960-61 to 1980-81)	0.0645(75.92%)	0.0850(84.50%)	3.47
Regime – II (1983-84 to 2001-02)	0.0615(82.79%)	0.0743(48.19%)	2.92
Regime – III (2001-02 to 2014-15)	0.0420(84.12%)	0.0500(90.48%)	2.83

**Figure – 1.a : Growth in productivity in total foodgrain for the district of Midnapur**



### Bankura District:

Table 1.3 represents the growth rate in productivity in total food grain for the district of Bankura. In Bankura, the growth rate in productivity in total food grain was 3.92% since 1960-61 to 2014-15 and it was significant at 1.22E-25 level of significance. During regime – I (1960-61 to 1964-65), it is observed that the growth rate in productivity in total food grain was 2.72% and it was significant. During regime –II (1968-69 to 1980-81) i.e. during the pre land reform regime, the growth rate in productivity in total food grain was 1.11% but this growth rate was insignificant. Thus, during the pre land reform regime, it is noticed that the growth rate in productivity was very low. After the adoption of land reform policy in West Bengal i.e. during the regime –III (1983-84 to 1996-97) it is found that the growth rate in productivity in total food grain increased from 1.11% to 7.16% and it was highly significant.

Now, in recent years i.e. during regime –IV (1996-97 to 2014-15), it is noticed that the growth rate in productivity decreased significantly from 7.16% to 1.89%. The difference between two sub periods growth rate was also significant.

Nature and extent of fluctuation in productivity in total food grain for the district of Bankura is represented in table 1.4. In Bankura, during the full period (1960-61 to 2014-15), the fluctuation from the growth path amounted to 20%, this fluctuation from the trend arose due to four types of fluctuation, due to year to year fluctuation, due to break in trend, cyclical or irregular fluctuation. The year to year fluctuation out of fluctuation in total variation amounted to 81%, so rest 19% fluctuation arose due to break in trend, due to cyclical or irregular fluctuation. During regime –I (1960-61 to 1964-65) it is observed that the fluctuation in total variation amounted to 90% and out of this fluctuation in total variation year to year fluctuation was 78%, so the rest percentage fluctuation arose due to cyclical or irregular fluctuation. During regime –II (1968-69 to 1980-81), it is estimated that the fluctuation in total variation as well as year to year fluctuation increased as compared to the previous regime. Therefore, we can say that the productivity in total food grain was more unstable in comparison to the previous regime. It is also noticed that the length of the cycle decreased during this period in comparison to the previous period. During regime –III i.e. after the adoption of land reform policy in West Bengal, the fluctuation in total variation decreased from 96% to 27%. Thus the productivity in total food grain was very much stable after the adoption of land reform policy. Now, during regime –IV (1996-97 to 2014-15), it is noticed that the productivity in total food grain was more unstable in comparison to the previous regime, because fluctuation from the growth path in productivity in total food grain increased during this period from 27% to 81% in comparison to the previous regime.

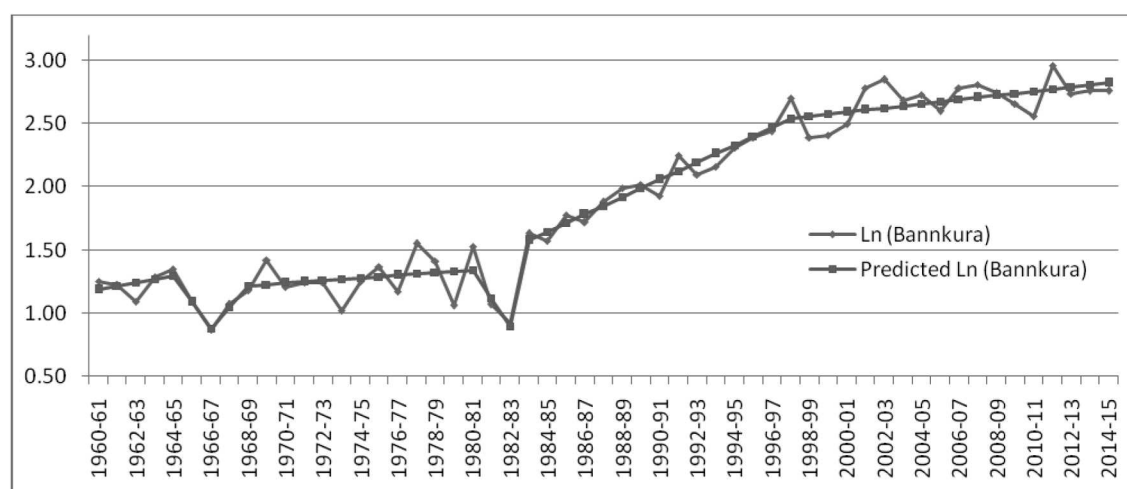
**Table – 1.3 : Growth in productivity in total foodgrain for the district of Bankura**

<b>Bankura</b>			
<b>Regimes</b>	<b>GROWTH RATES (%)</b>	<b>T-VALUE</b>	<b>P-VALUE</b>
Full period (1960-61 to 2014-15)	3.92	19.31	1.22E-25
Regime – I (1960-61 to 1964-65)	2.72	0.71	4.80E-01
Regime – II (1968-69 to 1980-81)	1.11	1.24	2.20E-01
Regime – III (1983-84 to 1996-97)	7.16	10.87	2.66E-14
Regime – IV (1996-97 to 2014-15)	1.89	4.19	1.23E-04

<b>Difference between regimes' growth rates(Bankura)</b>			
<b>Difference</b>	<b>GROWTH RATES (%)</b>	<b>T-VALUE</b>	<b>P-VALUE</b>
Difference between Sub period-I & II	-1.61	-0.41	6.84E-01
Difference between Sub period-II & III	6.05	5.45	1.92E-06
Difference between Sub period-III & IV	-5.27	-5.30	3.23E-06

**Table – 1.4 : Nature and extent of fluctuation in productivity in total foodgrain for the district of Bankura**

Bankura			
Regimes	Year to year fluctuation	Fluctuation from trend	Length of Cycle
Full period (1960-61 to 2014-15)	0.0568(81.39%)	0.0698(19.92%)	3.02
Regime – I (1960-61 to 1964-65)	0.0489(77.93%)	0.0628(89.78%)	3.29
Regime – II (1968-69 to 1980-81)	0.0945(79.64%)	0.1186(95.80%)	3.15
Regime – III (1983-84 to 1996-97)	0.0513(141.58%)	0.0362(27.20%)	1.00
Regime – IV (1996-97 to 2014-15)	0.0322(69.73%)	0.0461(81.44%)	4.11

**Figure – 1.b : Growth in productivity in total food grain for the district of Bankura****Purulia District:**

In the district of Purulia (Table 1.5), it is observed that the growth rate in productivity in total food grain during the whole period (1960-61 to 2014-15) was 2.90% and it was significant at  $9.39E-18$  level of significance. During regime –I (1960-61 to 1981-82), i.e. during pre land reform regime, it is observed that the growth rate in productivity in total food grain was minimum (0.36%) and this growth rate was insignificant. During regime –II (1983-84 to 2000-01), it is noticed that the productivity in total food grain significantly increased from 0.36% to 1.97%. Thus, after the adoption of land reform policy in West Bengal the performance of growth in productivity was very impressive. The difference between two regimes growth rate was significant. Now, during regime –III (2001-02 to 2014-5), i.e. in the recent years, it is estimated that the productivity in total food grain was negative (-0.53), although this negative growth rate was also not significant. The difference between two regimes growth rate was also insignificant.

Table 1.6 represents the nature and extent of fluctuation in productivity in total food grain for the district of Purulia. In Purulia, it is found that during the whole period (1960-61 to 2014-15) the fluctuation in total variation in productivity in total food grain amounted to 0.1730(50%) and out of this fluctuation year to year fluctuation was 63% so the rest percentage fluctuation arose due to partly break in trend, partly cyclical or irregular fluctuation. During regime –I (1960-61 to 181-82) i.e. during the pre land reform regime, it is estimated that the fluctuation in total variation amounted to 99% and out of this fluctuation year to year fluctuation was 83%, so the rest percentage fluctuation arose due to partly cyclical or partly irregular fluctuation. After the adoption of land reform policy in West Bengal i.e. during regime –II (1983-84 to 2000-01), it is found that fluctuation from the growth path amounted to 81%, it was lesser than the previous regime. Therefore, in this regime productivity in total food grain was more stable in comparison to the previous regime. During this regime the length of the cycle in productivity in total food grain decreased as compared to the previous regime, so the cycle in productivity in total food grain occurred more frequently as compared to the previous regime. During recent years i.e. from 2001-02 to 2014-15, it is observed that the fluctuation in total variation increased near about 19% as compared to the previous regime and the length of the cycle also increased during this regime in comparison to the previous regime. It is also evident that productivity in total food grain was more unstable and cycle in productivity in total food grain occurred less frequently as compared to the previous regime.

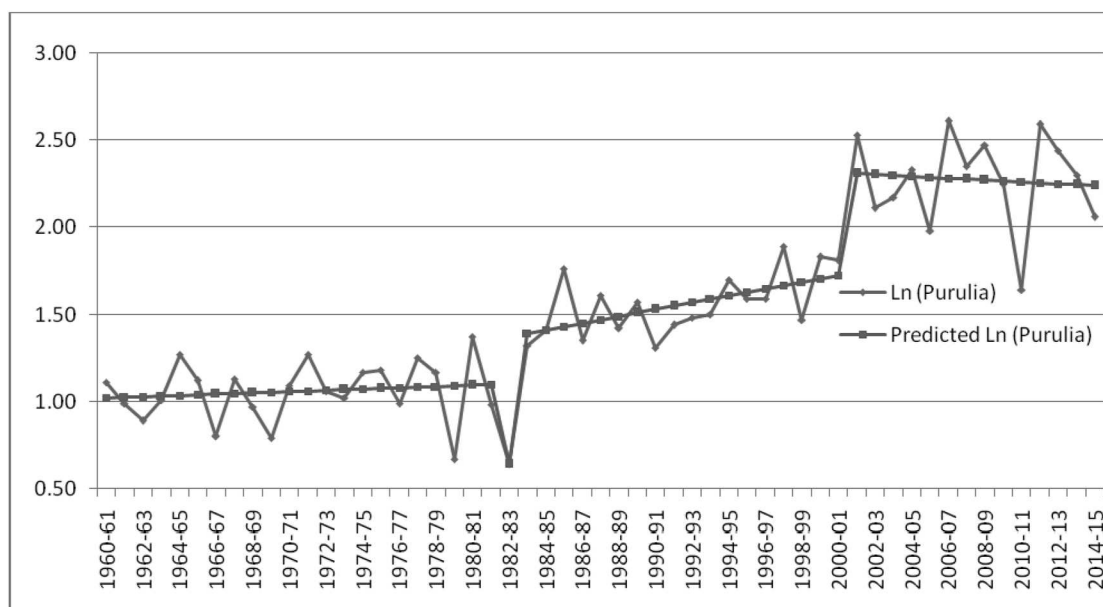
**Table – 1.5 : Growth in productivity in total foodgrain for the district of Purulia**

<b>Purulia</b>			
<b>Regimes</b>	<b>GROWTH RATES (%)</b>	<b>T-VALUE</b>	<b>P-VALUE</b>
Full period (1960-61 to 2014-15)	2.90	12.73	9.39E-18
Regime – I (1960-61 to 1981-82)	0.36	0.54	5.90E-01
Regime – II (1983-84 to 2000-01)	1.97	2.18	3.39E-02
Regime – III (2001-02 to 2014-15)	-0.53	-0.41	6.86E-01

<b>Difference between regimes' growth rate (Purulia)</b>			
<b>Difference</b>	<b>GROWTH RATES (%)</b>	<b>T-VALUE</b>	<b>P-VALUE</b>
Difference between Sub period-I & II	1.61	1.43	1.58E-01
Difference between Sub period-II & III	-2.50	-1.57	1.23E-01

**Table – 1.6 : Nature and extent of fluctuation in productivity in total food grain for the district of Purulia**

Purulia			
Regimes	Year to year fluctuation	Fluctuation from trend	Length of Cycle
Full period (1960-61 to 2014-15)	0.1081(62.48%)	0.1730(49.63%)	5.12
Regime – I (1960-61 to 1981-82)	0.1299(82.68%)	0.1571(99.06%)	2.93
Regime – II (1983-84 to 2000-01)	0.0877(96.77%)	0.0907(81.05%)	2.14
Regime – III (2001-02 to 2014-15)	0.0974(86.35%)	0.1127(99.65%)	2.68

**Figure – 1.c: Growth in productivity in total food grain for the district of purulia**

## V. Conclusion

In the district of Bankura the growth rate (3.92%) in productivity in total food grain was higher in comparison to the other two districts (Midnapur and Purulia) of West Bengal during the whole period. During the pre land reform regime, it is observed that the growth rate in productivity in total food grain was not impressive in the districts of Midnapur, Bankura and Purula also. It is notable that in the districts of Midnapur and Purulia the growth rate in productivity was less than one percent. After the adoption of land reform policy in West Bengal the growth rate in productivity increased significantly in three districts (Midnapur, Bankura and Purulia) of West Bengal, during this period the growth rate in productivity was very impressive. During the recent years, it is found that the growth rate in productivity

decreased significantly in the district of Midnapur and Bankura. In Purulia, during this period the growth rate in productivity was negative although this negative growth rate was insignificant.

