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Occupational Segregation within the Tertiary Sector

Dyuti Chatterjee*

Abstract

Female employment in India has always been less than its male counterpart. Female labour participation in the country is one of the lowest in South-East Asia. The economic reforms of the 1990's raised the hope of better employment opportunities for women with the rise of new services like IT, BPO and expansion of existing services like education and health. However, though liberalization did see an improvement in the educational levels of women, there was not much change in terms of employment of women. The Tertiary sector which is a heterogeneous sector attracts a high percentage of female main and marginal workers. The paper looks at the occupational segregation prevalent in the tertiary sector. It also measures the level of segregation across the different states of the country. The paper concludes that despite the increase in educational levels, women are still concentrated in care given services. Also, occupational segregation seems to be independent of the economic growth or development of a state. The paper recommends change in policies regarding education and skill training so that more women can enter the different avenues of employment within the tertiary sector.

Keywords :Liberalization, Tertiary sector, Female employment, Occupational pattern, Segregation

JEL Classification: J01, J16, J24

1. Introduction

The occupation of a person refers to the type of work performed by an individual from which the person earns. Segregation of the labour market occurs when there is division of the labour market in terms of any characteristic such as gender, race etc. Occupational segregation refers to the distribution of gender of workers in any occupation. Generally, men's and women's jobs differ across occupations. While these differences have slowly reduced over time, it has not been enough to reduce the occupational segregation. It is difficult to state whether occupational segregation leads to social inequality or vice versa. It can be said rather that the two tend to reinforce each other.

Occupational segregation can be explained from the perspective of both demand and supply. From the demand side, occupational segregation occurs because employers often

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prefer to hire men over women in key positions which require long duty hours or extensive travel. Women with heavier household work are more likely to be employed as self-employed, unpaid family work. Similarly, from the supply side, the number of women suited for a job is less because women with that required qualification is less. Women in general tend to avoid technical lines and opt for general lines where the opportunity for jobs is less.

Occupational segregation can be of two types- horizontal and vertical. Horizontal segregation occurs due to the difference in representation of female and male members among different occupations. Vertical segregation on the other hand refers to the representation of workers based on hierarchical order in terms of attributes like income, position etc. in an organisation.

Objectives

- To analyse the occupational segregation within the tertiary sector
- To compare the pattern of occupational segregation within the tertiary sector for the years 2001 and 2011.
- To measure the level of occupational segregation within the tertiary sector for the different states of the country.

II.A Review of Literature

The problem of occupational segregation have attracted the attention from researchers all over the world from a long time.Standing (1999) claimed that globalisation has led to a convergence of male and female patterns of workforce participation. However, the flow of female labour has not reduced gender segregation. It is generally assumed that greater the level of women empowerment in country, lower would be the level of segregation. However, evidence shows that countries with higher GDP, the rich industrialised nations have a greater degree of segregation than the developing countries. Anker (1998), Blackburn and Jarman (2000) measured segregation in occupations for different countries and found substantial evidence to support this.

Unfortunately, there has not been much research on occupational segregation in India except the work done by the likes of Anker (1998), Swaminathan and Singh (2006),Upal (2007), Chakraborty and Bharati (2013). Eapen (2004) puts forward his view that horizontal segregation measured by the index of dissimilarity has declined during the period 1987/88 – 1993/94 in urban areas but increased slightly in the rural areas. Women are more mobile between establishments without achieving any upper mobility in terms of status i.e. horizontal segregation is relatively low than vertical segregation in India. Eapen argues that in order to consider the social context in which ‘appropriate’ work for women, their own preferences become important. The case in point is Kerala where women choose to

opt of the workforce if they do not get jobs according to their preferences. This leads to gender stereotyping. This is a departure from usual cases where occupational choices are involuntary. Anker (1998) and Swaminathan and Singh (2006) confirmed that the level of segregation in India was lower compared to other countries. Upal (2007) found a U- shaped segregation pattern in unorganised manufacturing sector using NSSO data over different years. Uppal pointed out that the overrepresentation of women in part time and unpaid jobs in this sector has led to feminisation of poverty. Chattopadhyay and Chattopadhyay (2012) investigated the occupational segregation in the districts of rural West Bengal and its impact on the development of these regions in terms of demography, wealth, education and labour market characteristics. The paper reveals that the region with higher level of segregation has a higher intensity of poverty and the poverty gap is statistically significant. The difference is more pronounced with respect to variables like educational status and labour market characteristics.

II. Research Gap and need of the study

Women play a crucial role in the economic development of a country. The economic wellbeing of women is directly related to the employment of women. Most of the literature on female employment in India focuses on the issue of lower female participation. Not much has been discussed on how liberalisation has affected the composition of the workforce distribution of women workers. Again, the relation between the human development of a state has not been linked to its female employment. The existing paper is a modest attempt in this path. The tertiary sector has a huge potential to absorb female labour provided it is able to match demand with supply. For a country like India, where higher growth co-exists with accentuation of social problems like inequality and unemployment, the tertiary sector is the ideal platform to promote higher female labour participation

Data source and methodology

The paper is based on secondary data. Data has been used from the Economic Tables of Census 2011. The Census 2011 identifies nine occupational divisions at the one-digit level. At the two-digit level there are ninety-three occupational divisions.

Occupational classification at one-digit and two-digit level: -

Division	Sub- division	Description
1		Legislators, Senior Officials and Managers
	11	Legislators and Senior Officials
	12	Corporate Managers
	13	General Managers

2	21	Professionals Physical, Mathematical and Engineering Science Profes-sionals
	22	Life Science and Health Professionals
	23	Teaching Professionals
	24	Other Professionals
3	31	Technicians and Associate Professionals .Physical and Engineering Science Associate Professionals
	32	Life Science and Health Associate Professionals
	33	Teaching Associate Professionals
	34	Other Associate Professionals
4	41	Clerks Office Clerks
	42	Customer Services Clerks
5		Service Workers and Shop & Market Sales Workers
	51	Personal and Protective Service Workers
	52	Models, Salesperson and Demonstrators
6		Skilled Agricultural and Fishery Workers
	61	Market Oriented Skilled Agricultural and Fishery Workers
	62	Subsistence Agricultural and Fishery Workers
7	71	Craft and related Trades Workers Extraction and Building Trades Workers
	72	Metal, Machinery and Related Trades Workers
	73	Precision, Handicraft, Printing and Related Trades Workers
	74	Other Craft and Related Trades Workers
8	81	Plant and Machine Operators and Assemblers Stationary-Plant and Related Operators
	82	Machine Operators and Assemblers
	83	Drivers and Mobile Plant Operators
9		Elementary Occupations

	91	Sales and Service Elementary Occupations
	92	Agricultural, Fishery and Related Laborer's
	93	Laborers in Mining, Construction, Manufacturing and Transport
x	X0	Workers not Classified by Occupations New Workers Seeking Employment
	X1	Workers Reporting Occupations Unidentifiable or Inadequately Described
	X9	Workers Not Reporting Any Occupations

Source- NSSO, 68th round of Employment and Unemployment Survey

The states have been classified under six zones for the ease of classification. The zones and the states have been shown below -

i. North-Jammu& Kashmir, Uttar Pradesh, Uttarakhand, Punjab, Haryana, Himachal Pradesh

ii. South-Kerala, Tamil Nadu, Karnataka, Andhra Pradesh

iii. East-West Bengal, Bihar, Orissa, Jharkhand

iv. West- Rajasthan, Gujarat, Maharashtra, Goa.

v. Central-Chattisgarh, Madhya Pradesh

vi. North East-Sikkim, Assam, Tripura, Nagaland, Meghalaya, Manipur, Mizoram & Arunachal Pradesh

To measure the occupational segregation, two types of formulas have been used.

i. The Hutchens' square root index (SQRI). The Hutchen's index is defined as

$$SQRI = 1 - \sum_{i=1}^{n} f_i m_i 1 - \sum_{i=1}^{n} f_i m_i \quad \text{(Hutchens,2004)}$$

ii. The Duncan's Dissimilarity Index (DDI). The Duncan's index is defined as

$$DDI = \frac{1}{2}\sum_{i=1}^{n} | f_i - m_i | \frac{1}{2}\sum | f_i - m_i | \quad \text{(Duncans, 1955)}$$

fi= proportion of female workers in i^{th} occupation of the tertiary sector

mi= proportion of male workers in i^{th} occupation of the tertiary sector

n= Number of occupations

The value of both the DDI and the SQRI ranges from 0 to 1. A value of 0 means no segregation while a value of 1 means complete segregation.

Empirical results

Table 1 looks at the occupational classification of female workers within the tertiary sector for the years 2001 and 2011. It is observed that the occupations – Craft and related trade workers (7) and plant and machine Operators (8) employ the lowest percentage of women irrespective of rural and urban areas in both 2001 and 2011. This shows how ill-equipped women are to enter these occupations as they do not have proper technical knowledge. The major occupations in the rural areas for 2001 were Technicians and Associate professionals, Service workers and shop owners and elementary occupations. Among these occupations, maximum women were found as Service workers and shop owners. Service and sales workers provide personal services related to housekeeping, beauticians etc. Most occupations in this group require skills that can be accomplished using the first stage of secondary education. In urban areas most women were found in elementary occupations. Elementary occupations require simple and routine tasks which mainly require physical effort such as cleaning and sweeping. The reason that most women in the urban areas are found in elementary occupations are twofold. Firstly, women who work in the formal sector rely on these elementary workers to run their household. Owing to the demand of such workers, many women from rural and semi urban areas choose this as their occupation. Secondly, with their limited education, this is the best option for them to have a steady flow of cash. However, there is a shift in occupational tendency among women in 2011. In 2011, the highest percentage of women are found in the occupation- Technician and Associate Professionals. Technicians and associate Professionals perform mostly technical and related tasks and for this they require skills which are often not equivalent to university degrees. A most common example would be nurses and midwives in the rural areas. In the absence of new advanced subsector of the tertiary sectors, women are primarily occupied as Technicians and associate professionals. Again, with the increase in the level of education for women, women in the urban areas have moved one step ahead of elementary workers and moved in occupation of Technician and associate professionals. There are more women as Technicians and Associate Professionals in rural areas than in urban areas. An interesting point to note is that while the occupational of Clerks is one of the most common for women across the world the percentage of women clerks in India is very poor confirming the result of Chakraborty, S. and Bharati, S. (2013).

