Dynamics of Disguised Unemployment in the Unorganised Manufacturing Sector of West Bengal

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Abstract:

In this paper attempts have been made to calculate disguised unemployment in the unorganised manufacturing sector in West Bengal. For this, the concept of sub-vector efficiency as developed by Ray(2005) is used. Two rounds of NSSO data – 67th and 73rd are used to estimate the disguised unemployment. The surplus labour was calculated for OAE and Establishment firms separately for rural and urban sectors and different zones comprising of different districts of West Bengal. Wide variation of surplus labour across the sector, industry and zones are found. Again, in between two periods, the extent of surplus labour is found to be increased. Lack of employment opportunity in other sector may be a reason for this situation. Some urgent action is required to improve the performance of this sector.

Keywords: Disguised Unemployment, Efficiency, Surplus labour NSSO, OAE, Establishment, Firms, DEA.

JEL Classification: D24, J46, O17

Introduction:

The disguised unemployment is an important issue in any economy.Disguised unemployment is the amount of labour which is employed in the production process but have no positive contribution in the process. It basically implies the amount of labour that can be withdrawn from the production system without affecting output(Lewis 1954; Eckaus 1955;

Mellor and Stevens 1956; Rosenstein Rodan 1957; Leibenstein 1957; Majumdar 1961; Enke 1962; Wonnacott 1962; Sen 1966 etc). Now the question is how to measure the disguised unemployment? It can be measured by setting a benchmark for the optimum amount of labour. The amount of labour which is over and above this optimum amount is the disguised unemployment in any given situation. Now setting the benchmark is a major issue in economics. Many scholars attempted to measure it (Mazumdar 1959,Mathur 1964; Paglin 1965; Rudra 1973; Chattopadhyay 1977; Desai and Mazumder 1970). But , as observed by Nayak and Chatterjee, there is no general agreement about the criteria to measure the disguised unemployment (Nayak and Chatterjee 1986).

Fortunately, the efficiency analysis provides such a benchmark on the basis of which the optimal usage of labour can be identified. But the problem with efficiency measure is that it is a radial measure. The concept of sub-vector efficiency of Roy (2005) is of great help in this regard. Sub-vector efficiency finds out input requirement set keeping some of the inputs at their fixed level. Sub-vector efficiency is dependent on the previously chosen input. Using this the extent of disguised unemployment can be measured.

The literature of disguised unemployment is long. The concept traces back to the early writings of authors like Rosenstein Rodan, Joan Robinson, Lewis, and others .A comprehensive survey of the empirical evidence will be found in the writing of C. H. C. Kao, K. R. Anschel and C. K. Eicher[1], Mehra S (1966) found out the significance of surplus labour in Indian agriculture. The idea is that there is a large amount of labour the traditional sector. This amount can be removedfrom the present employment without reducing the amount of output.

Different explanation were put forwarded for the existence of surplus labour. Sen (1966) distinguished labour from the labourer. Basu (1992) relied on efficiency wage hypothesis. Recently, Sengupta, Dutta, Mondal (2009,2012) estimated the amount of surplus labour in the informal service sector using NSSO data.

The unorganised manufacturing sector is a major employment generating sector in India. Many unskilled labour can find job in this sector. Firms in the unorganised sector are very small in size.The present study is based on the unorganised manufacturing sector in West Bengal. In India West Bengal occupies a distinct position in the sphere of unorganised manufacturing sector. West Bengal comes first in the number of unorganised manufacturing enterprises. This state uses highest number of labour in comparison to other states of India. In terms of output produced West Bengal occupies third position in India.

For the present analysis, the NSSO 67th and 73rd round data is used to show the dynamics of surplus labour in unorganised manufacturing sector in West Bengal. Such an analysis, I believe, will be helpful to understand the labour absorption capacity of this sector.

The paper is organised as follows. In section 2, a brief description of data is given. Section 3 discusses the methodology used. Section 4 provides the extent of disguised labour in unorganised manufacturing sector of West Bengal. Lastly, conclusions are drawn in section 5.

Description of data:

For the present study, the data have been collected from the 67th and 73rd unit level data. The NSSO 67thround survey was conducted for the year July 2010 to June 2011 whereas the NSSO 73rd round survey was for the year July 2015 to June 2016. As for the selection and classification of enterprises, all enterprises are classified into two broad categories-Own Account Enterprise (OAE), and Establishment (ESTA).