Fluctuation is measured by the fluctuation from the growth path (fluctuation in total variation), fluctuation in total variation arose due to four types of fluctuation, namely, break in trend, year to year fluctuation, cyclical or irregular fluctuation. During the whole period (1960-61 to 2014-15), it is observed that the fluctuation in total variation was lower in the district of Bankura as compared to the other two districts (Midnapur and Purulia) of West Bengal. Therefore, the productivity in total food grain was more stable in the district of Bankura in comparison to Midnapur and Purulia districts. It is also observed that the length of cycle was lesser in Bankura district in comparison to the other two districts (Midnapur and Purulia) of West Bengal. Thus cycle in productivity in total food grain occurred more frequently in Bankura than the Midnapur and Purulia districts. During post land reform regime the fluctuation in total variation decreased in the three districts (Midnapur, Bankura and Purulia) of West Bengal as compared to the pre land reform regime. So the productivity in total food grain was more stable after the adoption of land reform policy in West Bengal. It is also observed that the cycle in the productivity in total food grain occurred more frequently during the post land reform regime.

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## UNDERSTANDING THE DIMENSIONS OF VULNERABILITY TO POVERTY OF PUNE'S SLUM DWELLERS

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### *Abstract*

*Though the government has been implementing various schemes for reducing the vulnerability to poverty, it may be of little use for the people that are not 'reported' to be poor in the 'official' estimates. Hence, the present study aims to address 'identification of the poor and vulnerable' which is the most basic and first step to help the poor and vulnerable to come out of the poverty trap. In addition to this, though the socio – economic caste census (SECC) is in the process of identifying the poor and vulnerable households on the basis of their residential, occupational and social vulnerabilities, the poor households have to go through various other vulnerabilities. Hence, the study aims to identify them on the basis of all those vulnerabilities along with the ones used for the SECC.*

*Using quantitative data, collected from 600 notified and non – notified slum dwellers staying in Pune city, an attempt has been made to understand their vulnerability to poverty and suggest context – specific measures to get out of poverty.*

*While framing policies for the non – notified slum dwellers and recent migrants, the focus should be on tackling the residential vulnerability and vulnerability with respect to the access to basic services. Moreover, importance should also be given to tackling the occupational vulnerability and vulnerability with respect to the health care, social security, and specifically the asset ownership and social networks at village in case of both the notified and non – notified slum dwellers. Finally, poverty being a dynamic phenomenon there has to be a periodic monitoring of the living conditions of the poor and the welfare entitlements should be provided accordingly.*

**Keywords: Poverty, Dimensions of Vulnerability, Socio – Economic Caste Census (SECC), Notified and Non – Notified Slum Dwellers.**

**JEL Classification Code : I32, I38, O18**

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## **I. Introduction**

*'The extent of poverty in today's world is unacceptable. The reason that the world does not erupt in dissent is because a huge amount of intellectual effort goes into making it appear acceptable'* (Basu 2010).

Poverty is a curse upon humanity. Though the national and international agencies have been striving hard to break the shackles of poverty, it continues to remain a major problem.

It is mainly because the history of poverty lines in India is a case study in the interaction of science and politics, with political discussions often claiming a scientific basis, sometimes with justification, more often without (Deaton and Kozel 2005). In addition to this, it is not just the absolute lowness of the poverty line that attracts criticism, it is this lowness in relation to the ordinary, everyday meaning one attaches to the term 'poverty line' and what that term is commonly intended to convey. Hence, though the 'resolution' frequently resorted to is to employ the language of a 'poverty line' to suggest that income is a means to an end (that of escaping deprivation in functionings' space), in practice, income ends up being employed as an end in itself (Subramanian 2014). Hence, poverty should be viewed as the deprivation of basic capabilities rather than merely as a low level of income or only in terms of the failure to meet the 'basic needs' of specified commodities (Sen 1992). Finally, using the capability deprivation approach should not imply that we abandon the income approach completely; rather, both approaches should complement each other (Son 2011).

The urban poor are subject to market risks and it is impossible to cover that risk due to their poor economic situation. Hence they continue to face various problems like low levels of literacy, lack of ownership of assets and proper housing, access to basic services, decent employment, ill health, etc. Furthermore, lack of social protection mechanisms may increase their vulnerability to poverty. So, Gupta et al. (2014) have created an 'Empowerment line'. It is an estimate of the minimum economic cost for a household to fulfil eight basic needs: food, energy, housing, drinking water, sanitation, healthcare, education, and social security. It was found out that 56% of India's population, i.e. 680 million Indians, (in contrast to 29.5% of BPL population as given by the Rangarajan committee) lacks the means to meet these essential needs.

Poverty by itself imposes a heavy tax on one's cognitive abilities (Mani, Mullainathan, Shafir, and Zhao 2013; Oommen 2015). This 'cognitive tax' in turn can lead to economic decisions that perpetuate poverty (Oommen 2015).

Though the government has been implementing various schemes for reducing the vulnerability to poverty, it may be of little use for the people that are not 'reported' to be poor in the 'official' estimates. Rather, after counting the number of poor one has to go a step ahead and identify the poor as there has been acrimonious discussion in India about how many are poor, but not on the more important issue of who the poor are and how they are being identified (Saxena 2015). Further, the measures of who is poor now are imperfect guides to who will be poor next year, yet it is the latter that is relevant for public policies that aim to reduce poverty. Hence, the solution is to identify those who are vulnerable to poverty (Zhang and Wan 2008; Haughton and Khandker 2009).

Therefore, the present study aims to address 'identification of the poor and vulnerable' which is the most basic and first step to help the poor and vulnerable to come out of the poverty trap. In addition to this, though the SECC is in the process of identifying the poor and vulnerable households on the basis of their residential, occupational and social vulnerabilities, the poor households have to go through various other vulnerabilities. Hence, the study aims to identify them on the basis of all those vulnerabilities along with the ones used for the SECC. Though this study has not made an attempt of providing an accurate estimate of the poor and vulnerable people, it tries to identify the background characteristics that are highly essential for identification of the poor and vulnerable people. Further, adopting a multidimensional approach for identification of the poor and vulnerable is indispensable particularly in India due to its socio – economic, cultural and ethnic diversities.

## **II. Methodology**

Pune city was basically selected for primary data collection due to its economic growth which has resulted in considerable growth of slums over the years. Equal proportion sample has been considered for comparing the situation of non – notified slum dwellers with the notified ones. Hence, primary data has been collected from 300 notified and non – notified slum dwellers each from March to September, 2015. Further, snowballing technique has been used for primary data collection as prior identification of the non – notified slums is not always possible.

The information regarding the ward wise notified and non – notified slums' population of Pune city was collected from the PMC's office. With the help of this data, the sample size to be covered from each administrative ward of the city has been computed. The method of proportionate stratified sampling has been used for the determination of sample size. In case of the proportionate stratified random samples, the sample strata use the same sampling fraction, i.e. have the same proportion of cases, as the population strata from which the cases are sampled. This method of sampling is important in generalizing sample results back to the population sampled because it ensures that no stratum in the combined sample has undue influence on the overall results of the study (McTavish and Loether 2002). Hence, if the

percentage of ward wise population to total slum population is 4.9, in case of the non – notified slums of Hadapsar ward, fifteen out of the 300 households would be selected for primary data collection from that ward.

Since a sample has to be a proper representative of the population all administrative wards of the city were selected for the purpose of data collection. For selection of notified and non – notified slums, information regarding names of the slums along with the population was collected from the PMC’s office. All the information obtained from the PMC’s office was updated up to the year 2009 – 10. In addition to this, the Spatial Slum Information available on the website of Shelter Associates was used for the selection of slums.

### III. Results and Discussion

#### *Socio – economic and demographic profile of slum dwellers*

‘As the face of urban poverty changes at the state level, differences are stark amongst cities as well as within a city’ (Agarwal, Taneja and Patra 2006). Hence, it is highly important to understand the living conditions of the poor and vulnerable staying in the Pune city.

**Table 1: Category by type of slum**

Category	Type of slum		Total
	Notified	Non – notified	
General	78 (29.21)	79 (29.70)	157 (29.46)
OBC	43 (16.10)	38 (14.29)	81 (15.20)
SC	98 (36.70)	127 (47.74)	225 (42.21)
ST	6 (2.25)	5 (1.88)	11 (2.06)
VJ	27 (10.11)	2 (0.75)	29 (5.44)
NT	15 (5.62)	15 (5.64)	30 (5.63)
Total	267 (100.00)	266 (100.00)	533 (100.00)

Note: 1) Figures in bracket indicate percentage  
2) Pearson chi<sup>2</sup> (5) = 25.6936 Pr = 0.000

Source: Primary data

A higher proportion of the non – notified slum dwellers staying in Pune city (47.74) belong to SC category and the results are highly significant. Most significantly, the biggest divide in poverty is not based on region or gender but on caste and religion; everywhere across the country the SC, ST and Muslims are worse off than all other groups (Shah and Lerche 2015).

A higher proportion of the non – notified slum dwellers (36.88) have been found out to be recent migrants vis – a – vis the notified ones (24.5). Recent migrants are considered to be the households that have migrated 20 years ago to the city. Majority of the households have migrated either from the rural areas of Pune district or from the drought – prone districts of Maharashtra. Since a higher proportion of non – notified slum dwellers are found out to be recent migrants, they may find it difficult to survive in the city without their friends or relatives. Hence, a higher proportion of these dwellers (58.75) had friends or relatives in the city prior to migration in comparison to the notified slum dwellers (39.07).

The age dependency ratio is calculated by dividing the population 0 – 14 years and 65 years and older by the population that is in the 15 – 64 year age group. Since this age dependency ratio (40.0973) is a combination of child and old age dependency ratio, it can be disaggregated further to compute separate dependency ratios. The separate dependency ratios would help us to get an idea of the age pattern of the dependents. The child dependency ratio (33.97) is found out to be more than 5 times of that of the old age dependency ratio (6.13) which could be because generally the elder members stay in the village and younger ones migrate to the cities. Further, the ‘economic’ dependency ratio (128.855) has revealed that the ‘actual’ number of dependents is much higher than what has been found out by the age dependency ratio. It is calculated by dividing the actual number of dependents by the actual number of earners in the sample. Interestingly, fertility rate is found out to be having a negative impact on the choice of school. Hence, as the number of children goes up to three and above a higher proportion are found out to be going to public school. Otherwise they go to private school.

According to the head count ratio (HCR), the number of below poverty line (BPL) households is slightly higher in case of the non – notified slum (11) vis – a – vis the notified slum (9.67). However, since the HCR has serious limitations as a poverty index, poverty gap index (PGI) and squared poverty gap index (SPGI) have also been computed. Moreover, even the value of these two indices is slightly higher in case of the non – notified slum dwellers in comparison to the notified ones. The level of expenditure inequality faced by the notified slum dwellers is higher than the non – notified slum dwellers. The value of Gini coefficient is found out to be 0.276 and 0.228 in case of the notified and non – notified slum dwellers respectively. Hence, poverty instead of inequality seems to be a major concern in case of the non – notified slum dwellers (unlike the notified ones). In addition to this,

expenditure inequality might be considered as a better measure instead of income inequality as there is a greater chance of misreporting in case of income.

A significant number of slums in any city remain non – notified and the vulnerability in such slums is usually more acute than the notified ones (Agarwal et al. 2006). Further, the percentage of slums lacking facilities considered necessary for a decent urban life was higher in non – notified slums in comparison to the notified slums (National Sample Survey Office [NSSO] 2013). In accordance with the literature, when the socio – economic and demographic profile is taken into consideration, the non – notified slum dwellers staying in Pune city are found out to be in the worse condition in comparison to the notified ones. On the basis of this background, it would be interesting to examine the extent of difference between these two types of slum dwellers with respect to their vulnerability to poverty.

#### ***IV. Dimensions of Vulnerability to Poverty***

The realities of the poor are local, diverse, often complex and dynamic. However, our views of the realities of the poor, and of what should be done, are constructed mainly from a distance, and can be seen to be constructed mainly for our convenience (Chambers 1995).

‘Household vulnerability to poverty is affected by, and affects, vulnerability in other dimensions and levels, such as the vulnerability of a country or region to natural hazards and macro – economic shocks’ (Naude, Santos – Paulino and McGillivray 2008). Hence, a clear sense of the causes of vulnerability to poverty is needed if one is to craft successful policies to combat it (Haughton and Khandker 2009).

Asset ownership and social networks at village, health care, access to basic services, social security, food security and corruption and harassment have been incorporated as essential dimensions of vulnerability. In addition to these, the three sources of vulnerability given by the SECC, namely residential, occupational and social, have also been taken into consideration. However, it is important to note that these are very basic dimensions and do not form a complete enough list.

Various indicators have been used for the computation of indices of these dimensions of vulnerability (see Appendix A). The methodology used by Sathe, Klasen, Priebe, & Biniwale (2013) has been followed for the computation of the indices. For each household and each indicator, there are multiple responses and a score has been given for each response starting from zero. The score of zero has been given to a worst response and one has been given to a best response. In case of indicators having more than two responses, the other options would lie in – between the worst and best response and have been scored accordingly. For instance, in case of the indicator type of house, the response kutcha house gets a score of

zero, pucca house gets a score of 1 and the response semi – kutcha house lies in – between the two and has been given a score of 0.5. Hence, all the indicators are equally weighted. In this manner, for every indicator, a score would be obtained. When all these scores are added up, the individual score for the household would be obtained. Then the maximum score for each household has been calculated by adding up the highest possible score for each indicator. The percentage of the household's individual score to the maximum score gives us the individual index values in case of all the dimensions of vulnerability. The percentage of households vulnerable to poverty has been computed as the opposite of the index value multiplied by 100. For instance, the index value of 0.25 indicates that the percentage of households vulnerable to poverty is 75 ( $1 - 0.25 = 0.75$ ;  $0.75 * 100 = 75\%$ ).