Table 1: Occupational classification of female workers in the-tertiary sector

	2001		2011	
Occupation	Rural	Urban	Rural	Urban
Legislators, senior officials, and managers	2.02	2.90	1.86	3.93
Professionals	9.98	14.88	5.56	12.05
Technicians and associate professionals	21.01	21.77	26.89	21.54
Clerks	2.74	9.08	1.91	6.37
Service workers and shop & market sales workers	25.53	17.02	19.11	15.26
Skilled agricultural and fishery workers	3.06	0.38	0.70	0.22
Craft and related trades workers	1.01	1.37	0.85	1.20
Plant and machine operators and assemblers	0.79	0.91	0.72	1.01
Elementary occupations	19.26	22.67	6.70	15.03
Workers not classified by occupations	14.60	9.02	35.70	23.40

** 1-digit classification. Source: Economic tables, B series, Table no 23 A, Census 2001, 2011

The Duncan's index of dissimilarity and Hutchens index have been written as DDI and SQRI henceforth. The DDI is the most widely used index. However, it is the SQRI which has been found to confirm all the desirable properties of a good index. Thus, the present analysis uses these two indices to explore the occupational segregation within the tertiary sector at the state and the zonal level. The union territories, capital Delhi has been kept out of the analysis. The value of DDI is found to be higher than the values of SQRI.

Table 2: Occupational segregation at one-digit level for the year 2001

Zone	**RURAL**		**URBAN**		**TOTAL**	
	DDI	**SQRI**	**DDI**	**SQRI**	**DDI**	**SQRI**
North Zone	0.363	0.095	0.388	0.107	0.380	0.085
North East Zone	0.305	0.066	0.330	0.089	0.310	0.088
East Zone	0.295	0.065	0.370	0.085	0.325	0.073
Central Zone	0.185	0.050	0.350	0.090	0.270	0.065

South Zone	0.310	0.092	0.360	0.095	0.340	0.093
West Zone	0.377	0.123	0.408	0.115	0.395	0.115

Source – Economic Table, B Series Table 23, Census 2001; Refer to A.6.2 in Appendix

Both DDI and SQRI showed that in 2001 the Western zone had the highest level of segregation while the Central zone had the lowest level of segregation in the rural areasAll the states from the Western zone showed high level of segregation. (Table 2) The Western Zone has the highest level of segregation according to both DDI and SQRI even in the urban areas. The Western zone derives its high value of segregation because of its two states – Rajasthan and Gujarat. Maharashtra fares better than these two states owing to a more developed rural region where the women are spread across different occupations. In both these two states, women suffer from lack of education and are therefore mainly restricted to agricultural activities. The North zone was also found to have high levels of segregation because of states like Punjab and Jammu & Kashmir which perform poorly compared to other states like Himachal Pradesh. While women in Punjab are mainly engaged in agricultural activities, the women in Jammu and Kashmir simply do not have much employment avenues to choose from. Thus, within zones also, there are segregation differences. The North East was found to have the lowest level of segregation according to the DDI and Eastern zone according to the SQRI in the urban areas. The fact that both the Central and the North Eastern region show low level of segregation could be because of the presence of significant tribal population in both these regions. The Central zone has low literacy rate. In areas where the level of education is low, male, and female workers both are engaged in low end occupations like agriculture, fishery, and elementary work. Thus, it has very low levels of segregation. (Chakraborty S,2016).

At the state level, Kerala has the highest levels of segregation in both rural and urban areas according to the SQRI while Gujarat has the highest levels of segregation in the rural areas according to the DDI .(Table 2.1) Kerala again has the highest segregation in the urban areas according to the DDI. Chattisgarh has the lowest segregation value in the rural areas according to DDI while Manipur along with some other states of the North East was found to have the lowest segregation according to the SQRI. Manipur also has the lowest segregation value in both the indices for the urban areas. It is to be noted that both Gujarat and Kerala fare much better than many others states of the country in terms of income or other development indicators. However, the female workforce participation rate in Gujarat has still been declining for some time from 43% in 2005 to 28% in 2011-12. Socially derived groups have poor education and are more involved in low paid marginal work. A primary survey found that convenience problem was one of the key reasons which held back educated women from working. (IAMR, 2013). Kerala on the other hand has been

a paradox to most economists since the state has the highest percentage of educated unemployment among women in the country. Kerala's case can be explained by the fact that education has imbibed in its women a strong preference for white collar jobs only. Apart from that, there are other conditions like work must be near home and it should align with the social stigma attached to a job for women. For states like Manipur where the social prejudice related to the working of the women is less, working outside home is easier. The fact that Manipur has a matriarchal society goes beyond the family to the market and its institutions where discrimination in women is less. Segregation in urban areas is more than rural areas for the zones according to the DDI and the SQRI. This is because compared to their rural counterparts, urban women are confined to selected occupation only. Rural women can work in occupations such as fishery, craft, and other related trade. The inter-regional and intra-regional differences in occupational segregation is thus the result of a mix of the level of patriarchy, the educational levels of women and the presence of job opportunities in the area.

Table2.1: Analysis of occupational segregation at one-digit level in 2001

2001							
Zone	**State**	**RURAL**		**URBAN**		**TOTAL**	
		DDI	**SQRI**	**DDI**	**SQRI**	**DDI**	**SQRI**
North	Jammu & Kashmir	0.41	0.10	0.44	0.12	0.46	0.13
	Himachal Pradesh	0.31	0.08	0.36	0.10	0.32	0.08
	Punjab	0.39	0.12	0.41	0.11	0.39	0.11
	Uttaranchal	0.36	0.09	0.39	0.12	0.38	0.10
	Haryana	0.31	0.10	0.38	0.11	0.4	0.01
	Uttar Pradesh	0.40	0.08	0.35	0.08	0.33	0.08
Avg		**0.363**	**0.095**	**0.388**	**0.107**	**0.38**	**0.085**

North East	Tripura	0.33	0.07	0.36	0.08	0.34	0.07
	Mizoram	0.21	0.04	0.22	0.07	0.2	0.06
	Manipur	0.25	0.04	0.13	0.02	0.2	0.03
	Sikkim	0.36	0.1	0.42	0.11	0.38	0.1
	Assam	0.37	0.09	0.44	0.12	0.38	0.09
	Meghalaya	0.24	0.04	0.28	0.12	0.25	0.04
	Nagaland	0.36	0.09	0.45	0.12	0.4	0.25
	Arunachal Pradesh	0.32	0.06	0.35	0.07	0.33	0.06
Avg		**0.305**	**0.066**	**0.33**	**0.089**	**0.31**	**0.088**
East	West Bengal	0.32	0.06	0.36	0.08	0.34	0.07
	Jharkhand	0.25	0.06	0.39	0.09	0.33	0.07
	Orissa	0.33	0.07	0.38	0.09	0.33	0.08
	Bihar	0.28	0.07	0.35	0.08	0.30	0.07
Avg		**0.295**	**0.065**	**0.37**	**0.085**	**0.325**	**0.073**
Central	Madhya Pradesh	0.19	0.05	0.35	0.09	0.29	0.07
	Chhattisgarh	0.18	0.05	0.35	0.09	0.25	0.06
Avg		**0.185**	**0.05**	**0.35**	**0.09**	**0.27**	**0.065**
South	Andhra Pradesh	0.29	0.08	0.34	0.08	0.31	0.08
	Karnataka	0.26	0.07	0.36	0.09	0.32	0.08
	Kerala	0.47	0.17	0.46	0.15	0.47	0.16
	Tamil Nadu	0.22	0.05	0.29	0.06	0.25	0.05
Avg		**0.31**	**0.092**	**0.36**	**0.095**	**0.34**	**0.093**
West	Goa	0.36	0.13	0.41	0.12	0.39	0.12
	Maharashtra	0.27	0.09	0.39	0.11	0.35	0.10
	Gujarat	0.48	0.17	0.4	0.11	0.42	0.13
	Rajasthan	0.40	0.10	0.43	0.12	0.42	0.11
Avg		**0.377**	**0.123**	**0.408**	**0.115**	**0.395**	**0.115**

Source- Economic Series, Table 23A, Census 2001

Both SQRI and DDI index were also calculated for the year 2011(Table 3). It was found that in 2011, the Eastern zone had the highest level of segregation according to the DDI and the SQRI in the rural areas. The North Eastern zone has the lowest level of segregation in both the rural areas according to both the indices. The Eastern zone also, shows the highest level of segregation in the urban areas according to the DDI index. This is because post 2001, segregation has increased for all the zones of the Eastern zone specially Bihar. However, according to the SQRI, the Southern zone has the highest level of segregation. The North Eastern zone shows the lowest level of segregation in the urban areas also in terms of DDI and SQRI. The occupational segregation indices for 2001 and 2011 show that the North Eastern zone fares better than the other zones in terms of occupational segregation. As far as the increase in occupational segregation of the Eastern zone is concerned, women in this region has failed to make inroads into the new avenues of employment. This is evident from the discussion in the previous chapter which showed that the pace of change in female employment in the Eastern zone was low in the era following liberalisation.