According to the NSSO report an enterprise, which is run without any hired worker employed on a fairly regular basis is termed as an own account enterprise (OAE). By 'fairly regular basis' it is meant that the employment is for a major part of the period of operation(s) of the enterprise during a reference period. On the other hand, "an enterprise which is employing at least one hired worker on a fairly regular basis is termed as Establishment(ESTA).

The NSSO data gives us the detailed information about outputs (Gross Value Added in rupees) and inputs. The information about the number of worker, amount of fixed assets (Capital) and operating expenses are given in the data set.

We have used the NSSO data to estimate the extent of disguised unemployment for different districts of West Bengal.The DEA technique cannot be used whenany one of theinputs becomes zero, since it is not possible to construct convex hulls(Banker, Charnes and Cooper 1984), so here the aggregated district-level data has been used.

Methodology:

In order to explain the notion of sub-vector efficiency, let us consider a set-up of m different outputs:$y \in R_{+}^{m}$and n different inputs $x \in R_{+}^{n}$.Now for any output bundle *y,*the input requirement set can be defined as:

$V(y) = \{x: x \text{ can produce } y\}$ (1)

Theory of production imposes certain restrictions on the form of input requirement set,*V(y)* (Varian 1984).

1. **Feasibility:** When(x^{j}, y^{j}) is observed in reality then $x^{j} \in V(y^{j})$ .This means that, all observed input-output bundles are feasible.
2. **Convexity:** V(y), the input requirement set, is a convex set.
3. **Free disposability of inputs:** If (x^0, y^0) is actually feasible then for any $x \geq x^0$, (x, y^0) is also feasible.
4. **Free disposability of outputs:** If (x^0, y^0) combination is feasible, then for any $y \leq y^0$, (x^0, y) is also feasible.

DEA measures are based on this set. If a firm produce output y^0 , from input x^0, then the radial measure of input oriented technical efficiency is given as :

$E^*_f = \frac{1}{\theta_f^*}$ Where $\theta_f^* = \min \theta_f : \theta_f x^0 \in V(y^0)$ (2)

Now, the BCC (Banker, Charnes and Cooper 1984) measure of technical efficiency is defined as:

$$\min_{\theta_f \lambda} \theta_f$$

Subject to:$y_f \leq Y\lambda$,

$X\lambda \leq \theta_f x_f$, $\sum \lambda_f = 1$ (3)

Now let us partition input vector as, x= (x_c, x_v). Sub-vector efficiency is defined as the calculation of the technical efficiency of a specific sub-vector of inputs,while the other inputs remain same at some fixed level.

Here, x_c may be kept at some fixed level x_c^0 while the efficiency of x_v is measured.

In this case, the relevant input requirement set is defined as:

$V(y^0/x_c^0) = \{x_v : (x_v, x_c^0) \epsilon V(y^0)\}$ (4)

Ray (2005), derived some properties of the conditional input requirement set (4) which follows the properties of the unconditional input requirement set (1).

1. Feasibility: If (x^{j}, y^{j}) is actually observed then$x_v^j \in V(y^j/x_c^j)$. All observed input-output bundles are feasible.

2. Convexity: V (y /x_c) is a convex set.

3. Free disposability of inputs-1: If $x_v^0 \in V(y/x_c)$ then for any $x_v^1 \geq x_v^0$, $x_v^1 \in V(y/x_c)$.

4. Free disposability of inputs-2: If $x_c^0 \in V(y/x_c^0)$ then for any $x_c^1 \geq x_c^0$, $x_v^0 \in V(y/x_c^1)$.

5. Free disposability of outputs: If $y^1 \in V(y^0/x_c^0)$ then for any $y^1 \leq y^0, x_v \in V(y^1/x_c^0)$. (5)

When a firm produce output y^0 from inputs x^0, the relevant input-oriented measure of sub-vector technical efficiency is $SE^*_f = \frac{1}{S\theta_f^*}$ .Where

$S\theta^*$=min $S\theta_f$: $S\theta_f\ x_v^0 \in V(y^0/x_c^0)$

(5) The BCC (Banker, Charnes and Cooper 1984) measure of efficiency is defined as:

$$\min_{S\theta_f \lambda} \quad S\theta_f$$

Subject to :$y_j \leq Y\lambda$,

$$\sum_j \lambda_j x_v^j \leq S\theta_f\ x_v^j,$$
$$\sum_j \lambda_j x_c^j \leq x_c^j,$$
$$\sum_j \lambda_j = 1 \quad (6)$$

Here, we have considered a single output , GVA, and three inputs set-up. The inputs are - capital input (K) , Operating cost (OP), and labour time (L).