Furthermore, a composite index constructed from numerous indicators may not be viewed as desirable, given that each indicator reflects a different dimension of wellbeing. While a single composite index may have the virtue of being simple, measuring and monitoring deprivation separately is more useful for policy making (Son 2011). Hence, instead of clubbing all the dimensions into an aggregate index separate indices have been developed for all the dimensions of vulnerability.

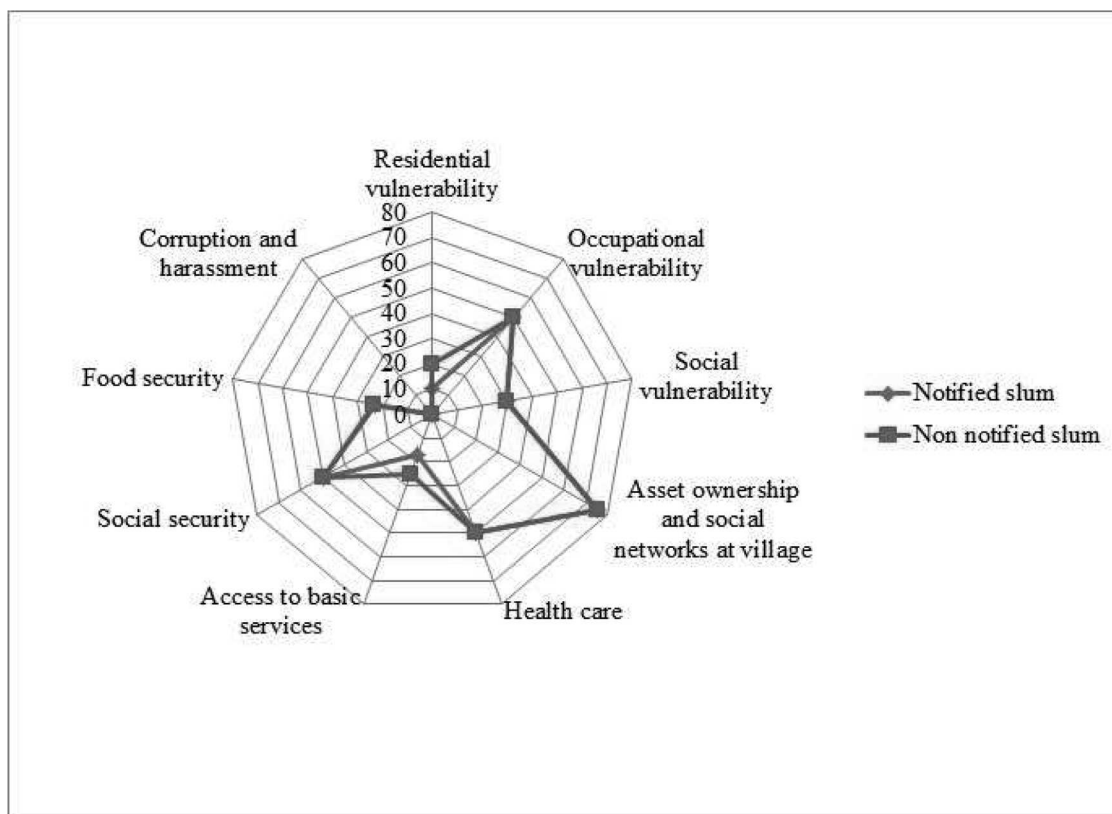
There is a marked difference between the notified and non – notified slum dwellers with respect to only two dimensions of vulnerability viz., residential vulnerability and access to basic services. However, 50% of the notified and non – notified slum dwellers are vulnerable to poverty when occupational vulnerability, health care and social security are taken into consideration. Furthermore, as high as 75% of the notified and non – notified slum dwellers are vulnerable to poverty with respect to asset ownership and social networks at village. Hence, only 25% of the dwellers can fall back upon the social networks and assets owned at village in case they are unable to make up / survive in the city.

Since there is a significant difference between the notified and non – notified slum dwellers with respect to the residential vulnerability and access to basic services it would be better to analyze the indicators, which have a significant influence and are used in the computation of the two indices, in order to be able to understand the reasons for differences between the two types of slum dwellers. An indicator – wise analysis of the residential vulnerability index shows that a higher proportion of non – notified slum dwellers stay in kutcha houses, use electricity on rent, and have faced eviction / demolition and theft in the past. Similarly, an indicator – wise analysis of the dimension access to basic services shows that a much higher proportion of the notified slum dwellers have own taps. Moreover, it is only the non – notified slum dwellers that have to practice open defecation and only 15% of them have own toilets. Further, a higher proportion of the non – notified slum dwellers use common and detached bathroom and they have to pay a higher price for the usage of community toilet and bathroom. The proportion of non – notified slum dwellers not having

a ration card is double than that of the notified ones. This may increase their vulnerability to poverty to a great extent as they get exposed to open market prices. This is because they would have probably bought subsidized food items if they had a ration card. Rather, even in case of the non – notified slum dwellers that have a ration card, a higher proportion of them do not have fair price shop (FPS) closer to their house. Finally, a higher proportion of these non – notified slum dwellers had to pay to an agent to get the ration card.

The percentage of households vulnerable to poverty is presented separately for notified and non – notified slum in Figure 1.

**Figure 1: Percentage of households vulnerable to poverty by type of slum**



Note: The percentages of households vulnerable to poverty are median values for both types of slum. Source: Primary data

To summarize, the non – notified slum dwellers obviously turn out to be highly vulnerable to poverty in comparison to the notified ones at least with respect to residential vulnerability and access to basic services. Since type of slum has a significant impact on these

two dimensions of vulnerability, it would be interesting to find out which other factor/s is / are having a substantial influence on these dimensions.

The index values of the two dimensions have been used as dependent variables. In case of residential vulnerability, the factors that may have an influence on it are type of slum, head of the household, category, recent migrants and food expenditure out of the total expenditure. All independent variables except the last one (food expenditure out of the total expenditure) are dummy variables. So, the variable type of slum takes the value of 1 if it is non – notified; 0 otherwise, the variable head of the household takes the value of 1 in case it is headed by female; 0 otherwise, the variable category takes the value of 1 if it is SC, ST, VJ, NT; 0 otherwise, and finally the variable recent migrants takes the value of 1 in case the households have migrated 20 years ago; 0 otherwise. It may be hypothesized that the non – notified slum dwellers, female headed households, households belonging to SC, ST, VJ, NT category and recent migrants face a higher level of residential vulnerability. Similarly, households that have to spend more on food out of the total expenses might be facing higher level of vulnerability.

Table 2 presents results of the following regression model:

Residential vulnerability index =  $\hat{a}_0 + \hat{a}_1$  Type of slum +  $\hat{a}_2$  Head of the household +  $\hat{a}_3$  Category +  $\hat{a}_4$  Recent migrants +  $\hat{a}_5$  Food expenditure out of the total expenditure +  $\hat{\epsilon}$

**Table 2: Determinants of residential vulnerability index**

Residential vulnerability index	Coefficients	t	P >  t
Type of slum	-.1173544	-7.49	0.000
Head of the household	-.0475612	-1.41	0.160
Category	-.0133549	-0.85	0.397
Recent migrants	-.0401641	-2.28	0.023
Food expenditure out of total expenditure	.0923395	1.82	0.069
Constant	.8808781	27.06	0.000

Source: Primary data

The value of adjusted R<sup>2</sup> is found out to be 0.1911 which means that 19.11% of the variation in the residential vulnerability index can be explained by the independent variables. The variables type of slum and recent migrants have a highly significant and negative impact

on the residential vulnerability index. Hence, the value of residential vulnerability index declines by 0.12 and 0.04 units for non – notified slum dwellers and recent migrants respectively which means that the vulnerability faced by both the groups increases. Therefore, as had been expected on the basis of literature, the non – notified slum dwellers’ vulnerability turns out to be more acute than the notified ones. Furthermore, Gupta and Mitra (2002) show that the incidence of poverty is highest among those who migrated between 1 – 5 years, and lowest among those who have been in Delhi for 12 – 15 years.

Though the variables head of the household and category have a negative impact on the residential vulnerability index it is not significant. It might be because of the low sample size of female headed households and households belonging to SC, ST, VJ, NT category out of the total sample size.

In case of access to basic services, the factors that may have an influence on it are type of slum, head of the household, category, recent migrants and help from a politician of any form. All the independent variables are dummy variables. So, the variable help from a politician takes the value of 1 in case the households have received it; 0 otherwise. It may be hypothesized that the non – notified slum dwellers, female headed households, households belonging to SC, ST, VJ, NT category and recent migrants face a higher level of vulnerability with respect to access to basic services. Similarly, the households that have not received any help from the politician in the past might be facing higher level of vulnerability.

Table 3 presents results of the following regression model:

$$\text{Access to basic services index} = \hat{\alpha}_0 + \hat{\alpha}_1 \text{ Type of slum} + \hat{\alpha}_2 \text{ Head of the household} + \hat{\alpha}_3 \text{ Category} + \hat{\alpha}_4 \text{ Recent migrants} + \hat{\alpha}_5 \text{ Help from politician} + \hat{\epsilon}$$

**Table 3: Determinants of access to basic services index**

Access to basic services index	Coefficients	t	P >  t
Type of slum	-.0546826	-5.89	0.000
Head of the household	-.0189243	-0.97	0.332
Category	-.0096464	-1.06	0.291
Recent migrants	-.0344451	-3.40	0.001
Help from politician	.0087239	0.83	0.406
Constant	.8243522	95.14	0.000

Source: Primary data

The value of adjusted  $R^2$  is found out to be 0.1478 which means that 14.78% of the variation in the access to basic services index can be explained by the independent variables. As has been observed in case of the residential vulnerability index, the variables type of slum and recent migrants have a highly significant and negative impact on the access to basic services index. Hence, the value of the index declines by 0.05 and 0.03 units for the non – notified slum dwellers and recent migrants respectively which means that the vulnerability faced by both the groups increases. As has been discussed earlier, though the variables head of the household and category have a negative impact on the access to basic services index it is not significant which could be because of the low sample size. Similarly, the variable help from politician has a positive impact on the index as expected. Rather, it has been widely reported that security of tenure as well as the acquisition of basic community facilities (eg: safe water supply, latrines, electricity) are usually acquired through informal political networks and are often the result of political patronage especially at the time of elections (Singh and De Souza 1980). However, the impact is again not significant may be because of the low sample size of households, which have received help from the politician, out of the total sample size. It is also possible that though the households have received help from the politician, especially during elections, they may not report it out of fear.

These regression models have also been tested in stata to find out the presence / absence of heteroscedasticity and multicollinearity. The Ramsey RESET test confirms the absence of heteroscedasticity and there is no multicollinearity in the model since the value of Variance Inflation Factors (VIFs) is less than ten.

### **V.Limitations**

The sample size could have been more than 600 households as larger the sample size more accurate the results are likely to be. Some other peculiarities of the poor could also be studied like understanding the problems faced (for instance, working poverty) and the tactics adopted to overcome it (renting out the houses provided by the government and returning back to the slum) by the resettled households. Instead of analyzing the overall living conditions, an in – depth analysis of specific variables like the pattern of food consumption and the adjustments made to it due to the lack of affordability (for instance, curtailing the consumption of chicken and mutton and eating eggs and preferring dal most of the times instead of vegetables) can also be of great use for formulating specific policies. Finally, since this is a cross – sectional study nothing can be said about the increase or decrease in poverty or vulnerability to poverty over time but one can get an idea about the current living conditions of the slum dwellers staying in Pune city.

## VI. Conclusion and Policy Implications

There have been innumerable studies that have tried to identify the most vulnerable groups. Furthermore, the concerned departments of the government have also been spending huge amounts on identifying the BPL population. However, it may be a 'national shame' that even after 71 years of independence we could not identify the needy.

In this study, an attempt has been made to identify and quantify the causes of vulnerability to poverty in addition to the ones given by the SECC. Further, the demographic and socio – economic profile of the slum dwellers has also been presented.

The non – notified slum dwellers are found out to be in the worst position with respect to various indicators in comparison to the notified ones. The poor people are found out to be making various adjustments to their lives to get out of the poverty trap.

The study suggests following policy directives to bridge the gap in development planning and program implementation:

The urban poor should be registered first so as to enable them to take advantage of the government schemes.

There is a need to define slums in a 'measurable' way instead of a 'subjective' definition. It is mainly because the government may not 'declare' a slum irrespective of the living conditions of the slum dwellers like lack of ventilation, overcrowding, etc. due to the subjectivity of the definition.

Just as the rural poor are provided employment during the lean period through National Rural Employment Guarantee Act (NREGA), the urban poor, especially the construction workers, should be provided alternative employment opportunities during the rainy season.

It was found out that though community toilets were available in majority of the slums, the children had no choice but to practice open defecation. Further, a hole had been made near the drainage plate so that the children can defecate over there but it may result into spread of diseases. So, some facility has to be made in all the Community Toilet Blocks (CTBs), specifically for the children who cannot control and wait in a queue to go to the toilet, just as has been done in some slums. For instance, there is a separate facility for children in the CTB at Sanjay Gandhi Vasahat, Erandwane. Further, a CTB at More Shramik Vasahat, Erandwane has a baby channel for children less than 5 years of age.