Table.3: Occupational segregation at one-digit level for the year 2011

Zone	RURAL		URBAN		TOTAL	
	DDI	**SQRI**	**DDI**	**SQRI**	**DDI**	**SQRI**
North Zone	0.446	0.168	0.405	0.143	0.422	0.150
North East Zone	0.338	0.126	0.350	0.116	0.340	0.121
East Zone	0.468	0.180	0.430	0.138	0.450	0.150
Central Zone	0.390	0.140	0.425	0.135	0.405	0.125
South Zone	0.428	0.168	0.418	0.145	0.420	0.150
West Zone	0.448	0.168	0.400	0.125	0.410	0.130

Source- Economic Series, Table 23A, Census 2011

Among the states, Punjab, Kerala, Rajasthan, and Gujrat possess high degrees of segregation. (Table 3.1) Punjab has the highest segregation according to DDI while Kerala has the highest segregation level according to SQRI in the rural and the urban areas. Though the North East has low segregation levels, there is significant amount of intraregional differences among them. For instance, Assam has high segregation values in both 2001 and 2011 while states like Mizoram and Meghalaya have low segregation values.

It is seen that the overall segregation has increased in 2011 as compared to 2001. This is because even though more women are joining the tertiary sector since 2001, they confine themselves to the same old occupations. Another interesting observation is that in 2001

segregation at the urban areas exceeded that of the rural areas. However, in 2011, the situation gets reversed with rural segregation becoming higher than urban segregation. This is because though in urban areas, women are entering new professions like IT, ITES, rural women are deprived from these opportunities. One important way of reducing segregation is thus to create adequate employment opportunities for women in the tertiary sector.

Table 3.1: Analysis of occupational segregation at one-digit level in 2011

2011							
Zone	**State**	**RURAL**		**URBAN**		**TOTAL**	
		DDI	**SQRI**	**DDI**	**SQRI**	**DDI**	**SQRI**
North	Jammu & Kashmir	0.35	0.14	0.4	0.15	0.35	0.14
	Himachal Pradesh	0.45	0.17	0.34	0.13	0.41	0.15
	Punjab	0.53	0.2	0.47	0.17	0.49	0.18
	Uttaranchal	0.44	0.16	0.38	0.14	0.41	0.14
	Haryana	0.44	0.16	0.41	0.14	0.41	0.14
	Uttar Pradesh	0.47	0.18	0.43	0.13	0.46	0.15
Avg		**0.446**	**0.168**	**0.405**	**0.143**	**0.422**	**0.15**
North East	Tripura	0.4	0.19	0.44	0.16	0.41	0.17
	Mizoram	0.28	0.11	0.39	0.13	0.36	0.12
	Manipur	0.32	0.1	0.28	0.09	0.31	0.12
	Sikkim	0.36	0.13	0.31	0.11	0.31	0.12
	Assam	0.49	0.2	0.44	0.16	0.47	0.18
	Meghalaya	0.26	0.1	0.3	0.1	0.25	0.09
	Nagaland	0.37	0.11	0.33	0.1	0.35	0.1
	Arunachal Pradesh	0.23	0.07	0.31	0.08	0.26	0.07
Avg		**0.338**	**0.126**	**0.35**	**0.116**	**0.34**	**0.121**
East	West Bengal	0.48	0.20	0.44	0.14	0.45	0.16
	Jharkhand	0.44	0.15	0.40	0.13	0.42	0.13
	Orissa	0.45	0.19	0.42	0.14	0.43	0.16
	Bihar	0.5	0.18	0.46	0.14	0.50	0.17

Avg		**0.468**	**0.18**	**0.43**	**0.138**	**0.45**	**0.15**
Central	Madhya Pradesh	0.43	0.18	0.42	0.13	0.41	0.14
	Chhattisgarh	0.35	0.10	0.43	0.14	0.40	0.11
Avg		**0.39**	**0.14**	**0.425**	**0.135**	**0.405**	**0.125**
South	Andhra Pradesh	0.39	0.14	0.4	0.12	0.39	0.12
	Karnataka	0.44	0.17	0.4	0.13	0.41	0.14
	Kerala	0.48	0.21	0.46	0.19	0.47	0.20
	Tamil Nadu	0.40	0.15	0.41	0.14	0.40	0.14
Avg		**0.428**	**0.168**	**0.418**	**0.145**	**0.42**	**0.15**
West	Goa	0.38	0.13	0.37	0.12	0.37	0.12
	Maharashtra	0.46	0.16	0.36	0.10	0.37	0.11
	Gujarat	0.47	0.18	0.43	0.14	0.44	0.15
	Rajasthan	0.48	0.20	0.44	0.14	0.46	0.15
Avg		**0.448**	**0.168**	**0.400**	**0.125**	**0.41**	**0.13**

Source- Economic Series, Table 23A, Census 2011

For the 2-digit level in 2001 the highest occupational segregation was found in the Western zone for both the DDI and SQRI respectively for the rural areas. (Table 4) The North zone was again found to have the highest segregation in the urban areas according to both the indices. The Central zone again was found to have the lowest level of segregation following both the indices in the rural areas while the North East had the lowest segregation in the urban areas according to both the indices. It is seen that the segregation is higher than rural areas.

Table 4: Occupational segregation at the two-digit level for the year 2001

Zone	RURAL		URBAN		TOTAL	
	DDI	**SQRI**	**DDI**	**SQRI**	**DDI**	**SQRI**
North Zone	0.42	0.14	0.47	0.18	0.44	0.14
North East Zone	0.39	0.12	0.40	0.13	0.39	0.11
East Zone	0.40	0.12	0.45	0.14	0.41	0.12
Central Zone	0.31	0.09	0.42	0.14	0.35	0.10

South Zone	0.39	0.13	0.42	0.15	0.40	0.14
West Zone	0.43	0.16	0.46	0.17	0.44	0.15

Source: Economic tables, Table 23, census 2001

States like Kerala, Gujrat are found to have high levels of segregation at the two-digit level. (Table 4.1) It is observed that the segregation value also increases from one-digit digit level in 2001 to two-digit level in 2011. However, there is not much change in pattern at the state level as one moves from one digit to the two-digit level.

Table4.1: Occupational segregation at the two-digit level for the year 2001

2001							
Zone	**State**	**RURAL**		**URBAN**		**TOTAL**	
		DDI	**SQRI**	**DDI**	**SQRI**	**DDI**	**SQRI**
North	Jammu & Kashmir	0.50	0.15	0.52	0.20	0.50	0.16
	Himachal Pradesh	0.42	0.14	0.44	0.17	0.38	0.14
	Punjab	0.42	0.19	0.50	0.20	0.49	0.14
	Uttaranchal	0.39	0.13	0.47	0.18	0.43	0.15
	Haryana	0.41	0.14	0.47	0.20	0.43	0.16
	Uttar Pradesh	0.40	0.12	0.43	0.14	0.41	0.12
Avg		**0.42**	**0.14**	**0.47**	**0.18**	**0.44**	**0.14**
North East	Sikkim	0.42	0.14	0.47	0.15	0.41	0.14
	Arunachal Pradesh	0.34	0.08	0.38	0.10	0.35	0.08
	Nagaland	0.40	0.13	0.49	0.16	0.43	0.14
	Manipur	0,42	0.12	0.26	0.06	0.36	0.09
	Mizoram	0.41	0.13	0.45	0.16	0.43	0.15
	Tripura	0.36	0.10	0.42	0.14	0.39	0.11
	Meghalaya	0.36	0.09	0.30	0.08	0.31	0.08
	Assam	0.43	0.12	0.47	0.16	0.44	0.13
Avg		**0.39**	**0.12**	**0.40**	**0.13**	**0.39**	**0.11**

East	Bihar	0.36	0.11	0.43	0.13	0.38	0.11
	West Bengal	0.44	0.13	0.48	0.16	0.45	0.14
	Jharkhand	0.40	0.11	0.44	0.15	0.41	0.12
	Orissa	0.39	0.13	0.46	0.14	0.41	0.12
Avg		**0.40**	**0.12**	**0.45**	**0.14**	**0.41**	**0.12**
Central	Chhattisgarh	0.31	0.08	0.43	0.14	0.36	0.10
	Madhya Pradesh	0.31	0.09	0.42	0.14	0.35	0.10
Avg		**0.31**	**0.09**	**0.42**	**0.14**	**0.35**	**0.10**
South	Andhra Pradesh	0.37	0.12	0.41	0.13	0.39	0.12
	Karnataka	0.31	0.10	0.40	0.13	0.36	0.11
	Kerala	0.52	0.22	0.51	0.21	0.52	0.21
	Tamil Nadu	0.35	0.10	0.35	0.11	0.35	0.10
Avg		**0.39**	**0.13**	**0.42**	**0.15**	**0.40**	**0.14**
West	Rajasthan	0.44	0.14	0.50	0.17	0.47	0.14
	Gujarat	0.53	0.21	0.47	0.17	0.50	0.18
	Maharashtra	0.35	0.12	0.43	0.15	0.39	0.13
	Goa	0.41	0.17	0.45	0.17	0.43	0.17
Avg		**0.43**	**0.16**	**0.46**	**0.17**	**0.44**	**0.15**

Source: Economic tables, Table 23, census 2001

Occupational segregation measured at the two-digit level in 2011 shows that the highest level of segregation is found in the Eastern region according to both the indices in the rural areas. (Table 5) The lowest segregation on the other hand is found in the North Eastern region according to both the DDI & SQRI index for both rural as well as urban areas.