In DEA, the Linear Programming technique is used. It constructs efficient frontiers to find out input efficiency of the above-mentioned specification. Here, following Farrel (1957), a simple illustration is given. Here we assume that the production function is subject to constant returns to scale (CRS). In this case, dividing by a constant level of output, Y, the production function is reduced to a single isoquant as F (x_1, x_2) =1. Following the assumption of CRS and convexity, this unit isoquant may be represented by negatively sloped convex hull. Farrel devised a non-parametric technic for constructing the convex hulls from the data that is actually observed.

The basic technique of Farrell (1957) is illustrated in the figure below:

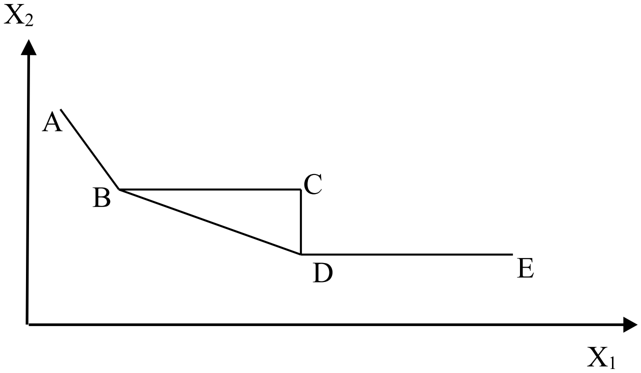

Figure-1

In the above figure five observations (A,B, C, D and E) are taken. These are levels of inputs that can produce unit output. According to the technique that described by Farrell, the convex hull is ABDE. The non-parametric technique of Farrell is generalized as DEA by Banker, Charnes and Cooper (1984). When there is a multi-input multi-output type structure, the convex hulls could be constructed by using linear programming technique within the structure of DEA. The constructed isoquant is used to give the information of the input requirement set (L(y)), that is empirical and gives a generalised production function. The input requirement set L(y) gives the all-possible inputs which can produce a certain level of output-y. Here, in the example, the input requirement set which can produce unit level of output (y=1), can be constructed. When an input requirement set is given (L(y)), then the question becomes a point in L(y) ishow far away from the isoquant.This idea is used in Efficiency analysts to develop the idea of *distance function*. In the distance function the *distances* are measured radially (along a ray through the origin passing the point). The value of the factor using which one can scale down a given combination of inputs while remaining within the input requirement set, is given by the input distance function.

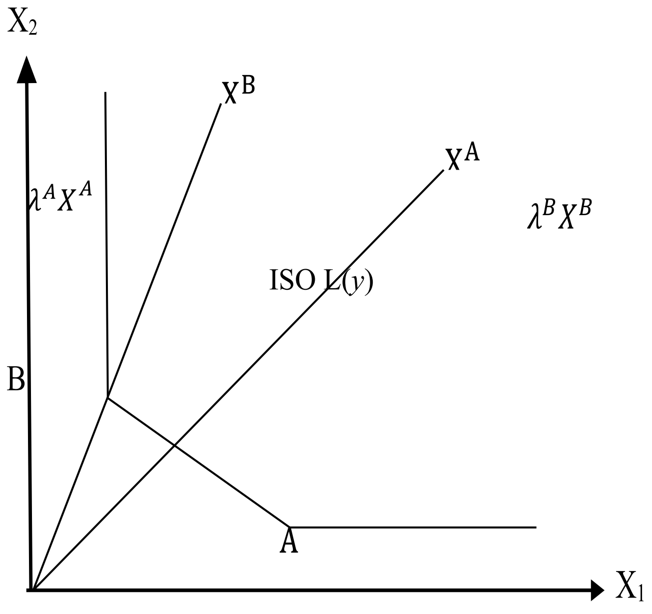

Figure-2

On the other hand, the input efficiency (Debreu-Ferrell) measures the extent to which the current inputs may be reduced without changing the level of output.Thus, the input efficiency measure is just a reciprocal of input distance function.