Since poverty turns out to be a major concern in case of the non – notified slum dwellers and inequality in case of the notified slum dwellers, both types of slum dwellers would require different sets of policies. Moreover, while framing policies for the non – notified slum dwellers and recent migrants, the focus should be on tackling the residential vulnerability

and vulnerability with respect to access to basic services. Moreover, importance should also be given to tackling the occupational vulnerability and vulnerability with respect to health care, social security, and specifically asset ownership and social networks at village in case of both the notified and non – notified slum dwellers staying in Pune city.

In order to tackle residential vulnerability, certain square feet should be ensured for every family in the slum itself.

Some changes should be made to the policies according to the needs of the poor. For instance, a respondent staying in Ramtekdi, Hadapsar had been given a house in a building built by Slum Rehabilitation Authority (SRA) which was very close to their slum. However, she said that she won't be able to resettle due to a very genuine problem. She explained that since we earn a monthly income of only around Rs. 2,500 we cannot afford to purchase a gas cylinder. She added further that currently we can cook our food on hearth in the slum, but once we shift to the new building how we can cook the food! Even in case of many other slum dwellers, that have Liquefied Petroleum Gas (LPG) for cooking food but use hearth mainly for boiling water, this challenge remains unresolved.

Poverty being a dynamic phenomenon there has to be a periodic monitoring of the living conditions of the poor and the welfare entitlements should be provided accordingly. For instance, the households having a yellow colored ration card may not be fulfilling the criteria required to get the card anymore like having an annual income of up to Rs. 15,000. Hence, the ration cards of the households should be changed periodically in accordance with the differing living conditions. There is also a need to review the criteria that had been set to issue the ration cards with changing times. For instance, there has to be an upward revision of the total annual income limit from time to time.

Finally, until large differentials in earning opportunities between cities and rural areas are reduced, the rural poor will continue to migrate and prick the conscience of the urban elite. Hence, for eradicating urban poverty we have to speed up rural development (Jagannathan and Halder 1989). In addition to this, for reduction of urban poverty one has to realize the importance of urban employment measures instead of seeking its solution only in terms of the rural employment programs (Mitra 1992). Hence, though the rural development programs are highly essential to curb the future generation of urban poverty, the policies suggested above are also indispensable especially to remove the poor people (already residing in the city) out of the pool of poverty.

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APPENDIX A					
Methodology – Indices: Dimensions of vulnerability to poverty					
Sr. No.	Dimensions of vulnerability	Indicators	Criteria	Scores	Maximum score
1	Residential vulnerability index	Type of house	Kutchha	0	1
			Semi kutchha	0.5	
			Pucca	1	
		Ownership of house	No	0	1
			Yes	1	
		Source of light	No electricity	0	1
			Rented	0.5	
			Own	1	
		Eviction / Demolition	Yes	0	1
			No	1	
		Theft	Yes	0	1
			No	1	
2	Occupational vulnerability index	No household member is earning on monthly basis	Yes	0	1
			No	1	
		At least one household member is carrying out secondary occupation	No	0	1
			Yes	1	
		None of the household member is employed	Yes	0	1
			No	1	
		Health problems due to the type of occupation	Yes	0	1
			No	1	
3	Social vulnerability index	No household member has completed primary education	Yes	0	1
			No	1	
		Children going to school	No	0	1
			Yes	1	
		Disability	Yes	0	1
			No	1	
		Number of dependent members	Greater than median	0	1
			Less than or equal to median	0.5	
			0	1	
		Ownership of assets	No asset	0	1
			Less than or equal to median	0.5	
			Greater than median	1	
4	Asset ownership and social networks at village index	Migration	Yes	0	1
			No	1	
		Ownership of land at village	No	0	1
			Yes	1	
		Ownership of house at village	No	0	1
			Yes	1	
		Relatives staying in village	No	0	1
			Yes	1	
5	Health care index	Chronic illness / accident	Yes	0	1
			No	1	
		Took loan for expenditure incurred on treatment	Yes	0	1
			No	1	

6	Access to basic services index	Source of drinking water	Hand pump	0	1
			Common tap	0.5	
			Own tap	1	
		Time taken to travel for fetching water	More than 20 minutes	0	1
			Between 10 to 20 minutes	0.33	
			Between 5 to 10 minutes	0.66	
			Less than 5 minutes	1	
		Type of toilet	Open defecation	0	1
			Mobile toilet	0.33	
			Common flush toilet	0.66	
			Own toilet	1	
		Availability of bathing facility	Open air	0	1
			Canal	0.2	
			River	0.4	
			Common bathroom	0.6	
			Detached bathroom	0.8	
		Amount paid for the usage of public toilet and bathroom	Greater than median	0	1
			Less than or equal to median	0.5	
0	1				
Availability of drainage facility	No drainage	0	1		
	Open	0.5			
	Closed	1			
	Garbage disposal	Open place	0	1	
		Common dustbin	1		
	Availability of ration card	No	0	1	
		Yes	1		
	Proximity of Fair Price Shop	No	0	1	
		Yes	1		
	Sufficiency of the quantity of commodities	No	0	1	
		Yes	1		
	Availability of aadhaar card	No	0	1	
		Yes	1		
	Time taken to reach public hospitals	More than 20 minutes	0	1	
		Between 10 to 20 minutes	0.33		
Between 5 to 10 minutes		0.66			
Less than 5 minutes		1			
7	Social security index	Bank account	No	0	1
			Yes	1	
		Insurance policy	No	0	1
			Yes	1	
		Saving	No	0	1
			Yes	1	
		Loan	Yes	0	1
			No	1	

8	Food security index	Cooking	No	0	1
			Yes	1	
		Type of cooking fuel	Wood	0	1
			Both wood and kerosene	0.17	
			Kerosene	0.34	
			Diesel	0.51	
			Wood, kerosene and LPG	0.68	
			Both kerosene and LPG	0.85	
			LPG	1	
		Ease of availability of cooking fuel	No	0	1
			Yes	1	
		Frequency of purchasing food grains	Never	0	1
			Rarely	0.13	
			Daily	0.26	
			Weekly	0.39	
			Fortnightly	0.52	
			Monthly	0.65	
			Quarterly	0.78	
		Bi annually	0.91		
		Annually	1		
		Frequency of purchasing vegetables	Never	0	1
			Rarely	0.33	
			Daily	0.66	
			Weekly	1	
		Frequency of purchasing oil, spices, sugar, salt, etc.	Never	0	1
			Rarely	0.13	
			Daily	0.26	
			Weekly	0.39	
			Fortnightly	0.52	
			Monthly	0.65	
			Quarterly	0.78	
			Bi annually	0.91	
			Annually	1	
		Frequency of purchasing fruits	Never	0	1
			Rarely	0.2	
			Monthly	0.4	
			Fortnightly	0.6	
			Weekly	0.8	
			Daily	1	
		Frequency of purchasing milk	Never	0	1
			Rarely	0.33	
			Weekly	0.66	
			Daily	1	
		Frequency of purchasing non – vegetarian food	Never	0	1
			Rarely	0.2	
			Monthly	0.4	
			Fortnightly	0.6	
			Weekly	0.8	
			Daily	1	

<b>9</b>	<b>Corruption and harassment index</b>	<b>Harassment for staying at the current location</b>	<b>Yes</b>	<b>0</b>	<b>1</b>
			<b>No</b>	<b>1</b>	
		<b>Payment of bribes for staying at the current location</b>	<b>Yes</b>	<b>0</b>	<b>1</b>
			<b>No</b>	<b>1</b>	
		<b>Payment to agent for getting ration card</b>	<b>Yes</b>	<b>0</b>	<b>1</b>
			<b>No</b>	<b>1</b>	
<b>Total</b>				<b>48</b>	

## WOMEN'S WORK IN INDIA

Arpita Bhowmick<sup>1</sup>

### **Abstract**

*The paper seeks to examine the trend and pattern of women's employment at the all-India level during 1983 to 2011-12. The women of the rural and urban areas have been experiencing continuous fall in their rates of work force participation over the years. Notably, enrolment in educational institutions and engagement in domestic duties appeared as the most important activities for the out of labour force women in rural and urban India, respectively. It can be concluded from our econometric analysis that the income effect played a deterministic role behind greater work force participation for the females. Further, the industries dominated by female employment have been manufacture of textiles and wearing apparels and educational services in the year 2011-12. Owing to the methodological discrepancies arising in the context of employment data for the year 2017-18, we looked into the female employment scenario, in a different section, with reference to the data available in the recently published report. It is seen that the Indian economy is characterised by the existence of significant gender inequality and low rates of work force participation for the females both in the rural and urban areas during 2017-18.*

Key Words: WPR, Sectoral Division, Periodic Labour Force Survey, Gender Inequality.

JEL Classification: **J16, J21, J70, C35, E24.**

### **I. Introduction**

The 1960s and early 1970s saw labour economists across the globe analyzing the discrimination, segregation and segmentation resulting in different labour markets based on gender. Discussions took place since mid-1970s to devise the effective mechanism such that impediments faced by the women could be eliminated. In 1971, the Government of India constituted a national committee to review the status of the women in India since the independence. The committee (chaired by Phulrenu Guha) compiled evidences of gender gaps in every sector and highlighted the inequalities that the women suffered in the spheres of employment, health and education and argued that the women must be integrated thoroughly in the process of development. This approach of integrating women in the overall development of the country came to be known as the 'Women in Development'. It was obvious that this integration could be accomplished by imparting education and training to the women and also by providing them with sufficient employment opportunities such that they can move into the market economy.

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Thus, the belief that growth by itself would take care of the problems of poverty, inequality and unemployment was replaced by the theory of direct intervention for promoting measures to deal with the socio-economic forces that marginalize women. In this context, the report of the 'Committee on the Status of Women in India' (1974) became a landmark in establishing the stark contours of the deprived condition of the Indian women. Since then, the issues surrounding the women's rights (mainly impediments faced by them in accessing gainful employment opportunities) have taken on the shape of a debate. Hence, the debate on women's employment is not only a social or an economic issue, but an issue with very deep political and cultural dimensions (Majumdar, 1983).

In order to formulate an idea about the developments that have taken place with regard to the employment scenarios for the females in the Indian economy over the years the data available from the NSSO surveys on employment and unemployment become handy. Using such data, this paper highlights various aspects of female employment for the period from 1983 to 2011-12. To provide some light on the scenario beyond 2011-12, we also consider data available from the recently released report on Periodic Labour Force Survey for the year 2017-18. The specific questions that we seek to answer are: (1) What have been the trends and patterns of the employment for the females' vis-à-vis the males at the All-India level for the period 1983 to 2011-12? Does the trend differ in the year 2017-18? (2) Which sectors are proving themselves as the major absorbers of the female workers? What lesson can be learnt about women's employment by extending our discussion to the 2-digit level of industrial classification? (3) What have been the factors influencing women's participation in the work force in India?

This paper is divided into 6 sections. Section II discusses the changing employment scenario for women in the context of the quinquennial Employment/Unemployment surveys of NSSO for the period 1983 to 2011-12. Section III makes us acquainted with the issues being raised with regard to the PLFS data for the year 2017-18. Section IV contains brief discussion on females' employment scenarios as revealed by the PLFS data. The factors determining the women's work force participation has been identified in Section V. Section VI concludes.

## **II. Changing Employment Scenarios for Women**

The estimates obtained from the various rounds of NSSO showed a continuous declining trend of WPR for the females in the rural areas during 1983-2012. In the rural areas, the rate of work force participation for females has declined from 34 per cent in 1983 to 24.8 per cent in 2011-12. While a declining trend similar to the rural sector was also observed in the urban sector but it was also seen that there has been certain cases of improvement in WPR of urban women during 1983 to 1993-94 and also during 1999-00 to

2011-12. However, this marginal rise in the WPR of urban females has been addressed as 'distress employment' by the scholars (Abraham, 2009; Himanshu, 2011). In addition to this, there persists significant gender inequality with regard to work force participation both in the rural and urban areas during the period 1983 to 2011-12. In fact, the male-female difference with respect to WPR is more persistent in the urban areas compared to the rural areas in all the years owing to greater involvement of urban women in domestic duties. Also, the work force participation for the rural persons has throughout remained above their urban peers across the various rounds of NSSO. For the first time in the year 2011-12, it is seen that rates of work force participation has been higher for men of the urban areas compared to their rural peers. There has also been a significant decline in the annual compound growth rate of the workforce, in case of rural women only, between 1999-00 and 2011-12 as compared to the period between 1993-94 and 1999-00.

**Table 1: Work Force Participation Rates by US-PS+SS: All India**

Sector	Rural			Urban			R+U			
	Year	M	F	P	M	F	P	M	F	P
	1983	547	340	445	512	151	341	539	296	421
	1993-94	553	328	444	521	155	347	545	286	420
	1999-00	531	299	417	518	139	337	527	259	397
	2011-12	543	248	399	546	147	355	544	219	386

*Source: Unit level data from the NSSO surveys on employment/unemployment for 38th, 50th, 55th and 68th rounds*

**Table 1A: Annual Compound Growth of Workforce: All-India**

Sector	Gender	1983 to 1993-94	1993-94 to 1999-00	1999-00 to 2011-12
Rural	Male	0.14	0.12	0.16
	Female	0.07	0.08	-0.06
	Persons	0.12	0.10	0.08
Urban	Male	0.21	0.20	0.41
	Female	0.22	0.10	0.42
	Persons	0.21	0.18	0.41

*Source: Same as Table 1*

The sectoral division of female worker in rural and urban areas is summarised in Table 2.