The Duncan's index shows that segregation has increased in the rural areas whereas it has mainly decreased in the urban areas. Similarly, while in 2001 the Western states had in general the highest level of segregation, in 2011, it had shifted to the Eastern states. This is because the segregation level had increased in all the Eastern states in 2011.Among the states, Punjab was found to have the highest segregation for both the rural and urban areas according to the DDI index whereas Kerala has the highest segregation in both rural and urban areas according to the SQRI. (Table 5.1)Arunachal Pradesh has the lowest segrega-

tion in rural areas according to both the indices.

For most of the zones, the level of segregation is found to increase in 2011 in the rural areas at the 2-digit level whereas for the urban areas either it is found to remain constant or decrease. This is because with the higher levels of education, women of the urban areas are slowly making their foray into new territories. However, owing to their lack of skills, adequate levels of education as well as the lack of employment opportunities, women in the rural areas are still stuck into old existing professions

Table 5: Occupational segregation at the two-digit level for the year 2011

Zone	RURAL		URBAN		TOTAL	
	DDI	SQRI	DDI	SQRI	DDI	SQRI
North Zone	0.45	0.17	0.41	0.14	0.42	0.15
North East Zone	0.34	0.13	0.35	0.12	0.34	0.12
East Zone	0.47	0.18	0.43	0.14	0.45	0.16
Central Zone	0.39	0.14	0.43	0.14	0.41	0.13
South Zone	0.43	0.17	0.42	0.15	0.42	0.15
West Zone	0.45	0.17	0.40	0.13	0.41	0.14

Source: Economic tables, Table B 23 A, Census 2011 Refer to A.6.5 in Appendix

It was found that the margin between the states having the highest level of segregation and the lowest level of segregation has reduced from 2001 to 2011.The SQRI index shows that in general the rural segregation level is higher than the urban segregation level. It is seen that the North East has continued to have the low level of segregation over the years. The implication of occupational segregation in the states is difficult to interpret in a way. However, it can be said women in those states which have high segregation have not diversified in the different occupations as their male counterparts post liberalisation. Women have continued to cluster in occupations where they used to be occupied earlier, leading to stereotyped occupations for females. This has affected the overall balance of the labour market giving rise to wage discrimination between female dominated occupations and male dominated occupations. Thus, high levels of segregation can be an impediment for the overall welfare of women workers in the long run. Unfortunately, in India, states with low levels of segregation cannot be said to be the epitomes of beneficiaries of liberalisation either. This is because most of the states which have low segregation do not have much job opportunities. In the absence of the expansion of the new, modern technology driven sectors, men, and women crowd over whatever job opportunities they have. Occupational segregation for a country like India is thus different from other developed countries and

needs to be addressed with proper care and caution.

Table 5.1: Occupational segregation at the two-digit level for the year 2011

Zone	State	RURAL		URBAN		TOTAL	
		DDI	**SQRI**	**DDI**	**SQRI**	**DDI**	**SQRI**
North	Jammu & Kashmir	0.35	0.14	0.4	0.15	0.35	0.14
	Himachal Pradesh	0.45	0.17	0.34	0.13	0.41	0.15
	Punjab	0.53	0.2	0.47	0.17	0.49	0.18
	Uttaranchal	0.44	0.16	0.38	0.14	0.41	0.14
	Haryana	0.44	0.16	0.41	0.14	0.41	0.14
	Uttar Pradesh	0.47	0.18	0.43	0.13	0.46	0.15
Average		**0.45**	**0.17**	**0.41**	**0.14**	**0.42**	**0.15**
North East	Tripura	0.4	0.19	0.44	0.16	0.41	0.17
	Mizoram	0.28	0.11	0.39	0.13	0.36	0.12
	Manipur	0.32	0.1	0.28	0.09	0.31	0.12
	Sikkim	0.36	0.13	0.31	0.11	0.31	0.12
	Assam	0.49	0.2	0.44	0.16	0.47	0.18
	Meghalaya	0.26	0.1	0.3	0.1	0.25	0.09
	Nagaland	0.37	0.11	0.33	0.1	0.35	0.1
	Arunachal Pradesh	0.23	0.07	0.31	0.08	0.26	0.07
Average		**0.34**	**0.13**	**0.35**	**0.12**	**0.34**	**0.12**
East	West Bengal	0.48	0.2	0.44	0.14	0.45	0.16
	Jharkhand	0.44	0.15	0.4	0.13	0.42	0.13
	Orissa	0.45	0.19	0.42	0.14	0.43	0.16
	Bihar	0.5	0.18	0.46	0.14	0.5	0.17
Average		**0.47**	**0.18**	**0.43**	**0.14**	**0.45**	**0.16**
Central	Madhya Pradesh	0.43	0.18	0.42	0.13	0.41	0.14
	Chhattisgarh	0.35	0.1	0.43	0.14	0.4	0.11
Average		**0.39**	**0.14**	**0.43**	**0.14**	**0.41**	**0.13**

South	Andhra Pradesh	0.39	0.14	0.4	0.12	0.39	0.12
	Karnataka	0.44	0.17	0.4	0.13	0.41	0.14
	Kerala	0.48	0.21	0.46	0.19	0.47	0.2
	Tamil Nadu	0.4	0.15	0.41	0.14	0.4	0.14
Average		**0.43**	**0.17**	**0.42**	**0.15**	**0.42**	**0.15**
West	Goa	0.38	0.13	0.37	0.12	0.37	0.12
	Maharashtra	0.46	0.16	0.36	0.1	0.37	0.11
	Gujarat	0.47	0.18	0.43	0.14	0.44	0.15
	Rajasthan	0.48	0.2	0.44	0.14	0.46	0.16
Average		**0.45**	**0.17**	**0.4**	**0.13**	**0.41**	**0.14**

Source: Economic tables, Table B 23 A, Census 2011

IV.Conclusion

Occupational segregation is one of the key problems for the Indian labour market along with poor female workforce participation. In 2001, most women were found as Service workers in the rural areas whereas in urban areas most of them were found in elementary occupation. But in 2011, maximum women are found to be engaged as Technicians and Associate Professionals in both rural and urban areas. This is because with the increase in educational level of young women, they have shifted to occupations which pay more and have greater prestige. So, there has been a shift in the occupational pattern of female workers in the tertiary sector in 2011 from 2001. Craft and related trade workers and Plant, machine operators and assemblers continue to have very low percentage of female workers in both 2001 and 2011 owing to the poor technical skills of women workers. In order to measure the segregation level across the regions, the DDI and the SQRI occupational segregation index were calculated at the one digit and two-digit level.

The analysis at the one-digit level reveals that both DDI and SQRI showed that in 2001 the Western zone has the highest level of segregation. However, in 2011, both DDI and SQRI showed the Eastern zone to have the highest level of segregation in the rural area. For the urban areas, the DDI also showed the Eastern zone to have the highest level of segregation while the SQRI showed the South to have the highest segregation. The increase in occupational segregation for the Eastern zone was due to the fact there has not been much opening for female workers in the tertiary sector post 2004-05. The Central was found to have the lowest segregation in the rural areas in 2001 while the North-Eastern zone had

the lowest level of segregation in the urban areas. The North East also has the lowest segregation in both rural and urban areas according to both the indices in 2011at the one digit as well as the 2-digit level. The low level of segregation for the Central zone is because of the fact that owing to poor educational qualifications male and female workers are equally concentrated in low end jobs like agriculture, fishing, and elementary duties. The North East on the other hand has low occupational segregation on the basis of its matriarchal society. Thus, there has also been a clear shift in the pattern of occupational segregation at the zonal level from 2001 to 2011.

Among the states, Kerala despite having the best socio-economic indicators in the country has one of the highest levels of occupational segregation. Similarly, Gujarat, which is one of the most economically developed states of the country has high levels of segregation. This shows that occupational segregation can persist despite an increase in the educational level or income level. Again, despite poor economic conditions and infrastructure, the North Eastern states have the low levels of occupational segregation owing to their matriarchal society where women are not discriminated from men as such. Overall segregation has increased in 2011 compared to 2001 at the one-digit level. At the two-digit level, the SQRI shows that total segregation has increased for all the zones. To sum up the differences in the socio-economic background of the states ranging from their patriarchal framework to the presence of job opportunities for women in that state all lead to inter regional and intra-regional occupational segregation.

Recommendations

Firstly, the tertiary sector needs to penetrate further into the interiors of the country so that women can find employment opportunities in banking, ITES in rural areas as well.

Secondly, he education of women must be linked keeping in mind the needs of the market. For this vocational training can be introduced at the school and college level

Women also need to be aware of the career choices available to them and for this career counselling is necessary at the school level itself.

Lastly, better infrastructure can go a long way in increasing the employment of women in the tertiary sector. Basic infrastructure like sanitation, water and electricity facility can directly change the lives of women specially those from the rural areas.

Limitation

The paper is based on the 2011 Census. Thus,recent development on female employment could not be captured due to lack of current data. Moreover,for occupational segregation, data at the one digit and the two-digitlevel have been considered since data for the tertiary sector was not available for three- and four-digitlevel. Further disaggregation could have added more information in the analysis.