In figure 2, one can reach the Iso L(y), by scaling down from the point $X^A \equiv (X_1^A, X_2^A)$ to the point $\lambda^A X^A \equiv (\lambda^A X_1^A, \lambda^A X_2^A)$ with $0 \leq \lambda^A < 1$.In the same way, reduce from X^B to $\lambda^B X^B$ to reach Iso L(y). In the above example, then λ^Abecomes the efficiency index for the observation A and λ^Bbecomes the indexfor observation B. The BCC (Banker, Charnes and Cooper) method generalizes this basic concept for the many-input many- output case.

For measuring sub-vector efficiency one of the inputs is taken as constant. Then the task is to find out the maximum possible reduction in the other inputs so that one can reach the isoquant. In Figure-3, for example, the measurementfor sub vector efficiency of input 1 is done (by taking input 2 as constant) for observation A, along the line AA'' while the radial efficiency is measured along AA' (when both the inputs vary) when the relevant isoquant is y=1.

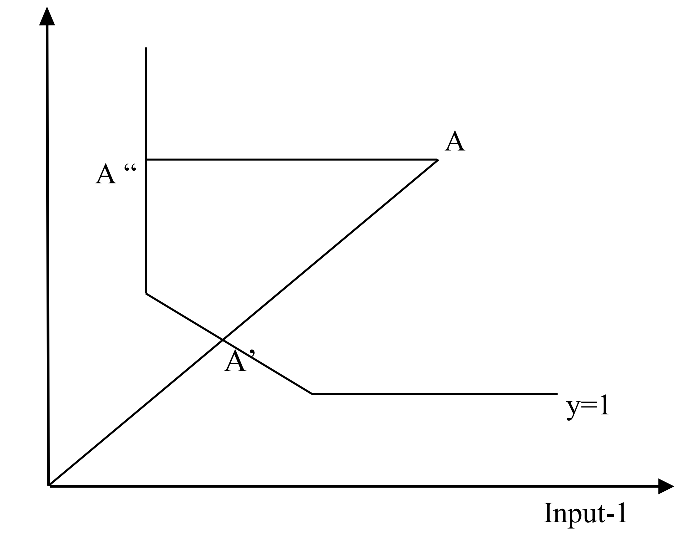

Figure-3

In the next, the empirical estimation of the modelsare done using two rounds of NSSO data. Here as output, Gross Value Added (GVA) is taken. The inputs are Capital (measured in terms of money), Operating Expenses andLabour hour used in production. Input oriented sub-vector efficiency is used to estimate the disguised unemployment.

Pattern of Disguised Unemployment:

Estimates of the disguised unemployment are presented the tables 1 to 4 in appendix. In these tables zone-wise average disguised labour is plotted. All districts of West Bengal are divided into five zones by NSSO. Zone-1 includes the districts of Darjiling, Jalpaiguri and Koch Bihar. Zone-2 includes Uttar Dinajpur ,Dakshin Dinajpur, Maldah , Murshidabad, Birbhum and Nadia. In zone 3 there are three districts- North Twenty Four Parganas, Kolkata and South Twenty Four Parganas. Barddhaman,Hugli and Haora are in zone 4. Lastly, zone 5 includes Bankura,Puruliya,Paschim Midnapur and Purba Midnapur districts. With the help of the tables in appendix, cross sectional and dynamic nature of disguised unemployment is worked out. Cross-section wise, for each round the comparison is made for the extent of disguised unemployment across two types of industries and regions. On the other hand, dynamically the changes in the surplus labour are worked out for the two time periods (2010-11 and 2015-16).

Gleaning at the tables (Table 1 and 2) it is found that the extent of surplus labour is more in the OAE firms than in the Establishment (ESTA) firms. The same result is found for rural sector in 73rd round data (Table-3). However, from table 4 it is found that in the latter period (2015-1616) the urban ESTA firms have more surplus labour.