**Table 2: Percentage Distribution of UPSS workers across the Broad Economic Sectors: All-India**

Year	Sectors	Rural			Urban			Rural+Urban		
		M	F	P	M	F	P	M	F	P
1983	Agriculture	77.75	87.74	81.49	10.40	31.18	14.78	62.23	81.07	68.69
	Industry	10.04	7.42	9.06	34.29	30.91	33.58	15.63	10.19	13.76
	Service	12.21	4.84	9.45	55.31	37.91	51.64	22.14	8.74	17.54
1993-94	Agriculture	74.05	86.24	78.43	9.06	24.98	12.43	58.4	78.1	64.9
	Industry	11.14	8.29	10.12	33.02	29.08	32.19	16.4	11.0	14.6
	Service	14.81	5.47	11.46	57.92	45.94	55.38	25.2	10.8	20.5
1999-00	Agriculture	71.40	85.36	76.30	6.56	17.67	8.76	54.9	76.3	61.7
	Industry	12.59	8.95	11.32	32.75	29.38	32.09	17.7	11.7	15.8
	Service	16.00	5.69	12.39	60.68	52.95	59.16	27.3	12.0	22.5
2011-12	Agriculture	59.36	74.94	64.10	5.64	10.91	6.69	43.6	62.8	48.9
	Industry	21.94	16.69	20.34	34.69	33.36	34.43	25.7	19.9	24.1
	Service	18.71	8.37	15.56	59.67	55.73	58.89	30.7	17.4	27.0

*Source: Same as Table 1*

The primary sector of the economy is witnessing continuous decline in the proportion of workers engaged in its domain over the years and for the first time in 2011-12 the share of employment in the farm sector went below 50 percentage point. At the all-India level, women's share of employment in the farm sector has remained above their male counterparts in all the years indicating that they are more prone towards unskilled employment. Thus, one possible interpretation could have been that farming operations have been the mainstay for women in all the years. Further, disaggregating farming operations up to 2-digit level helps us to understand that, both in the rural and urban areas, women are mostly concentrated in agriculture, hunting and related service activities as compared to forestry, logging and fishing operations in all the years. Also, there has been a tendency among the males and female farm workers to withdraw themselves from farming operations and move towards industry and services in the recent years.

**Table 3: Percentage Distribution of UPSS workers within Agriculture, Industry and Services: All-India**

Year	Sectors	Rural			Urban			
		M	F	P	M	F	P	
1983	Crop and animal production, hunting and related service activities	99.04	99.44	99.20	94.74	98.91	96.59	
	Forestry and logging	0.36	0.36	0.36	1.08	0.64	0.88	
	Fishing and aquaculture	0.61	0.20	0.44	4.19	0.45	2.53	
	Mining	5.70	4.40	5.30	3.40	2.19	3.16	
	Manufacturing	69.63	85.90	74.62	78.58	86.90	80.19	
	Electricity Gas and Water Supply	2.32	0.09	1.64	3.20	0.65	2.71	
	Construction	22.35	9.60	18.44	14.82	10.26	13.94	
	Trade	39.66	40.71	39.86	41.97	25.53	39.42	
	Transport	13.91	1.02	11.44	18.07	3.98	15.89	
	Financial Services	2.42	0.43	2.03	5.73	2.17	5.18	
	Community, Personal and Social Services	44.01	57.84	46.66	34.23	68.33	39.51	
	1993-94	Crop and animal production, hunting and related service activities	98.77	99.42	99.03	94.08	99.39	96.34
		Forestry and logging	0.42	0.40	0.41	1.07	0.34	0.76
		Fishing and aquaculture	0.81	0.18	0.56	4.84	0.27	2.90
Mining		6.59	4.68	6.03	3.96	2.09	3.60	
Manufacturing		62.56	85.61	69.34	71.49	83.31	73.75	
Electricity Gas and Water Supply		2.60	0.34	1.93	3.69	0.82	3.14	
Construction		28.26	9.36	22.70	20.85	13.79	19.50	
Trade		42.01	38.06	41.33	43.56	22.39	39.85	
Transport		14.81	0.99	12.44	16.77	2.68	14.30	
Financial Services		2.80	1.20	2.53	6.45	4.06	6.03	
Community, Personal and Social Services		40.38	59.76	43.70	33.22	70.86	39.83	
1999-00		Crop and animal production, hunting and related service activities	99.08	99.35	99.19	92.37	98.70	94.89
		Forestry and logging	0.35	0.50	0.41	1.26	0.55	0.98
		Fishing and aquaculture	0.57	0.15	0.40	6.38	0.75	4.13
	Mining	4.55	3.24	4.19	2.67	1.21	2.41	
	Manufacturing	57.98	84.88	65.44	68.27	81.76	70.71	
	Electricity Gas and Water Supply	1.94	0.09	1.43	2.43	0.57	2.09	
	Construction	35.52	11.79	28.94	26.63	16.46	24.80	
	Trade	42.30	35.15	41.15	48.40	32.01	45.51	
	Transport	19.71	1.08	16.71	17.13	3.34	14.69	
	Financial Services	2.93	1.13	2.64	7.28	4.69	6.82	
	Community, Personal and Social Services	35.05	62.64	39.49	27.19	59.97	32.98	

2011-12	Crop and animal production, hunting and related service activities	98.99	99.66	99.22	91.87	98.40	93.98
	Forestry and logging	0.32	0.16	0.26	1.34	0.22	0.98
	Fishing and aquaculture	0.70	0.18	0.51	6.78	1.37	5.03
	Mining	2.47	1.76	2.29	2.47	0.88	2.16
	Manufacturing	37.06	58.69	42.46	64.48	86.04	68.63
	Electricity Gas and Water Supply	1.19	0.07	0.91	2.34	1.22	2.12
	Construction	59.29	39.49	54.34	30.71	11.85	27.09
	Trade	45.79	35.80	44.15	45.92	23.31	41.68
	Transport	22.27	1.42	18.85	16.46	1.98	13.75
	Financial Services	5.63	2.66	5.14	14.21	10.48	13.51
	Community, Personal and Social Services	26.32	60.12	31.85	23.41	64.24	31.07

Source: Same as Table 1

On the other hand, at the all-India level, the employment share of industry and services has increased continuously and has reached 24.1 per cent and 27 per cent respectively in the year 2011-12. The quinquennial marked between 1999-00 and 2011-12 showed the highest compound annual growth rate of employment in industry and services for both the males and females at the all-India level. Also, the annual growth rate of employment within the secondary sector has been higher for the males as compared to the females between 1983 and 2011-12. However, the reverse has taken place within the domains of the service sector.

While in the rural areas the female's employment share in the secondary sector has increased continuously over the years, it has declined in between the years 1993-94 and 1999-00 in urban areas. However, in 2011-12, 33.36 per cent of the urban females are found working in industry as compared to 29.38 per cent in 1999-00. On the other hand, the proportion of women working in the service sector has increased throughout the period 1983-2012 from 4 per cent and 37 per cent in 1983 to 8 per cent and 55 per cent in 2011-12 respectively in the rural and urban areas. Thus, the year 2011-12 has witnessed a 2-fold increase in women employment share within the domains of industry and services in the rural areas.

**Table 4: Annual Compound Growth Rate of Workers by Sex and Sector: All India**

Sector	Gender	1983 to 1993-94	1993-94 to 1999-00	1999-00 to 2011-12
Agriculture	Males	0.09	0.07	-0.03
	Females	0.05	0.06	-0.18
Industry	Males	0.22	0.23	0.77
	Females	0.18	0.15	0.70
Service	Males	0.32	0.24	0.37
	Females	0.35	0.21	0.45

*Source: Same as Table 1*

During the year 2011-12, within the secondary sector, manufacturing and construction is characterised to have higher concentration of female workers in the rural areas. Out of total women workers employed in the secondary sector in rural India, 58 per cent were engaged in activities related to manufacturing and 39 per cent were engaged in construction related activities in 2011-12. In case of tertiary sector, the highest concentration of rural women took place in trade followed by community, personal and social services in 2011-12. On the other hand, among the urban women employed in industry and services, 86 per cent are engaged in manufacturing and 64.2 per cent are working as community, personal and social service workers (CPSS).

In the secondary sector, in both rural and urban areas, the industries dominated by women across the years are manufacture of tobacco products, textiles, wearing apparels, dressing and dyeing of fur. In the UPSS status, construction of utility projects like roads and railways has also been dominated by rural women in 2011-12. In activities related to service sector, rural women dominate in retail sale of food, beverage, tobacco, automotive fuel, cultural and recreation goods and in educational services. On the other hand, the dominant presence of urban women is seen in residential care activities, social work activities and in activities of households as employers of domestic personnel.

**Table 5: Share of Women Workers in Top Five Industries in 2011-12- Rural UPSS**

		Manufacturing	
Industry	Manufacture of Tobacco items		30.52
	Manufacture of Textiles		18.58
	Manufacture of Wearing Apparels		17.68
	Manufacture of wood and cork items		8.10
	Manufacture of food products		8.01
		Construction	
	Utility Projects		62.68
	Buildings		31.52
	Specialised Construction Activities		5.80
		Trade	
Services	Retail Trade		77.75
	Food and Beverage Services		15.45
	Wholesale Trade		2.15
		45	2.01
	Repair of Computers		1.52
	Accommodation		1.13
		Community, Personal and Social Services	
	Education		52.45
	Other Personal Services		15.36
	Employers of Domestic Personnel		10.21
	Health		8.62
	Public administration and Defence		5.69

*Source: same as Table 1*

**Table 6: Share of Women Workers in Top Five Industries in 2011-12-Urban UPSS**

Manufacturing		
Industry	Manufacture of Wearing Apparels	29.44
	Manufacture of Textiles	24.76
	Manufacture of Tobacco items	12.92
	Manufacture of food products	9.37
	Manufacture of jewellery items, musical instruments etc	6.65
Community, Personal and Social Services		
Services	Education	37.25
	Employers of Domestic Personnel	23.25
	Other Personal Services	15.42
	Health	11.17
	Public administration and Defence	7.34

*Source: Same as Table 1*

### III. The Periodic Labour Force Survey (PLFS)

While the employment-unemployment surveys from NSSO have been the major sources for assessing various aspects of employment over the years, the Task Force headed by Arvind Panagariya (2017) argued that NSSO's employment-unemployment surveys (EUS) has ended up providing low-frequency data as they are conducted annually and are made available at an interval of five years; as a result the data loses its reliability and desirability for sound policy making. Thus, the need to develop a new data system replacing the existing 5-year surveys which would address the issues of representation, periodicity and timeliness was recently felt by the Task Force.

Following the recommendations of the Task Force and aiming at improving the global compatibility and comparability of the employment estimates, MOSPI provided information on the labour market parameters using Periodic Labour Force Surveys (PLFS) for the year 2017-18. The release of labour market statistics using PLFS showed the rate of unemployment at its peak in the last 45 years. However, the government officials were unwilling to accept such alarming rates of unemployment and they expressed their doubts regarding the authenticity of the data gathered through the PLFS. Also, as the 'Standing Committee on Labour Statistics', appointed to oversee the PLFS, introduced multiple changes in the procedure of data collection, design and size of the sample and techniques of sample selection and stratification (like, introduction of Computer Assisted Personal Interviewing Method (CAPI), Rotational Panel Sampling Design for the urban areas and consideration of NSS regions as the basis of forming the rural and urban stratum) the officials of *Niti Aayog*

highlighted the issue of non-comparability of the PLFS data with the employment estimates obtained from the QEUS of NSSO in the past years. However, the members of the statistical agencies rejected the critical evaluations made by the government officials. Thus, the economy was buzzing with the differences in opinion and exchange of heated arguments amidst the members of the statistical commission and the government officials regarding PLFS. Nevertheless, it clearly appeared that the researchers and the policy makers would no longer be able to provide long term oversights about the labour market from the current employment statistics.

#### IV. Women's Employment According to PLFS

The conclusions emerging with regard to the participation of women in the workforce of the economy remained more or less the same irrespective of the differences aroused in the context of the data generating methodology used by NSSO in the periodic labour force surveys with the one used in the past EUS. In both the years – 2011-12 and 2017-18, it is seen that the females in the rural and urban areas have recorded significantly low WPR as compared to the males. As seen, the WPR for the males have exceeded above 50 per cent while the same for females have remained below 20 per cent in both the years in the rural and urban areas. Thus, both the surveys indicated at the presence of gender inequality in the Indian labour market. Also, the rural-urban differences with regard to the female LPR and WPR was visible in both the surveys with the rural women recording greater rates of participation compared to their peers in the urban areas.

**Table 7: Distribution of Persons (UPSS-PS+SS) in the Labour force and Work Force of the economy in 2017-18: All India**

	RURAL			URBAN			RURAL+URBAN		
	M	F	P	M	F	P	M	F	P
LPR	549	182	370	570	159	368	555	175	369
WPR	517	175	350	530	142	339	521	165	347

**Source: Annual Report on PFLS 2018-19**

As the distribution of workers across the three major economic sectors and the broad status of employment are considered for the years 2011-12 and 2017-18, it is seen that, in the rural areas, the primary sector has absorbed highest proportion of workers (55 per cent for the males and 73.2 per cent for the females) followed by the secondary sector and tertiary sector. In fact, the secondary and tertiary sectors have absorbed rural persons almost in equal

proportion in the year 2017-18 (23 per cent for the males and 13 per cent for the females). It must be noted that majority of these men and women in the rural areas are self-employed – precisely, in the rural areas, 48 per cent of these self-employed male workers are either own account workers or employers and the females in greater proportion are engaged as unpaid family helpers during 2017-18.