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Efficiency of Indian Pharmaceutical Industry: A Non-Parametric Approach

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Abstract

Several measures were adoptedto encourage the growth of Indian pharmaceutical industry (IPI). The Product Patent Act in 2005, significantly altered the business environment. The present paper is an attempt to estimate Technical efficiency (TE) and to find out its enhancing factors employing firm level panel data for the period 2000-01 to 2015-16. Output oriented Technical efficiency measure employing Data Envelopment Analysis and Panel Regression are used to achieve these objectives. It is found that TE is more in Post product regime compared to the Pre product regime. The changed patent law in India is not detrimental to the performance of IPI. The efficiency scores also indicated that about 68% firms are enjoying above average TE. It is determined that Research and Development Intensity, Market Share and Advertisement Intensity are the enhancing factors of TE. Along with it, increase in import relative to export may be favourable for efficiency in IPI. The industry is able to suitably modify the production process thereby increasing TE to cope up with the changed legal environment.

Keywords: Indian Pharmaceutical Industry, Technical efficiency, Data Envelopment Analysis, Product patent

JEL Classification:C02, C61, D220, L65

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I. Introduction

India is a prominent and rapidly growing presence in global pharmaceuticals.The industry, in addition to meeting the domestic demand, is in a position to export significant volume of pharmaceutical products to various destinations. Indian companies carved a niche in both the Indian and world markets with their expertise in reverse-engineering new processes for manufacturing drugs at low costs which is the advantage for industry. The Government started to encourage the growth of drug manufacturing by Indian companies in the early 1960s, and with the Patents Act in 1970.

Several measures were undertaken by the Government of India to encourage the growth of Indian pharmaceutical industry (IPI). The economy has started to open up to the foreign market, both qualitatively and quantitatively through trade-liberalization to strengthen competition among firms of different industries. In fact, the open market competition puts challenges before different domestic firms in regard of their endurance. In the presence of foreign competition in the domestic market, the less efficient firms may exit the market and the reallocation of market shares towards the more efficient exporting firms may increase the efficiency of the industry as a whole. Thus, to achieve growth in production and for mere survival, a producing unit has to operate efficiently. Along with it, provision of pharmaceutical goods at an affordable price is a major concern. Thus it is meaningful to measure efficiency of IPI which will be helpful for academics and policy.

Efficiency can be categorised into Technical Efficiency (TE) and Allocative efficiency (AE). Again TE can be output oriented or input oriented type.The present paper is concerned withthe estimation of output-oriented TE of IPI and to find out the factors which are responsible for the variation in TE scores.The literature suggests different ways of estimating TE: Parametric (Stochastic Frontier Production Function Approach) or Non parametric approach (Data Envelopment Analysis).The present paper tries to estimate Output oriented TE by using DEA Approach considering each firm as a producing unit.

The performance of Indian Pharmaceutical industry is not uniform across firms as each firm has its own characteristics that persuade the growth and performance of that particular firm. Thus for appropriate policies towards reduction of disparities at the firm level, it is important to have an idea regarding the firms which are lagging behind and appropriate policies can be taken to improve the TE level of those firms. Therefore, one should have knowledge about the TE scores of different firms. Thus there are good reasons to look at the TE of IPI using firm level data.To achieve steady growth over the years, along with the measurement of TE, it is also necessary to explain the factors behind the variation in TE.

Given this background, the objectives of the present paper are to measure the Output oriented TE employing DEA approach considering each firm as a decision making unit

and explains the possible sources of variation of such efficiency score taking into accountResearch and Development intensity, market share, advertisement intensity and net export intensity as possible determinants.The justification for inclusion of the above explanatory variables are as follows:

Research and Development on one hand generates new technologies and, on the other hand, it enhances a firm's ability to exploit existing technology. Different studies considered Research and Development as the determinant of efficiency (Mazumder et al. (2010), Kumbhakar et al. (2009), Driffled and Kambhampti (2003) among others. It can be hypothesized that highermarket share will be more efficient because of the presence of threshold limit in production, scale economies, imperfection in capital market (Kumar, 2003). However, beyond a certain limit higher market power may also plague the firm with X-inefficiency (Leibenstein, 1976) which may lead to lower efficiency. Advertisement introduces new product in the market easily, increases sales and fights market competition. Linkages between advertising intensity and technical efficiency are due to Carod and Blasco (2005), Goldar et al. (2004) among others. Also the role of trade related variables in explaining variation of TE has been examined by taking net export intensity as a possible determinant along with the above mentioned variables.

Rest of the chapter is as follows:Section 2 discusses the survey of literature. methodology and data source are discussed in Section 3. In subsection 3.1 the methodology for estimation of technical efficiency by using DEA approach is discussed. For finding out the determinants of TE employing Panel regression is discussed in subsection 3.2. Data Sources are discussed in 3.3. Section 4 presents the results of estimation elaborately and some concluding remarks are made in Section 5.

II. Literature Review

There are some studies on TE of IPI due to Majumder (1994), Saranga and Phani (2003), Chaudhuri and Das (2006), Saranga (2007), Majumdar and Rajeev (2009), Mazumdar, Rajeev and Ray (2010), Fujimori et. al. (2010), Mahajan, Nauriyal and Singh (2014, 2018), Alamand Rastgi (2019)among others.

Majumder (1994) examined input-oriented efficiency using DEA of a small number of pharmaceutical companies, had studied the capabilities and resource utilisation of nine large firms from the period 1987 to 1990 and inferred that the private sector firms are more efficient as compared to the public sector firms. Saranga and Phani (2003) gave an overview on cost efficiency using DEA on a sample of 44 listed companies that have survived in the past one-decade, to determine the best practices if any in the Indian Pharmaceutical Industry. They concluded that irrespective of the growth strategies adopted by the individual firms, internal efficiencies played an important role in the survival and growth of these

firms over the last one decade.Saranga (2007) employed DEA to measure input oriented efficiency of a sample of 44 firms from the Indian pharmaceutical industry.Majumdar and Rajeev (2009) examined the technical efficiency, technological gap ratio and productivity change of Indian pharmaceutical firms across different groups, formed on the basis of their size, strategies and product varieties and indicated that vertically integrated firms that produce both bulk drug and formulation exhibit higher technological innovation and efficiency. Also the study revealed that increased export earnings do not necessarily lead to higher efficiency and that installing capital-intensive techniques or imported technology propel the technological growth of firms.Mazumdar, Rajeev and Ray (2010) made a study on technical efficiency for the period 1991 to 2005 of IPI and found a negative trend for the output efficiency levels of firms and the evidence of efficient use of labour and raw material. They also found that research and development, export expenditure and use of imported technology played a negative role in improving the Technical Efficiency of firms. Saranga and Banker (2010) studied the productivity change using DEA and factors driving this change in the Indian pharmaceutical industry during 1994-2003, in the backdrop of economic liberalization and change in regulatory norms.Mahajan, Nauriyal and Singh (2014), for large Indian pharmaceutical firms according to ownership, measured the technical efficiency, super efficiency, slacks, and input/output targets by applying DEA approach. They found that mean overall technical efficiency scores of Private Indian and Private Foreign firms are higher than Group-owned firms and suggested that type of ownership affects the performance of a given firm. Further they pointed out that foreign firms have minimum slacks in inputs, evidently owing to their superior technology, better engineering skills and managerial practices. Mahajan, Nauriyal and Singh (2018) determined the efficiency of Indian pharmaceutical firms and its determinants in the pre- and post-product patent regime and found that the Product Patent Act has a negative impact on efficiency. Ownership, capital imports intensity and size variables are positively related with efficiency scores whereas age, time dummy and size square variables are inversely related. The study supports the finding that with an increase in mergers and acquisitions, a movement towards diversifying operations, the use of advanced imported foreign technology, investment in fixed assets and judicious allocation of resources for marketing activities could improve firm performance. Alamand Rastgi (2019) using DEA assessed the efficiency of five Indian Pharmaceutical companies and suggested that the industry were efficient in utilizing their resources to produce all the defined outputs. The results are indicative of the scenario that changed patent laws in India are not detrimental to the financial and overall health of Indian Pharmaceutical companies in general.

Whereas Chaudhuri and Das (2006) differs from the other studies in that they use the parametric Stochastic Frontier Analysis (SFA) to measure output efficiency of the Indian pharmaceutical sector exploring firm level data for the period 1990 to 2001 and concluded

that the mean efficiency score of the industry had improved over the sub–period 1999 to 2001 against the sub-period 1990-1998 and large sized firms exporting more of their product in the international market have improved their efficiency. Also Fujimori et. al. (2010), using data of small scale IPI, estimated stochastic frontier production function and found that the small scale pharmaceutical industries (SSPI) have inefficiency in their production activity. They further showed the evidence that the SSPI supporting policy improves the TE in some extent.

III. Data and Methodology

III.1. Measurement of Efficiency

Technical efficiency can either be Input oriented or Output oriented. In case of output oriented measure, the TE of a firm can be computed by comparing its actual output with the maximum producible quantity from its observed inputs i.e. by how much can output quantities be proportionally expanded without altering the inputs quantities used. In input oriented measure, the TE of a firm can be measured by comparing its actual input in use with the minimum input that would produce the targeted output level i.e. by how much can input quantities be proportionally reduced without changing the actual output bundle.