The analysis also reveals the inter-zonal variation in surplus labour. From table-1 it can be found out that in the 67th round data for Rural sector OAE firms, zone-1 has the lowest rate of disguised unemployment (15.05%) whereas, zone-5 has the highest rate (41.18%). But for rural ESTA firms, zone-3 has the lowest (4.61%) and zone 3 has the highest (32.65%) of disguised unemployment. On the other hand, for urban OAE firms the incidence of surplus labour is lowest in zone-1 (9.84%) and highest in zone-5 (41.94%). In case of ESTA urban firms again zone-3 has the lowest rate (5.92%), and zone-2 has the highest rate (20.57%).

This inter-zonal variance is also observed in 73rd round NSSO data. Here, in general for rural firms, incidence of surplus labour is lowest in zone-3 (17.14%) and highest in zone 4 (29.49%). But for rural OAE firms, the lowest incidence is found in zone-1. For ESTA firms no surplus labour is found for zone-3. But the situation dramatically changes for urban firms. In general, for urban firms zone-1 records the lowest rate of disguised unemployment (13.13%) and zone-2 shows highest incidence of surplus labour(29.65%). Zone-1 records lowest rate for both OAE (7.96%) and ESTA (18.91%) firms. But zone-5 shows the highest rate (25.48%) for OAE and zone -4 shows the highest rate (44.89%) for ESTA firms.

Now, comparing two rounds (67th and 73rd rounds of NSSO) it is found that in general the incidence of surplus labour has increased in the later period. This increment is more prominent in case of urban area than in rural area as are found from tables 1 to 4. However, for rural areas for zones- 1 and 2 the incidence have come down slightly but for zones 3 to 5 the extent of disguised unemployment increased heavily. For urban areas, the incidence of surplus labour slightly decreased for zone-1 but for all other zones this has gone up.

This increase in the disguised unemployment across the two period implies the declining labour absorption rate in the unorganised manufacturing sector in West Bengal. Other sector of the economy is now unable to provide employment for the labour force and so pressure is felt in this sector.

This sector is suffering from many ills. To improve the performance and hence efficient labour absorption certain measures are necessary. The measures to increase the performance of firms in this sector include easy provision of bank loan, training for skill formation, market facility, supply of technical know-how etc. These will make this sector more competitive and efficient. This sector must not be treated as the dumping ground for the labour. A change in the mindset is necessary.

Conclusion:

In this paper disguised unemployment in the unorganised manufacturing sector in West Bengal was calculated using NSSO data for 67th and 73rdrounds. For calculating these the concept of sub-vector efficiency as developed by Ray (2005) was used. Here disguised unemployment rate has been calculated for various types of firms , zones are sectors. It is found that substantial amount of surplus labour exists in this sector. Limited employment opportunity in the other sector has led to such a situation. Some policy regarding the enhancement of the performance of this sector is necessary.

Reference:

- Banker, R.D. Charnes, A & Cooper, W.W. (1984). Some Models for Estimating Technical and Scale Efficiencies in Data Envelopment Analysis. Management Science, 30, 1078-1098
- Bhattacharya, A. (1970).Urbanisation and Employment Trends : A Case-study of Asansol-Durgapur region, Economic and Political Weekly, 5(67).
- Chattopadhyay, M. (1961). Some Aspects of Employment and Unemployment in Agriculture, Economic and Political Weekly, 12(24).
- Desai, M& Mazumdar, D. (1970). A Test of Hypothesis of Disguised Unemployment, Economica, 37(145), 39-53.
- Eckaus, R.S. (1955). Factor Proportions in Underdeveloped Countries, American Economic Review, Vol. 45 , 539-565.
- Enke, S. (1962). Economic Development with Unlimited and Limited Supplies of Labour, Oxford Economic Papers, Vol. 14, 158-172.
- Farrell, M.J. (1957). The Measurement of Productive Efficiency. Journal of the Royal Statistical Society, Series A, General, 120(3), 253-281.
- Kao, Charls. H. C. , Kurt. R. A and Carl. K. Eicher. (1964). Disguised Unemployment in Agriculture: A Survey, in C. K. Eicher and L. W. Witt (eds.), *Agriculture in Economic Development,* New York.
- Leibenstein, H. (1957). The Theory of Underemployment in Backward Economies, Journal of Political Economy. Vol. 65, 91-103.
- Lewis, W.A. (1954). Economic development with Unlimited Supplies of Labour, Manchester School of Economic and Social Studies, pp. 139-192.
- Majumdar, N.A. (1961), *Some Problems of Underemployment*, Popular Book Depot, Bambay.
- Mazumdar, D. (1959). The marginal productivity theory of wages and disguised unemployment. Review of Economic Studies, 26(3), 190–197.
- Mellor, John W. and Robert D. Stevens.(1956). The Average and Marginal Product of Farm Labour in Underdeveloped Economies, Journal of Farm Economies, Vol. 38, 780-791
- Mehra, S. (1966). Labour In Indian Agriculture. Indian Economic Review, 1(1), 111–129.
- Nayark, P., & Chatterjee, B. (1986). Disguised Unemployment in Agriculture : A Case Study of Rural Orissa. Indian Journal of Industrial Relations, 21(3), 310–334.
- Paglin, M. (1965). 'Surplus' Agricultural Labor and Development: Facts and Theories. The American Economic Review, 55(4), 815–834.
- Ray, Subash C. (2005). Surplus labour in Indian Manufacturing: Evidence from the Annual Survey of Industries.In R. Hosh and Chiranjib Neogi (Eds). Theory and application of Productivity and efficiency: Econometric and DEA Approach. Macmillan India Limited.
- Rudra, A (1973). Direct Estimation of Surplus Labour in Agriculture, Economic and Political Weekly, 8 (Annual Number)