**Table 8: Percentage Distribution of Persons (UPSS-PS+SS) across the various sectors of the economy in 2017-18: All India**

	RURAL			URBAN			RURAL+URBAN		
	M	F	P	M	F	P	M	F	P
Agriculture	55	73.2	59.40	5.4	9.1	6.14	40.24	56.99	44.14
Industry	23.10	13.68	20.78	36	30.13	34.77	26.90	17.85	24.81
Services	21.95	13.13	19.78	58.63	60.8	59.06	32.86	25.17	31.07

*Source: Same as Table 7*

**Table 9: Percentage Distribution of Persons (UPSS-PS+SS) across the various modes of employment in 2017-18: All India**

	RURAL			URBAN			RURAL+URBAN		
	M	F	P	M	F	P	M	F	P
Self-Employed	57.8	57.7	57.8	39.2	34.7	38.3	52.3	52	53
Own account workers and Employers	48	19	41	34.9	23.7	32.6	44	20	38
Unpaid Family Helpers	9.8	38.7	16.9	4.3	11	5.7	8	32	14
Regular Employed	14	10.5	13	45.7	52.1	47	23	21	22.8
Casual Employed	28.2	31.8	29.1	15.1	13.1	14.7	24	27	25

*Source: Same as Table 7*

On the other hand, the employment share of the urban persons has been the highest in tertiary sector and the lowest in the primary sector. Also, both the males and females of the urban areas are engaged as regular workers in highest proportion (45.7 per cent among the males and 52 per cent among the females) followed by self-employment and casual employment. It must be noted here that, unlike the women in the rural areas, among the urban women workers who are self-employed (35 per cent) nearly 23 per cent are working as own account workers or employers.

## V. Factors Determining the Women's Work Participation?

We discuss this issue using the unit-level data for the year 2011-12 (68<sup>th</sup> round) as available from the EUS for that year as unit-level data from the PLFS for 2017-18 is yet to be released. It may be noted here that the preference of a woman to participate in the work force depends on the interplay of various socio-economic factors ranging from her household and individual characteristics to her affiliation in a particular socio-religious community (Majumdar, 2012; Neff, Sen and Kling, 2012; Neetha and Majumdar, 2011; Swaminathan, 2012; Sachar Committee Report, 2006; Rustagi, 2013). Aiming to identify such factors, we have estimated a logit regression model. The detail of the empirical analysis is mentioned in Appendix 1.

As seen from the odd ratios in Tables 10 and 11, both in rural and urban India, the likelihood of work force participation for the females goes up with the increase in her age (measured in years) and fall in the number of her household members implying that the non-young women who are subjected to low burden of household work have shown greater chances of work participation. Since the odds ratio for the poverty status dummy is seen to be less than one and statistically significant so clearly we understand that the females who belong to the poor households are compelled to participate in the work force in large numbers in order to supplement the income level of their family that we designate as the 'income effect'.

Further, it is seen that divorced women bears greater chances of work force participation than the married or the widowed ones both in the rural and urban areas as there is no one to look after which in turn impose a compulsion upon them to earn their livelihood on their own. Also, lending credence to Becker's human capital theory (1993), we see that as a woman climbs up education ladder, her chances of participation in the workforce also rises and amongst these educated ones those who have completed their post-graduation studies is 1.96 times (in the rural areas) and 6.22 times (in the urban areas) more likely to participate in the work force than the non-educated ones. In addition to this, significantly greater likelihood of female work force participation in households for which the major source of income has been casual employment adheres to 'distress employment'. Also, owing to increased autonomy and decision-making abilities in families where she herself is the head increases her chance of participation in the work force.

Again, the estimated coefficients corresponding to the religious group and social group dummies suggest that the women of the Hindu families and ST communities in the rural areas have the highest probability of work force participation; while in the urban areas, the women of the SC households and the Christian communities have greater likelihood of work force participation than the non-SCs and non-Christians. However, as mentioned in the Sachar Committee report (2006), our empirical results have also shown that women from

the Muslim communities have low chance of work participation both in the rural and urban areas. This could be explained in terms of their low levels of education and imposition of higher young age dependency burden on them (Basant, 2007). Further, location of the residence also plays an important role in determining the female work force participation and so this factor has been controlled in our analysis. It is seen that, among the rural females, those who reside in the Northern states have shown greater chances of work force participation (because of the inclination of the north Indian women towards working as agricultural wage labourer) whereas in the urban areas, her chance of work force participation goes up if she resides in the Southern states of India.

## **VI. Conclusion**

The methodological discrepancies arising in the context of the recent periodic labour force surveys prevent us from providing long term oversights about the employment scenarios for the females. Abiding by the norm of non-comparability between the current and past surveys of NSSO, our study has highlighted the major findings about the employment conditions for women separately for the current period. However, the conclusions emerging with regard to the participation of women in the workforce of the economy remained more or less the same. As indicated in our study, the Indian labour market is characterised by the existence of significant gender inequality and low rates of work force participation for the females both in the rural and urban areas in all the years.

Also, there has been a tendency among the male and female farm workers to withdraw themselves from farming operations and move towards industry and services in between the years 1983 and 2011-12. It is observed that the year 2011-12 has witnessed a 2-fold increase in women employment share within the domains of industry and services in the rural areas. As we disaggregate the sectors at 2-digit level for the year 2011-12, it is seen that the industries dominated by women are manufacture of tobacco products, textiles, wearing apparels, dressing and dyeing of fur. In addition to this, construction of utility projects like roads and railways has also been dominated by rural women. In activities related to service sector, rural women dominate in retail sale of food, beverage, tobacco, automotive fuel, cultural and recreation goods and in educational services. On the other hand, the dominant presence of urban women is seen in residential care activities, social work activities and in activities of households as employers of domestic personnel. In the context of the PLFS data (2017-18), it is seen that, the urban females in increasing percentage are seen getting employed in well paid regular jobs particularly within the domains of the service sector; while the women in the rural areas are engaged in agriculture as unpaid family helpers in maximum proportion. Also, in the context of the recent survey, it has been seen that women's access to regular jobs has increased in recent times.

Further, detailed evaluation of the results obtained from the econometric model that was fitted to identify the determinants of work force participation for the females of the rural and the urban areas helped us to conclude that these females are participating in the work force out of compulsion and not by their choice. Also, it is true that women of the rural and the urban areas, in higher proportion, are enrolling themselves in higher educational institutions and achieving better grades; however they are seen standing in long queues seeking low quality jobs. In fact, these educated middle-aged females have crossed the boundaries of their households in order to meet the daily needs of their family members as their husbands' income seems to be insufficient for meeting the daily necessities of the members of the family.

Again, as seen that the garment industry within the manufacturing sector appeared to be female employment friendly in the different years, so, the Government must harp upon setting new textile industries such that the employment opportunities for women gets augmented. Also, the factors such as higher pay, home based work which is conducive for female's employment must be considered in the remaining industries as well aiming to improve the overall WPR for the females in the Indian economy.

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### Appendix 1

The dependent variable of our model (workf) has two categories – it assumes the value 1 if the person participates in the work force and 0 otherwise. The relevant regressors are explained below:

- a. age: This is the quantitative variable representing the age of a person in years.
- b. hsize: It represents the total number of persons living in a single household.
- c. landph: It shows the amount of land possessed by a person in hectares.
- d. povstat: It represents the poverty status of the person; assumes the value 1 for non-poor and zero for poor.
- e. s1: it is the social dummy. It takes the value 1 for ST persons and 0 otherwise.
- f. s2: it is the social dummy. It takes the value 1 for SC persons and 0 otherwise.
- g. s3: it is the social dummy. It takes the value 1 for OBC persons and 0 otherwise.
- h. r1: it is the religion dummy. It takes the value 1 for Hindus and 0 otherwise.
- i. r2: it is the religion dummy. It takes the value 1 for Muslims and 0 otherwise.
- j. r3: it is the religion dummy. It takes the value 1 for Christians and 0 otherwise.
- k. relh1: it assumes the value 1 if the person is the head of the family and 0 otherwise.
- l. m2: it is the marital status dummy. Takes the value 1 for married and 0 otherwise.
- m. m3: it is the marital status dummy. Takes the value 1 for widowed and 0 otherwise.
- n. m4: it is the marital status dummy. Takes the value 1 for divorced and 0 otherwise.
- o. e6: it assumes the value 1 for persons who have completed primary education and 0 otherwise.
- p. e8: it assumes the value 1 for persons completing who have completed secondary education and 0 otherwise.

- q. e9: it assumes the value 1 for persons who have completed higher secondary education and 0 otherwise
- r. e10: it assumes the value 1 for persons who have completed diplomas and 0 otherwise
- s. e11: it assumes the value 1 for persons who have completed graduation and 0 otherwise
- t. e12: it assumes the value 1 for persons who have completed post-graduation and above and 0 otherwise
- u. states1: it assumes the value 1 for the North-Indian states and 0 otherwise.
- v. htype1: takes the value 1 if the source of household income is self-employed in agriculture; 0 otherwise. In case of urban areas, takes the value 1 if the source of household income is self-employment and 0 otherwise.
- w. htype2: takes the value 1 if the source of household income is self-employed in non-agriculture; 0 otherwise (for rural areas). In case of urban areas, takes the value 1 if the source of household income is regular employment and 0 otherwise.
- x. htype3: takes the value 1 if the source of household income is regular wage; 0 otherwise (for the rural areas). In case of urban areas, takes the value 1 if the source of household income is casual employment and 0 otherwise.
- y. htype4: takes the value 1 if the source of household income is casual labour in agriculture; 0 otherwise
- z. htype5: takes the value 1 if the source of household income is casual labour in non-agriculture; 0 otherwise

**Table 10: Binary Logit Regression Result of Determinants of Female Work Force Participation Rural India**

(Dependent variable: labf=1 if present in the labour force; 0 if absent)				
Explanatory Variables	Odds Ratio	dy/dx	Z statistic	Sig
age	1.00	0.000	1.65	0.10
hsize	0.92	-0.013	-13.61	0.00
landph	0.99	-0.001	-0.76	0.45
povstat	0.91	-0.015	-2.64	0.01
r1	1.54	0.069	8.59	0.00
r2	0.67	-0.065	-6.84	0.00
r3	1.09	0.013	0.97	0.33
s1	2.46	0.145	15.62	0.00
s2	1.04	0.007	1.11	0.27
s3	0.95	-0.008	-1.58	0.11
relh1	5.69	0.280	27.41	0.00
m2	11.02	0.386	53.74	0.00
m3	3.21	0.187	14.97	0.00
m4	22.02	0.497	17.68	0.00
e6	0.98	-0.003	-0.42	0.67
e8	0.89	-0.019	-2.95	0.00
e9	0.83	-0.030	-3.57	0.00
e10	1.67	0.082	4.26	0.00
e11	1.04	0.006	0.55	0.58
e12	1.97	0.109	5.77	0.00
states1	1.32	0.044	8.78	0.00
htype1	21.10	0.490	29.63	0.00
htype2	15.68	0.442	26.81	0.00
htype3	15.98	0.445	26.91	0.00
htype4	26.10	0.524	30.23	0.00
htype5	16.49	0.451	26.98	0.00
_cons	0.00	0.00	-41.55	0.00
Pseudo R <sup>2</sup> =0.21	LR-statistic=11201.01(df = 26) [sig 0.00]			
	No. of observations = 42244			

Source: same as table 4.1

**Table 11: Binary Logit Regression Result of Determinants of Female Work Force Participation Urban India**


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**(Dependent variable: labf=1 if present in the labour force; 0 if absent)**

Explanatory Variables	Odds Ratio	dy/dx	Z statistic	Sig
age	1.01	0.001	3.72	0.00
hsize	0.89	-0.014	-12.76	0.00
landph	1.05	0.006	2.44	0.02
povstat	0.62	-0.055	-9.55	0.00
r1	1.03	0.003	0.32	0.75
r2	0.79	-0.028	-2.45	0.01
r3	1.20	0.021	1.53	0.13
s1	1.62	0.056	4	0.00
s2	1.46	0.044	6.65	0.00
s3	1.13	0.015	2.86	0.00
relh1	6.30	0.213	22.39	0.00
m2	3.16	0.133	19.98	0.00
m3	1.43	0.041	3.31	0.00
m4	11.09	0.278	12.97	0.00
e6	1.10	0.011	1.76	0.08
e8	0.88	-0.015	-2.28	0.02
e9	0.95	-0.006	-0.73	0.47
e10	4.35	0.170	13.13	0.00
e11	2.35	0.099	14.41	0.00
e12	6.22	0.211	23.32	0.00
states1	0.72	-0.038	-7.35	0.00
htype1	36.39	0.416	20.79	0.00
htype2	34.71	0.410	20.62	0.00
htype3	44.63	0.439	21.66	0.00
_cons	0.00	0.00	-25.94	0.00

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Pseudo R<sup>2</sup>=0.16 LR-statistic=4434.36(df = 24) [sig 0.00]

No. of observations = 29386

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Source: same as table 4.1

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## DEVELOPMENT WITH DISPARITY

Biswajit Chatterjee\*

### *Abstract*

*Economic development of nations has been characterised by increasing disparity and inequality across countries and between persons which has adverse consequences for social order, peace and harmony, and questions of sustainability have cropped up in the informed discussions. Whether such disparity has been the outcome of initial distribution of endowments or of the growth process underway in capitalist economies are serious questions that social scientists and policy makers face. This paper points to the analytical issues and the empirical reality that pose threats to the inclusive development paradigm in the contemporary world, including India.*

**Keywords :Inequality, Disparity, Inclusive Development**

**JEL Classification Codes: I32,O15, R 10.**

### **I. Introduction.**

Economic development of nations has been christened with the objectives of improving the standard of living of its population, and ensuring justice and augmentation of welfare. It is clear that such objectives, to be fulfilled, warrant a combination of growth with redistribution. Both the components of this strategy is essential in the sense that without growth the size of the pie to be distributed remains static , and without redistribution one cannot ensure justice and improvements in welfare, which may constrain the process of economic growth in the long run. Observed reality is that perfect enmeshing of these strategies are far from complete and we find development in some sense to occur but with creation of disparities galore. We need to reflect on why such puzzling results are parts of our life and also on how to counter /tackle the problems of disparity /inequality in the growth process. It may be noted that such disparities are often outcomes of in-built diversity and heterogeneity of the Indian State, but they are also driven by the type of development programmes and their implementation in different states of India over the years. Needless to say, we are confronting the challenge of reaching the landmark of nearly \$5 trillion economy in the near future , along with being the home of a high percentage of world's poor, and the top 1 % of the income earners occupying about 26% of the national wealth in 2018. Surely, the important example of *development with disparity* in the contemporary world happens to be our Indian Economy aiming to achieve also *Sab Ka Sath Sab Ka Vikas*.