The paper uses the concept of output oriented TE of non-parametric DEA approach following Banker, Charnes, and Cooper (1984), the output-oriented radial technical efficiency of a firm with an observed input-output bundle (x^0, y^0) under the variable returns to scale assumption is obtained as:

$$\zeta_y (x^0, y^0 \zeta_y (x^0, y^0) = \frac{1}{\Phi^* \Phi^*} \quad (1)$$

Where $\Phi^* \Phi^* = \max \varphi\varphi$

s.t $\sum_1^N \lambda_j y^j \sum_1^N \lambda_j y^j \geq y^0 y^0$;

$\sum_1^N \lambda_j x^j \sum_1^N \lambda_j x^j \leq x^0 x^0$;

$\sum_1^N \lambda_j = 1 \sum_1^N \lambda_j = 1$ Where $\lambda_j \lambda_j \geq 0$;(j=1,2,…N)

III.2 Panel Regression

Since the efficiency performance of IPI in different firms do not always move in the same path and there is considerable variation in efficiency across firms over the years then it can be partially explained. A second-stage regression using panel estimation technique of the efficiency values can help to identify factors that enhance or hinder it. This, in its turn, becomes helpful for academics and policy for improving efficiency of IPI. The factors

which are considered as possible determinants of efficiency are Research and Development intensity, net export intensity, market share and advertisement intensity.

The inclusion of the above explanatory variables has already been justified in the introduction part. Different alternative forms of structural equations aretried out while estimating the model and model with better result are taken which are represented by the following equation:

$$TE = f(RDI, NXI, AI, MS, D)$$

The specified equation for efficiency is a function of RDI, NXI, AI, MS and D. The equation is nonlinear in efficiency, RDI, NXI, MS and AI. D is the dummy variable capturing the effect of product patent on efficiency i.e. D=1 if Year >2005 and zero otherwise.

III.3. Data

Data on IPI at the firm level is obtained from Prowess Database of Centre for Monitoring Indian Economy (CMIE) over the period 2000-01 to 2015-16. In thepresent study a 1-output, 4-input technology is used. The output issales value and inputs areRaw material expenses, power and fuel expenses, salaries& wages and capital. This study uses panel data analysis to find out the effect of different factors which areResearch and Development intensity, net export intensity, market share and advertisement intensity and Time dummy for product patent on efficiency of IPI.Those firms are selected for which all the data of inputs and outputs and the determinants are available throughout the sample period. On the basis of this, a sample of 74 firms for IPI has been selected.

IV. Result and Discussion

IV.1 Estimated Results of Technical Efficiency

The present study has considered IPI which is composed of associate firms (goods) and since these associate goods, are of similar type, it can be assumed that such associate goods share same frontier operating under similar kind of technology. The frontier is generated for each period from 2000-01 to 2015-16 and the measure of TE is obtained for all the firms over the sample period, using the computer programme solver in Excel.

TE for each of the firms over the sample period are estimated. From Table 1 it can be concluded that the average efficiencyis 0.928823 for the overall sample period 2000-01 to 2015-16. The sample period is broken down into three sub periods, period 1(2000-2005), period 2 (2006-2010) and period 3 (2011-2016).Now if one considers the different periods, the average efficiencyis0.909762, 0.925162 and 0.954111 for period 1, 2 and 3 respectively. This average TE is highest in period 3 followed by period 2 and then 1. This maximumaverage TE in period 3 may be the effect of product patent regime in pharmaceu-

ticals. Thus it is found that TE is more in Post product regime compared to the Pre product regime. In the Pre product regime, IPI produced 90% of the maximum producible output whereas in Post product regime i.e. in period 2 and 3, the industry is found to produce 92% and 95% of the maximum producible output. Considering all the firms over the sample period whose results are demonstrated in Table 2, efficiency ranges between 0.462 to1, the mean TE being 0.928. Most of the firms i.e. about 68% firms are enjoying efficiency level above the mean TE and the rest firms are having TE below the mean.

IV.2 Determinants of TE: A Panel regression

In the second stage, panel regression has been carried out to find out the major determinants of TE of IPI. The variables considered are Research and Development Intensity (RDI), Advertisement Intensity (AI), Market share (MS) and Net Export Intensity (NXI) of the firms. Also a dummy (D) variableis considered to capture the effect of product patent on TErelative to process patent.

It may be mentioned that the estimated equation is found to be nonlinear. Thus the sign of marginal effects will help to understand the positive or negative relationship. While estimating the panel model, to test for appropriateness of the assumption of fixed effect vis a vis the random effect model, Hausman's specification test is performed for each of the regression which strongly rejects the assumption of random effect model and supports the assumption of fixed effect model.

Table 3 demonstrates the estimated results of determinants by panel regression. The relationship between AI and TE is found to be U shaped. This implies that as AI increases TE decreases but after some threshold level with rise in AI, TE also rises. But MS and TE are of inverted U shaped indicating that at first TE rises with rise in MS but after some threshold level TE falls with increase in MS. There isan interaction terms RDI.NXI which affects TE positively.

It is seen that RDI, MS and AI are positively related whereas NXI is negatively related with TEas suggested by the marginal effectwhose results are presented in Table 4. The positive relationship between RDI and TE may be due to the reason that Research and Development basically search for various newpaths and develop knowledge which may ease faster product development thereby encouraging TE. The positive relationship between Advertisement intensity and TE possibly may be due to firms spending more on advertisement may be more prone to introduce a new product in the market easily, increases sales, fights market competition and thus may increase production and thus TE. It is found that higher is the MS, more is the TE may be the advantages of big size and secured market. But there exists a negative association between Net export intensity and TE pointingto the fact that import is better thanexport for promoting TE. The reason may be with more import

firms can have access to machineries which may improve its production process thereby increasing output with same inputsand thus TE.Again the effect of product patent on TE compared to the process patent is found to be positive and statistically significant. This result may suggest that the Indian pharmaceutical companies are able to suitably modify their production process to cope up with the changed legal environment.

V. Conclusion

The present paper used the DEA technique to assess the efficiency of Indian Pharmaceutical industry employing firm level data. The efficiency scores have indicated that about 68% firms are enjoying above average TE. The results are also indicative of the scenario that changed patent laws in India are not detrimental to theperformance of Indian pharmaceutical companies asit is found that TE is more in Post product regime compared to the Pre product regime.Panel regression used to identify the major determinants of IPI suggests that there exists nonlinear relationship between TE and the explanatory variables. RDI, MS and AI are the factors that can enhance TE. On the other hand, increase in export relative to import may be detrimental for efficiency in IPI. Indian pharmaceutical companies are able to suitably modify their production process to cope up with the changed legal environment.Any policy changes that may lead to increase in Research and development, Market Share and Advertisement may be emphasised.

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Appendices

Table 1: Average Efficiency for Different Periods

2000-16	2000-05	2006-10	2011-16
0.928823	0.909762	0.925162	0.954111

Table 2: Overall Picture of Efficiency

	Range	Mean Value	of Firm below Mean %	of Firm above Mean %
Efficiency	0.462-1	0.928	31.08	

Table 3: Estimated Results of Determinants by Panel Regression

	.Coef	t	|P>|t
RDI	***0.00035	4.09	0
NXI	***-0.00016	-9.55	0
AI	**-0.00005	-2.29	0.022
MS	***1.92447	4.40	0
AI^2	**0.0000014	2.30	0.021
MS^2	***-8.91410	-4.09	0
RDI.NXI	***0.00000	3.30	0.001
D	***0.03242	7.09	0
cons_	***0.93672	16.22	0
=(F(73,117	***16.24	= (Wald chi2(12	***229870.7
Prob> F	0	= Prob> chi2	0

Table 4: Marginal Effect of Determinants

RDI	0.00037
NXI	-0.00015
AI	0.00048
MS	1.68354

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Public Health, Financing and COVID-19 in India – Operation and Challenges

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Abstract:

The present paper deals with operation and challenges to make healthcare affordable and accessible for the people, especially for the poor section, in India. The analysis has shown that Infant Mortality Rate (IMR) has been declining, and the total expenditure on the health sector has increased to some extent.

This paper also reviews the current gloomy scenario of COVID-19. The surge in coronavirus cases has crippled the public health system globally. No exception in India. Historically, in India, the concept of health accompanied by the principles of Ayurveda which is very similar to concepts of health defined by the World Health Organization (WHO). Public health is described as the art and science of preventing disease, prolonging life, and promoting physical and mental health, sanitation, personal hygiene, control of infectious diseases, and organization of health services. However, the concept of public health is not unique and has changed over the years. Fragile health infrastructure, inadequate fund allocation is the fact in India. Limited access to public health care facilities forces people to go to private providers, resulting in substantial out-of-pocket spending, especially for the poor. However, Indian polity has taken some policies to improve the public health sector. Introduction of the National Rural Health Mission (NRHM) and Rashtriya Swastya Bima Yojana (RSBY) are the two positive steps.

Key Words: Public Health, COVID-19; World Health Organization (WHO); National Rural Health Mission (NRHM); Public Expenditure

I. Introduction

Available information suggests that about one billion people in the world suffer from infectious diseases, undernutrition, and complications of childbirth, conditions not seen among the non-poor, and that are largely avoidable because inexpensive and effective tools exist to deal with much of it (WHO, 1999a). Public health is an important issue all over the world. Historically, the Indian healthcare system has been dominated by the provisioning of medical care and neglected public health. According to UNDP's Human Development Report 2010, in a set of 193 countries, while India ranked 119th on the human develop-

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ment index, 143rd in infant mortality rate, 124th in maternal mortality rate, 132nd in life expectancy at birth, and 145th in under-five mortality rate. In India, 62 percent of children are immunized. Communicable disease is the cause of death for 53 percent of all deaths in India. The present paper pointed out the declining rate of Infant Mortality Rate (IMR), though the difference between rural (55) and urban (34) IMR is still high. The public expenditure on health is far below compared to other countries. However, total expenditure on health sector has increased to some extent.