- Sen, A. K. (1966). Peasants and Dualism with or without Surplus Labor. Journal of Political Economy, 74(5), 425–450.
- Sengupta, A., Datta, S. K., & Mondal, S. (2009). Gendering Disguised Unemployment : A Study of Informal Service Sector in India. Sarvekshana, 29(95), 20–39.
- Sengupta, A., Datta, S. K., & Mondal, S. (2011). Male Female Quality Differential in Informal Service Sector : A State Level Study from India. Indian Economic Review, 46(1), 153–176. http://www.jstor.org/stable/23266421
- Varian, H.R. (1984). *Microeconomic Analysis.*(2nd Ed). W.W Norton and Company, New York.
- Wonnacott, P. (1962). Disguised and Overt Unemployment in Underdeveloped Economies. The Quarterly Journal of Economics, 76(2), 279–297.

Appendix:

Table 1: Zone-wise average disguised unemployment rate for Rural sector (%) in 67th round

zone	OAE	ESTA	Total
1	15.05	32.65	23.85
2	21.16	25.10	23.13
3	16.44	4.61	10.53
4	20.00	8.30	14.15
5	41.18	11.03	26.10
Total	23.87	18.15	21.01

Source: Author's calculation from 67th Round NSSO Data

Table 2: Zone-wise average disguised unemployment rate for Urban sector (%) in 67th round

zone	**OAE**	**ESTA**	**Total**
1	26.96	20.38	23.67
2	12.15	20.57	16.36
3	9.84	5.92	7.88
4	23.79	12.10	17.94
5	41.94	6.53	24.24
Total	**22.23**	**13.93**	**18.08**

Source: Author's calculation from 67th Round NSSO Data

Table 3: Zone-wise average disguised unemployment rate for Rural sector (%) in 73rd round

zone	**OAE**	**ESTA**	**Total**
1	15.84	21.12	18.48
2	21.01	23.67	22.34
3	34.28	0.00	17.14
4	27.51	31.46	29.49
5	26.74	27.73	27.24
Total	**23.98**	**22.82**	**23.40**

Source: Author's calculation from 73rd Round NSSO Data

Table 4: Zone-wise average disguised unemployment rate for Urban sector (%) in 73rd round

zone	OAE	ESTA	Total
1	7.96	18.91	13.43
2	18.97	42.34	30.65
3	15.35	32.69	24.02
4	14.74	44.89	29.82
5	25.48	29.42	27.45
Total	17.36	34.80	26.08

Source: Author's calculation from 73rd Round NSSO Data

Endnotes:

1. C. H. C. Kao, K. R. Anschel and C. K. Eicher, "Disguised Unemployment in Agriculture: A Survey", in C. K. Eicher and L. W. Witt (eds.), Agriculture in Economic Development, New York, 1964.