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Let us take the simple possible indicator of development, namely per capita income level. There may be debates regarding the adequacy or otherwise of this simple indicator- and in some sense, some of the objections are on justified grounds- yet it is still a useful indicator. To quote from Dutt(2014): "*India's per capita income was about Rs 64,000 (for 2010), which translates into approximately US\$1400. This is considerably lower than those of the US (US\$47,000) and Japan (US\$43,000), or even Mexico (US\$9,100), Brazil (US\$10,700), and China (US\$4,400), and is close to the average for Sudan and Ghana. India is ranked 138, out of 190 countries listed by the World Bank... If we convert rupees into Purchasing Power Parity (PPP) dollars [to take account of differences in prices between countries], India's per capita income is US\$3,400, compared with US\$47,300 for the US, US\$34,600 for Japan, US\$14,400 for Mexico, US\$11,000 for Brazil and US\$7,640 for China., and closer to those for Guyana and Vietnam. India ranks 126 out of 181 listed countries*". Clearly disparity exists in the level of development on the world scale, and within India, between regions, between groups within a region, and above all between persons, disparity not only exists, but also assume accelerating proportions in some periods of Indian history since independence. Lot of questions arise in this context of burgeoning disparity or inequality- are these the outcome of initial differences in endowments or are there any reasons for growth process not necessarily converging in our economy- due to domestic or external influences? These are important questions that merit discussions among social scientists. But to start with, let us briefly go back to the essence of the rationale of economic development in backward or less developed economies

## II. Development Economics

The basic task of economic development is not only to improve the material conditions of living of the people in a given society or region, and minimize or eliminate the deficiencies or deprivations of material well being, but also to foster and promote the capabilities inherent in human beings. How are the twin goals best achieved, whether the trade-offs that may exist between multiple objectives could be minimized, and how governance of development programmes in particular, could be directed to the welfare and well being of the people—are all debated extensively in the literature contributed by academic economists as well as by the practitioners over the years. With shift in development paradigm from 'growth only' to 'growth with sustainable human development', the canvas of development discourse has widened considerably over the years, and it is now increasingly realized that efforts of development administration to alleviate poverty through economic growth only, would be meaningless unless it is accompanied by expansion of basic capabilities of the human beings in a given society or region, and of the basic amenities that condition such capabilities, along with explicit and efficient redistribution mechanisms.

Development Economics as a distinct sub-discipline of economic analysis began to take shape in the 1950s, although the notion of economic progress of nations is as ancient as the discipline of Economics itself. Adam Smith's *Wealth of Nations* typifying the importance of the interaction between social and economic factors for explanation of growth and opulence of nations and the role of institutions like market-internal and external – in shaping growth, welfare and justice of a progressive society can be viewed as a precursor of any modern discourse of development and under-development of nations. As the subject grew, it increasingly drew on the history of experience of some present-day developed nations and of socialist countries to explore the possibility of economic regeneration and transformation of so-called backward nations who attained political independence mostly after the Second World War. However, the record of development of such backward nations, though somewhat encouraging, has not fully lived up to the initial expectations and optimisms regarding the speed and dimensions of change. The problem of poverty amidst plenty, and the associated problems of malnutrition and hunger, unemployment, absence of social justice in many nations pose serious challenges about the validity of the analysis and prescriptions of development economics

The second half of the 20<sup>th</sup> century has witnessed significant surge in the literature on the development in economies considered “poor” or “underdeveloped” in the 1950s. Notwithstanding the discussions of the limits to growth, and the impact of growth on cultural values and national wellbeing, the issues of distribution of income and inequality thereof, have been extensively discussed in the modern theories of economic development. In the immediate post-war period, the focus was on rapid growth and industrialization (Rosenstein-Rodan, 1943; Mahalanobis, 1963). Simon Kuznets (1955) had put forward his “inverted U hypothesis”, that inequality first increases and then decreases as per capita income rises. During the process of development, he visualized population shift (away from rural and non-agricultural sectors) such that, under certain assumptions, it would lead to a temporary rise in overall inequality. His famous conjecture about the (curvilinear) relationship between inequality and development spurred an extraordinary amount of empirical research, but Kuznets never intended to assert that inequality was a necessary condition of economic takeoff. The 1960s and 1970s saw the culmination of concerns on the distributional consequences of fast growth, led by the experiences of such countries as Brazil, where Fishlow (1972) argued that distributional worsening may even have been such as to increase poverty despite rapid growth. The Indian Third Five Year Plan also explicitly took on distributional objectives. This was due to the realisation that growth per se might not benefit the poor because of its adverse distributional consequences, and that active intervention was required to manage the distributional consequences of growth processes. Much of the discussion of “targeting” of transfers for poverty alleviation also originated from this literature. The World Bank's (1990) *World Development Report* and the UNDP's (1990) *Human Development*

*Report* captured the consensus that not only is growth necessary for poverty reduction but that growth and equitable distribution of growth can indeed go hand in hand—all that is needed are the right policies.

One of the major stylized facts about long-run processes of economic development is the Kuznets curve—the inverse-U shaped pattern of inequality. In his famous paper “*Economic Growth and Income Inequality*”, Simon Kuznets (1955) argued that as countries developed, income inequality first increased, peaked, and then decreased, and documented this using both cross-country and time-series data. Kuznets argued that even if within-sector inequality is constant, and also the ratio of mean sectoral incomes, the shift of population between sectors at first produced widening of income inequality and then narrowed it. The inverted U arises in his model due to the fact that the sector (non-agriculture) to which people migrate in the process of development is the sector with the higher mean income as well as higher internal inequality. Varying numerical assumptions regarding sectoral inequalities and sectoral income ratios would place the inequality in the range of 0.6 to 0.8, he argued. Studies on inequality-development nexus based on cross country regressions that followed were many, mostly based on heterogeneous data and varied samples, often inclusive of developed countries, and the results were also mixed. These studies in general assumed that the relationship between income shares of the poorest 40 per cent and per capita GNP was quadratic in the log of per capita GNP, and may be conditioned by a set of dummy variables capturing characteristics such as whether the country is socialist or not, dualistic or not, or rich in resources or not. These studies are in general supportive of the inverted U hypothesis, although some argued that the location of the peak depended on the sample composition and the specific functional forms used. Barro (2000), for example, argues that the curve reflects not only the likely influence of the level of income per capita, but also an effect of the adoption of new technologies—the poor sector tends to use old technologies, whereas the rich sector uses more advanced techniques. Eventually, however, as more people take advantage of the new technology, inequality falls.

The idea of Inclusive Development has surfaced in contemporary discourse on development policy and in the Indian context, this term has been coined in the XI and XII plan document to highlight the importance of development programmes that seek to include those who were hitherto neglected or not included in the distribution of fruits of development over the years. Basically, inclusive growth (IG) refers *both* to the pace and pattern of growth, which is interlinked, and allows people to contribute to and benefit from economic growth. Rapid pace of growth is a necessary prerequisite for substantial poverty reduction, but for this growth to be sustainable in the long run, it should be *broad-based* across sectors, and *inclusive* of the large part of the country’s labor force. Removal of inequality of distribution

in income and wealth across persons has surfaced into the top agenda for development policy as per this paradigm of development such that instead of rely on trickle down, there is spread from the bottom layers itself of the fruits of development, without sacrificing macroeconomic stability, but may be at the cost of slower yet sustained rate of economic growth in developing nations.

It is worth noting that sustained, high growth rates and poverty reduction can be realized only when the sources of growth are expanding, and an increasing share of the labor force is included in the growth process in an efficient way. This would require that growth associated with progressive distributional changes will have a greater impact in reducing poverty compared to growth which leaves distribution unchanged. The empirical cross-country literature suggests that growth has neither a positive nor a negative effect on inequality, and that the impact of inequality on growth is ambiguous. Policies on spread of education and promotion of infrastructure seem to have both a positive effect on growth and a negative effect on inequality.

### III.Recent Studies

**Thomas Piketty's** epoch-making book *Capital in the Twenty-First Century*(2014), was about the concentration of wealth and the dynamics of economic inequality in capitalist economies. Based on two centuries of historical data from 20 countries, Piketty has estimated time trends for the top 10 percent and the top 1 percent of the distribution of income and wealth in the world and predicted that” *It is almost inevitable that inherited wealth will dominate wealth amassed from a lifetime's labor by a wide margin, and the concentration of [wealth] will attain extremely high levels—levels potentially incompatible with the meritocratic values and principles of social justice fundamental to modern democratic societies*”.(Piketty 2014: 26).His argument has been that as long as the rate of return to capital is higher than the rate of growth in the economy (Piketty's famous equation  $r > g$ ), the owners of capital will accrue an ever larger share of the economic pie. Thus inter-temporal rise in inequality in the distribution of income is due to the uneven distribution of wealth and inherited capital which has propelled the forces of generation and augmentation of income inequality between persons, and even between nations. In his own words, *the fundamental source of inequality is the unequal ownership of capital , more so of human capital between persons and nations* Piketty (2015).

According to Piketty (2014) , the debate on capital –labour split and more so on the unequal distribution of capital ownership prompts discussions on how to tackle such inequality in income and wealth distribution. He favoured the imposition of a global tax on wealth that might at least reduce net differences in the returns to labor and capital. Since such progressive redistribution mechanism would benefit *some* and hurt *some others* at least in the short run,

there are debates regarding his recommended redistribution mechanism. Among the various critiques addressed to his analysis, the first set points to within-factor inequality, i.e., inequalities in the distribution of wage income across individuals, whereas Piketty's book for most part is really about the relative returns to capital vis-à-vis labor, i.e., between-factor inequality. It is also not clear how wealth inequality across people in society could be tackled by a tax on income from capital alone. Indeed, there is ample inequality in the asset holdings among those people that do possess wealth—indeed most measures of wealth inequality, be it land inequality or housing inequality, show higher rates of wealth inequality (by, say the Gini measure) than hold for income inequality. The political economy of asset redistribution appears to be much more difficult than redistribution of income via taxation.

Piketty's influential narrative of the dynamics of wealth inequality in capitalist economies and the distribution of income between capital and labour, poses important challenges to the researches on inequality and well-being. It must be understood that capitalism in the contemporary world have long deviated from the idealized vision of perfect competition—there are imperfections in markets of commodities, factors, as well as financial instruments, and there have been significant technological progresses in different sectors within a nation and between nations, with varying effectiveness, such that it becomes meaningless to rely on dynamic general equilibrium version of neoclassical economics, as has been attempted by Piketty and his followers. Perhaps one could go back to the analysis of the dynamics of capital accumulation and income distribution in an imperfectly competitive capitalist economy, which is integrated to the working of the world economy in an era of globalization

There are *two* important pathways to achieving inclusive development. First, is the employment expansion which is linked with economic growth, and more particularly with the nature of growth, i.e., whether job creation at the micro-level is associated with economic expansion. The rationale is that productive job creation will be associated with income generation at the lower stratum of income distribution and will directly transfer the benefits of growth to those who are hitherto bypassed because of variety of reasons. This will create both demand and supply side linkages to propel growth with equity. The second alternative is inequality mitigation through direct and redistributive taxation, which in principle can reduce the incidence of inequality and poverty in a growing economy, but difficult to accomplish in practice due to political economy reasons, particularly in developing nations. Piketty (2014, 2015) has advocated global taxation on capital, and the Indian policy makers recently have proposed imposition of surcharge on income-tax of very high income group, due mainly to high share of profit, but the outcome on inclusivity of the growth process seem uncertain, particularly in the absence of well-designed *additional* targeted transfer mechanism, while most of the existing redistributive mechanisms in India are either inefficient or mis-

targeted. Let us have a close look at the inequality scenario in India, as have been brought out through several important studies.