Public health service with increasing financing is significant. Public Health is related to preventing premature and unavoidable deaths. The concept of public health is not unique and has changed over the years due to changes in the health status of the population and the determining situations of health. In general, public health is described as the art and science of preventing disease, prolonging life, and promoting physical and mental health, sanitation, personal hygiene, control of infectious diseases, and organization of health services. Historically, in India, the concept of health accompanied by the principles of Ayurveda. Health defined by World Health Organization (WHO) is very similar to the concepts of Ayurveda. WHO defined Health (of an individual) as the state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. World Health Organization, however, does not define Public Health.

Globally, it is widely accepted that public health is an important issue of nations' development. Unfortunately, the extent of poor public health services in developing countries is enormous. Mortality is much higher than in developed countries. Most of the developing countries face the challenges of allocation, internal inefficiency, and inequity of health services. No exception in India. In India, nearly 73 percent of the population lives in rural areas and 26.1 percent is below the poverty level. India lacks a strong healthcare infrastructure, as well as the country, which has several inherent weaknesses in its healthcare system. Unfortunately, the government's funding is now less than 1% of GDP – compared to other emerging nations. Though the overall level of funding allocated for healthcare nationally is comparatively high, 4.1% of GDP, the health care delivery segment is dominated by the private sector in India.

Public health is a social issue. Public health endeavors to create the right conditions to provide this state of health for the benefit of society. Currently, the whole world has been facing the pandemic crisis of COVID -19. Coronavirus disease 2019 (COVID-19) is a novel human respiratory disease caused by the SARS-CoV-2 virus. The first cases of COVID-19 disease surfaced during late December 2019 in Wuhan city, the capital of Hubei province in China. Shortly after, the virus quickly spread to several countries. On January 30, 2020 The World Health Organization (WHO) declared the virus as a public

III. Public Health – Concept, History

The concept of public health is vital. The assessment of the historical development of public health, which began in ancient times, emphasizes how various public health concepts have evolved. Historical public health measures included quarantine of leprosy victims in the Middle Ages and efforts to improve sanitation following the 14th-century plague epidemics. During the modern era, the increasing awareness of infant deaths and a proliferation of hospitals in turn led to the establishment of modern public health agencies and organizations, designed to control disease within communities and to oversee the availability and distribution of medicines.

The concept of public health is not unique and has changed over the years due to changes in the health status of the population and the determining situations of health. Globally, many organizations expressed the concept of public health in various ways. The World Health Organization (WHO) opined on Health (of an individual) as the state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. This means that public health aims to create the right conditions to provide this state of health for the benefit of society. World Health Organization, however, does not define Public Health. Public Health is related to preventing premature and unavoidable deaths. In general, public health is described as the art and science of preventing disease, prolonging life, and promoting physical and mental health, sanitation, personal hygiene, control of infectious diseases, and organization of health services.

The Indian approach to health is enshrined in the concepts and principles of Ayurveda. Ayurveda means the science of life. Ayurveda is one of the oldest systems of health care in the World. Ayurveda deals with both preventive and curative aspects of health. Health defined by WHO is very similar to the concepts of Ayurveda.

Public health is a social issue. Worldwide, from the normal human interactions involved in dealing with the many problems of social life, there has emerged the importance of community action in the promotion of health and the prevention and treatment of disease, and this is expressed in the concept of public health. Comparable terms for public health medicine are social medicine and community medicine and the practitioners are called community physicians.

The practice of public health draws heavily on medical science and philosophy and concentrates especially on manipulating and controlling the environment for the benefit of the public. Most of the world's ancient peoples practiced cleanliness and personal hygiene, often for religious reasons, including, apparently, a wish to be pure in the eyes of their gods. Religion, law, and customs were inextricably interwoven. For thousands of years societies looked upon epidemics as divine judgments on the wickedness of humankind. However,

health emergency of international scope. Forty-one days later, on March 11, 2020 it was officially declared to be a global pandemic. India confirmed its first case of COVID-19 on January 30. Coronavirus cases are quickly increasing across the nation. The surge in coronavirus cases has crippled the health system, primarily due to a shortage of hospital beds, manpower, equipment like personal protective equipment, ventilators, etc. However, the whole nation has been fighting against this virus with unity.

Not surprisingly, throughout the world, governments have had a significant role in providing and regulating health services and their role is particularly important in developing countries with a large concentration of the poor. Lately, but Indian polity has started to show some concern about public health. Making healthcare affordable and accessible for all its citizens is one of the key focus areas of the country today. However, the challenge is immense. The National Rural Health Mission (NRHM), established in 2005, and the recent introduction of Rashtriya Swastya Bima Yojana (RSBY) a national health insurance scheme for people below the poverty line are the two most important initiatives by the central government. Several state governments also have come up with various public health insurance schemes. Despite these initiatives, the actual public spending on health has not shown much increase. Here, we cannot ignore the role of the private sector, Non-Governmental Organizations (NGOs).

II. Objective & Methodology

Poverty is a serious issue in India. Access to public health care is critical for the country. Government financing in the health sector is essential. Presently, due to fragile healthcare infrastructure, as well as inadequate government spending country has been facing a massive challenge of COVID-19. The objective of this paper is to address the inevitability of growth and development of public health with optimal utilization of public expenditure. This paper also draws attention to the gloomy picture of COVID-19 in India.

Investigation is made in some vital areas of accessibility and negligence to address the problems of the public healthcare system. Government measures to ensure affordable public healthcare and course of action are two important areas.

The study is undertaken with the help of published Government and private information. Publications and reports of WHO, UNO, UNDP, and other international bodies have been utilized. Secondary published and unpublished sources are the main source of information.

In India, the Central Bureau of Health Intelligence, the Ministry of Health and Family Welfare, Medical Council of India are the important sources of information on public health. Information has been also collected from some NGOs, private sector institutions.

the idea that pestilence is due to natural causes, such as climate and physical environment, gradually developed. This great advance in thought took place in the book Airs, Waters, and Places, written by the Greek physician Hippocrates in the 5th or 4th century BCE, the first systematic attempt was made to set forth a causal relationship between human diseases and the environment. This book provided a theoretical basis for the comprehension of endemic disease and epidemic disease.

In terms of disease, the Middle Ages can be regarded as beginning with the plague of 542 and ending with the Black Death (bubonic plague) of 1348. Diseases in epidemic proportions included leprosy, bubonic plague, smallpox, tuberculosis, scabies, erysipelas, anthrax, trachoma, sweating sickness, and dancing mania. The isolation of persons with communicable diseases first arose in response to the spread of leprosy. This disease became a serious problem in the Middle Ages and particularly in the 13th and 14th centuries. During the Middle Ages several first steps in public health were made - attempts to cope with the unsanitary conditions of the cities and, through quarantine, to limit the spread of disease; the establishment of hospitals; and provision of medical care and social assistance.

During the 16th and 17th centuries, with the scientific accomplishments many countries recognized that the political and economic strength of the state required that the population maintain good health. Scientific advances laid the foundations of anatomy and physiology. Observation and classification made possible the more precise recognition of diseases. The idea that microscopic organisms might cause communicable diseases had begun to take shape. However, 19th-century movements to improve sanitation and the rapid growth of hospitals attract governmental attention and leads to governmental action.

During the first decade of the 20th century, improvements in environmental sanitation were dealing with some problems and usefulness in solving the many health problems among the poor. The period also saw further advances in community health care, particularly in the welfare of mothers and children and the health of schoolchildren, the emergence of the public health nurse, and the development of voluntary health agencies, health education programs, and occupational health programs.

The Indian healthcare system has been historically dominated by the provisioning of medical care and neglected public health. The public healthcare system in India evolved due to several influences from the past 70 years, including British influence from the colonial period. The need for an efficient and effective public health system in India is large. The public health system across nations is a conglomeration of all organized activities that prevent disease, prolong life, and promote the health and efficiency of its people.

Public health systems in the colonial period were focused on health care for British citizens who were living in India. The period saw research institutes, public health legis-

lation, and sanitation departments. Annual health reports were released and the prevention of contagious disease outbreaks was stressed. At the end of the colonial period, death rates from infectious diseases such as cholera had fallen to a low, although other diseases were still rampant.

In modern-day India, the spread of communicable diseases is under better control and now non-communicable diseases, especially cardiovascular diseases, are major killers. Health care reform was prioritized in the 1946 Bhore Committee Report which suggested the implementation of a health care system that was financed at least in part by the Indian government. In 1983 the first National Health Policy (NHP) of India was created with the goals of establishing a system with primary-care facilities and a referral system. In 2002, the updated NHP focused on improving the practicality and reach of the system as well as incorporating private and public clinics into the health sphere. In the context of universal health coverage, the recent policy focus in India, there is an attempt to ensure that every citizen should have adequate access to curative care without any financial hardships. Equally relevant is the acknowledgment of social determinants of health as an important determinant of population health and the need to have public health care within the existing health care system. This calls for a need to distinguish between the 'Public health' system and 'Public' sector health care system as the latter uses public to indicate the primary role of government and not necessarily as population as used in public health.