Since the initiation of the economic liberalisation reforms in 1991, there has been a surge in the growth performance of the Indian economy, although that this growth has been skewed across sectors in the sense that the sluggish growth in the country's agricultural sector has been accompanied by spectacular impressive growth in the high-skilled services sector. In such structural transformation of the Indian economy, the manufacturing sector has grown in modest rates due to the operation of several constraints. According to Banerjee and Piketty (2005), one of the outcomes of this unequal growth across sectors has been that while the income of a few has grown, the majority have not benefitted much, raising income inequality. This rise of inequality in income and wealth distribution has been accompanied by augmentation of social and religious inequalities that persisted in India over the ages. Available statistics indicate that most of the Indian states have become unequal over time, consistent with the national trend. Inequality has increased the most in faster-growing states, implying worsening of relative economic outcomes with growth. Again, even though poverty has reduced in faster-growing states, the intensity of poverty as indicated by the PGI has not changed much, suggesting that the reduction in poverty in the periods of growth is brought about by improvement in outcomes for households very close to the poverty line. The growth-inequality linkage therefore warrants a fresh look.

There have been fascinating literature on poverty and inequality in India since independence. However, most of the studies on poverty and inequality in India focused on how overall inequality in income distribution has undermined the 'trickle down' effect, i.e., the higher the inequality in the income distribution, the lower the growth elasticity of poverty. The focus has, however, now shifted to the income disparity between the richest 1% (or 0.01%) and the bottom 50%, following the publication of Piketty's (2014) magnum opus, demonstrating that rising income inequality is a byproduct of growth in the developed world.

Srinivasan et al (2017) reviewed poverty and inequality trends in India during the period 1951 to 2012–13, and find that the headcount ratios (HCR) rose and fell within a range of 45% and 65% in rural areas and a narrower 35% and 55% in urban areas during 1951–73. There was a downward trend from 1977–78 to 2012–13, from about 55% to around 25% in rural areas, and from 50% to 15% in urban areas. They argued that reduction at varying rates during the 1980s and from 1991 on was due to mild and hesitant reforms during the earlier phase and more comprehensive reforms later. They found that the rate of decline in HCR in rural regressions varied between 0.89% and 1.9% per year and between 0.76% and 1.9% a year in urban regressions, and similar trends were discernible in respect of the poverty gap and poverty gap squared over the period 1951–52 and 2010. Srinivasan (2013) also has reported comparisons of the (nominal) MPCE Lorenz curves for different years between

2001–02 and 2009–10: the estimated Ginis varied between 0.40 and 0.51 in rural areas and between 0.44 and 0.55 in urban areas, but no attempt was made by him to examine the interrelationship between poverty and inequality.

Thus, most of the literature on poverty and inequality in India focused on how overall inequality in income distribution has undermined the ‘trickle down’ effect, i.e., the higher the inequality in the income distribution, the lower the growth elasticity of poverty. The focus has, however, now shifted to the income disparity between the richest 1% (or 0.01%) and the bottom 50%, following the publication of Piketty’s (2014) magnum opus, demonstrating that rising income inequality is a byproduct of growth in the developed world. [Chancel and Piketty \(2017\)](#) have offered a rich and unique description of the evolution of income inequality in India since 1922, combining household survey data, tax returns and other specialised surveys, and their major findings are :

- I. The share of national income accruing to the top 1% income earners is now at its highest level since the launch of the Indian Income Tax Act in 1922. The top 1% of earners captured less than 21% of total income in the late 1930s, before dropping to 6% in the early 1980s and rising to 22% today.
- II. Between 1951 and 1980, the bottom 50% captured 28% of total growth and this group’s income group grew faster than the average, while the incomes of the top 0.1% decreased.
- III. Between 1980 and 2014, the situation was reversed; the top 0.1% of earners captured a higher share of total growth than the bottom 50% (12% versus 11%), while the top 1% received a higher share of total growth than the middle 40% (29% versus 23%).

Inequality has many dimensions and in India, the objective of inclusive growth and poverty eradication call for coordination and complementarity among alternative policy interventions to bring about an equitable social and economic order. The process of inclusive growth would entail if and only if the planners set out a growth process in those lines of productive activities for which the weak, marginalized and so-called inefficient or low-skill workers are capable of participating. The essence of achieving inclusive growth lies in reducing inequalities in the bottom layers of income distribution, and India’s record of achieving inclusiveness is rather poor across the states. Policy complementarity, efficiency and macroeconomic stabilization are essential ingredients of achieving equitable and accelerating growth process in the Indian economy in the medium term.

### III. A SUM UP

There are important dimensions of inequality and disparity in Indian society and economy. If one looks at the historical snapshots, the important questions to be asked are why such disparities—initial distribution or growth process that leads to such diversity, and secondly

why convergence fails to occur, and inequality and disparity persist? In coming days social scientists and policy makers must address these questions before lamenting that we have burgeoning inequalities. In the Indian context, time has come to address such questions in research domains, as our objectives of ushering in equitable and harmonious social order in our development process are far from being achieved. Inclusive development is an important ingredient of achieving harmonious social order and Indian policy experiments should be freed from setting illusive milestones only.

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**BOOK REVIEW**

**STUDIES ON ECONOMETRIC APPLICATIONS**

**by Debesh Bhowmik, Synergy Books, New Delhi, 2019, Pp 301 pages.**

Ordinary least squares, heteroscedasticity, autocorrelation, logit model, unit roots, autoregressive processes, impulse-response functions, vector error correction model, fixed effects, random effects, dynamic panel data analysis, Bayesian estimation... Definitively, econometrics is a very complex but, at the same time, very interesting aspect of economic research. In fact, at present most of academic research in economics is dominated by econometrics. Basically, this is because, as Samuelson says, "Econometrics may be defined as the quantitative analysis of actual economic phenomena based on concurrent development of theory and observation, related by appropriate methods of inference".

In this context, Dr. Debesh Bhowmik's book *Studies on Econometric Applications*, which is a compilation of papers, constitutes an excellent example of how econometrics can be rigorously used to analyze different topics in economics. Indeed, it applies several econometric methods from cross-sectional analysis, time series and panel data. Thus, it is evident that Dr. Bhowmik masters an extensive set of econometric techniques, so that his work can be a very useful reference for students and researchers (or, even better, it can inspire students to become researchers).

In his previous book, *Applications of Econometrics in Economics* (2017), Bhowmik developed several applications of time series econometrics but did not include panel data methods. By contrast, in this book we can find, as added value, several applications of panel data econometrics, especially in terms of panel vector error-correction models. For example, in the paper "Factors of Human Development Index in ASEN: Panel cointegration analysis" Bhowmik applies a panel VECM to study the relationship between Human Development Index and other variables like GDP, education expenditure, health expenditure and unemployment rate in ASEAN countries during the period 1990-2016. Similarly, in the paper "Sectoral employment rate in India: Panel cointegration and vector error correction analysis" the same method is applied to investigate sectoral employment rates in males and females in India during the period 1991-2016. Interestingly, it is found that male employment rate of all sectors is positively related with GDP shares of sectors and growth rates of sectors and that female employment rate of all sectors is negatively related with GDP shares of sectors and growth rates of sectors. This result shows a clear pattern which must be studied more thoroughly by those interested in equality of opportunities between men and women.

Of course, as an Indian scholar, Dr. Bhowmik is focused on economic problems of India, which is the third largest economy in the world in terms of GDP based on PPP (purchasing power parity). In this way, in the paper “Econometric test on growth-unemployment nexus in India” he relates these variables during 1991-2016 in India and finds that there is a negative relationship between unemployment and economic growth, which is significant at 10% level. In turn, in the paper “Impact of social sector expenditure on economic growth in India” he uses a double-log regression model for the Indian economy during the period 1990-2017 and finds that one per cent increase in social expenditure generate 0.6374% increase in GDP, 0.48627% increase in GDP per capita, 0.1166% increase in HDI, 0.1679% increase in growth rate and 0.060139% decrease in unemployment rate, so that it is clear that social expenditure is a very important instrument to promote economic development in India.

But there are not only studies focused on India or Asian economies. For instance, in the paper “Linkages among global CO<sub>2</sub> emission and world GDP” Bhowmik performs a study at the world level. This paper is relevant because it presents econometric evidence against climate change deniers who argue that there is no association between climate change and human activity. Indeed, using data from 1960 to 2015 and applying Granger causality test, Bhowmik finds that world GDP growth rate Granger causes world CO<sub>2</sub> emission per capita. On the other hand, in the paper “Impact of Foreign Direct Investment on trade integration in African bloc-ECOWAS” he studies the impact of FDI on trade integration in the Economic Community of Western African States (ECOWAS) during the period 1995-2016 and, considering intra bloc exports and imports, finds that FDI accelerates trade integration in this group of countries.

Moreover, we have that econometrics has been traditionally seen as the key tool for testing economic theories. In this vein, Bhowmik uses econometric methods to test different economic ideas. Thus, in the paper “Econometric test for orthodox quantity theory of money” he analyses the validity of the well-known equation  $MV=PT$  in India during the period 1960-2015 and finds that there is a positive but not proportional relationship between price level and money supply. In addition, in the papers “Robertsonian saving function in India” and “Econometric test on Keynesian saving function in India” he also tests economic theories.

So, it is clear that Dr. Bhowmik’s book constitutes a valuable contribution to economic research since it shows the application of several sophisticated and highly technical econometric tools and models but in a simple a direct language. In turn, it is remarkable the scope of subjects which are discussed, including human development, GDP, economic integration, investment, labor markets, social expenditure and climate change. All of this reminds me Keynes’ description of the ideal economist: “The master-economist must possess a rare combination of gifts. He must be mathematician, historian, statesman, philosopher -in some degree. He must understand symbols and speak in words. He must contemplate the particular

in terms of the general and touch abstract and concrete in the same flight of thought. He must study the present in the light of the past for the purposes of the future. No part of man's nature or his institutions must lie entirely outside his regard. He must be purposeful and disinterested in a simultaneous mood; as aloof and incorruptible as an artist, yet sometimes as near to earth as a politician."

**Prof. Dante A. Urbina**  
**University of Lima**  
**durbina@ulima.edu.pe**

**ANNOUNCEMENT- I****IEA –INTERNATIONAL ECONOMIC ASSOCIATION****Call for papers****The 19th World Congress of the International Economic Association (IEA)**

As President of the International Economic Association (IEA) and Program Chair of the Nineteenth World Congress of the IEA, we invite you to submit a paper to the contributed sessions of this triennial congress, jointly organized with the Ministry of Finance of Indonesia, that will be held in Bali, Indonesia from July 3 to July 7, 2020.

The 2020 IEA World Congress will be a unique academic event which, in addition to the daily keynote lectures, numerous policy sessions and the many invited sessions, will host the latest and most engaging research in Any Field in economics in the many contributed sessions. The Congress will provide an excellent forum to present one's own research results. This is why we warmly encourage each of you to submit a paper for the congress and make a note of the following dates:

**August 12 2019 – Paper Submission Opens**

**November 15 2019 – Paper Submission Closes**

**January 15 2020 – Notification of Paper Acceptance**

**August 12 2019 – Registration Opens**

The Local Organizing Committee (LOC) is doing a great job to ensure that the 2020 IEA World Congress will run smoothly and in the best possible way. The Nineteenth World Congress will be held in Bali, Indonesia.

For questions related to paper submission please contact [contact@ieawc2020.org](mailto:contact@ieawc2020.org)

Full details on the scientific program and logistics, including accommodation and how to book rooms will be available at the congress website [www.ieawc2020.org](http://www.ieawc2020.org). Please take time to look at the website and contact [iea@iea-world.org](mailto:iea@iea-world.org) for additional information.

We do hope to see you at the IEA World Congress!

With our best wishes,

**Kaushik Basu (Cornell University)**  
President of the IEA

**Dani Rodrik (Harvard)**  
Program Chair, 19th World Congress  
President Elect of the IEA

## Announcement II

### 40<sup>th</sup> Annual National Conference of Bangiya Arthaniti Parishad

(Bengal Economic Association) shall be held in collaboration with Department of Economics, Bethune College, Kolkata, 181, Bidhan Sarani, Kolkata 700 006, West Bengal, India on 29.02.2020 and 01.03.2020. The focal theme of the Conference is “Analysing the Growth Trajectory of Indian Economy: Productivity, Efficiency, Employability & Equity”. Professor Dilip.M.Nachane is the Conference President.

#### Call for Papers:

Papers are invited for presentation and publication on the following subtopics:

- Agriculture and development
- Industry, Labour and Emerging markets
- 50 yrs of Bank Nationalisation
- Inequality and Justice
- Social sector

Full papers (4000 words) preceded by an abstract (1000 words), keywords in MS-Word/ PDF to be submitted/ sent to the Local Organizing Secretary, 40<sup>th</sup> Annual Conference and to the President Bangiya Arthaniti Parishad at :

[bchatterjee.presidentbea@gmail.com](mailto:bchatterjee.presidentbea@gmail.com) , [satarupabandyopadhyay17@gmail.com](mailto:satarupabandyopadhyay17@gmail.com)  
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#### Important Dates:

- Last date for abstract submission: 10<sup>th</sup> December, 2019
- Notification of Acceptance: 31<sup>st</sup> December, 2019
- Last date for full paper submission: 15<sup>th</sup> January, 2020
- Last date for registration: 15<sup>th</sup> February, 2020

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