IV. Dimension of Public Health, Financing

The concept of public health is indispensable. Public health is a social issue. Providing public health services especially to the poor people is essential. Correspondingly, increasing government financing in the health sector is crucial. However, fragile public health infrastructure in the developing world is the fact. Here, the role of government is significant. Government spending on healthcare is far below what is needed. Limited access to public health care facilities forces people to go to private providers, resulting in substantial out-of-pocket spending, especially for the poor. Poverty is a massive challenge in India. Ensuring access to public healthcare to the poor people helps to minimize absenteeism, enhance labor productivity, and prevents misery in India. Government intervention in health is also argued for, due to the presence of a high degree of asymmetric information in the health sector.

With a population of 1.21 billion, India is the second-most populous country in the world. Provision of health care to such a vast population needs sound planning and implementation of health policies by the government with the support of the private sector, local and regional bodies, NGOs and self-help groups. Nearly 72 percent of the country's population lives in rural areas. While substantial progress has been made in the provision of healthcare services in the urban areas, there is a need to improve the availability of ser-

vices and enhance the quality of care in many rural areas.

Therefore, the formulation of strategies for providing public healthcare facilities with optimal utilization of financing is necessary. In order to develop meaningful policy options and strategies for public healthcare of the nation, there is a need for collection, compilation, and analysis of data on public health. However, the collection of reasonable accurate data on the health sector is a challenging task.

In India, the Central Bureau of Health Intelligence, the Ministry of Health and Family Welfare, Medical Council of India are the important sources of statistical data on public health. However, many NGOs, private organizations also provide quantitative information on public health in the State.

Here, the analysis of dimensions of health and financing in India is based on the health indices, expenditure on health, and central allocation. A comparison of health sector data between India and some selected countries is also made here.

The data depict that health achievements in India have been extremely modest when compared to most other developing countries and that outcomes are linked with the level of public health spending. The healthcare finance indicators provide an understanding of patterns of investments, expenditure, sources of funding, and proportion of allocation against the total allocation. They also help us understand the health outcomes with the expenditure. The infant mortality rate (IMR) has declined considerably from 70 in 1999 to 50 per 1,000 live births in 2009 though the difference between rural (55) and urban (34) IMR is still high. According to the Global Burden of Diseases data published by WHO in 2008, of the total number of deaths in a sample of 192 countries across the world, India accounted for nearly one-fourth of the deaths due to diarrhea, more than a third of the deaths due to childhood cluster diseases - many of which are preventable by basic immunization, more than a third of the deaths due to Leprosy, more than half the deaths due to Japanese Encephalitis and about 30 percent of the deaths due to prenatal conditions.

The National Commission on Macroeconomics and Health identified the major classes of health conditions that contributed more than 80 percent of the overall disease burden in India and require priority policy attention. The below data shows that the percentage of allocation for the health sector against the total planned investment in the country by the central government has increased to some extent in the Eleventh Plan when the Health Research Department was created and the NRHM schemes were started.

Table-1: Population Trends in India

Year	(Male (in akh	(Female (in akh	Total
1951	1855.3	1755.6	3610.9
1961	2262.9	2129.4	4392.3
1971	2840.5	2641.1	5481.6
1981	3533.7	3299.5	6833.3
1991	4393.6	4070.6	8464.2
2001	5321.6	4964.5	10286.1
2011	6237.25	5864.69	12101.93

Source: Registrar General of India

Table-2: Population Living Below Poverty Line in India

Year	Poverty Line (Per capita income (in INR/month		Percentage of Persons		
	Rural	Urban	Rural	Urban	Combined
2004-05	356.30	538.60	41.8	25.5	37.2
2009-10	672.8	859.6	33.8	20.9	29.8
2011-12	781.00	965.00	25.7	13.7	21.9

Source: Planning Commission of India

Table-3: Health Indices for India and Selected Countries

Indicator	India	Thailand	China	Bangladesh	Sri Lanka	Pakistan	Brazil
Infant Mortality Rate	50	12	17	41	13	70	17
Under Five Mortality Rate	66	13	19	52	16	87	21
Fully Immu-(%) nized	66	98	95	89	99	80	99

Birth By Skilled At-(%) tendants	47	99	96	18	97	39	98
Per Capita Government Expenditure on Health ($ (PPP Int	39	247	203	14	66	20	483

Source: HLEG Report 2011 and World Health Statistics, WHO 2011

Table-4: Estimated Birth rate, Death rate and IMR in India

Year	Birth Rate			Death Rate			Infant Mortality Rate		
	Rural	Urban	Combined	Rural	Urban	Combined	Rural	Urban	Combined
1994	30.5	23.1	28.7	10.1	6.7	9.3	80	52	74
1995	30.0	22.7	28.3	9.8	6.6	9.0	80	48	74
1996	29.3	21.6	27.5	9.7	6.5	9.0	77	46	72
1997	28.9	21.5	27.2	9.6	6.5	8.9	77	45	71
1998	28.0	21.0	26.5	9.7	6.6	9.0	77	45	72
1999	27.6	20.8	26.1	9.4	6.3	8.7	75	44	70
2000	27.6	20.7	25.8	9.3	6.3	8.5	74	44	68
2001	27.1	20.3	25.4	9.1	6.3	8.4	72	42	66
2002	26.6	20.0	25.0	8.7	6.1	8.1	69	40	63
2003	26.4	19.8	24.8	8.7	6.0	8.0	66	38	60
2004	25.9	19.0	24.1	8.2	5.8	7.5	64	40	58
2005	25.6	19.1	23.8	8.1	6.0	7.6	64	40	58
2006	25.2	18.8	23.5	8.1	6.0	7.5	62	39	57
2007	24.7	18.6	23.1	8.0	6.0	7.4	61	37	55
2008	24.4	18.5	22.8	8.0	5.9	7.4	58	36	53

Source: SRS Bulletin January 2011, Registrar General of India, New Delhi

Table-5: Estimated Total Deaths ('000s) by Cause

	Cause of Death					
	Diarrhea	**Childhood Cluster Diseases**	**Leprosy**	**Japanese Encephalitis**	**Dengue**	**Perinatal Conditions**
India	516	295	2.1	6.1	5.2	920
World (among 192 WHO member Countries	2162	847	5.4	11	18.1	3177
Share of Deaths in (%) India	23.8	34.8	38.2	55.1	28.8	29

Source: Global Burden of Diseases, WHO 2008.

Note: India's share of population in the sample of 192 countries was about 17.4 percent

Table-6: Disease Burden Estimations

Disease/Health Condition	**Estimates in 2005 ((lakh**	**Projected Estimate for (2015 (lakh**	**Cases Reported in (2010 (lakh**
Communicable Diseases			
Pulmonary Tuberculosis	85	NA	11.74
HIV/AIDS	51	190	-
Acute Respiratory Infection	257.37	NA	247.20
Diarrheal Diseases ((episodes/year	760	880	101.13

Malaria and other vector borne conditions	20.37	NA	13.73
Enteric Fever	6.95	NA	10.35
Pneumonia	7.74	NA	7.32
Leprosy	3.67	Expected to be eliminated	-
Otitis Media	**3.57**	**4.18**	**-**
Non-communicable Conditions			
Cancer	8.07	9.99	9.80
Diabetes	310	460	376.70
Mental Health	650	800	-
Blindness	141.07	129.96	-
Cardiovascular diseases	290	640	469.70
COPD and Asthma	405.20	596.36	-
Other non-communicable conditions			
Injuries-Deaths	9.8	10.96	3.35
No. of Hospitalizations	170	220	-

Source: The National Commission on macroeconomics and Health

Table-7: Expenditure on Health in Selected Countries

	Public Expenditure		Total Expenditure	
	As Percent of GDP	Per Capita (PPP ($ in	As Percent of GDP	Per Capita (PPP ($ in
India	1.1	29	4.1	109
Bangladesh	1.1	14	3.4	42
Sri Lanka	2.0	85	4.2	179
China	1.9	104	4.3	233
Thailand	2.7	209	3.7	280

Source: World Health Statistics, 2010, WHO

Table-8: Pattern of Central Allocation (total vs. health sector) (crore INR)

Period	Total Planned Investment	Health Allocation	Family Welfare Allocation	AYUSH Allocation	Total for Health Sector
Eighth Plan ((1992-1997	**434100.0**	**7494.2 (1.7%)**	**6500.0 (1.5%)**	**108.0 (0.02%)**	**14102.2 (3.2%)**
Ninth Plan ((1997-2002	**859200.0**	**19818.4 (2.31%)**	**15120.2 (1.76%)**	**266.35 (0.03%)**	**35204.95 (4.09%)**
Tenth Plan ((2002-2007	**1484131.3**	**31020.3 (2.09%)**	**27125.0 (1.83%)**	**775.0 (0.05%)**	**58920.3 (3.97%)**
Eleventh Plan (2007-(2012	**2156571.0**	**(6.31%) 136147.08**		**3988.0 (0.18%)**	**140135.0 (6.49%)**

Source of the National Commission on macroeconomics and Health

Table-9: Measured Levels of Expenditure on Health in India

Selected National Health Accounts Indicators	2003	2004	2005	2006	2007
Total Expenditure on Health as a % of GDP	4.2	4.0	3.8	3.6	4.1
General Government Expenditure on health as a % Total Expenditure on Health	20.4	20.9	22.4	25.0	26.2
Private Expenditure on Health as a % of Total Expenditure on Health	79.6	79.1	77.6	75.0	73.8
General Government Expenditure on health as a % of Total Government Expenditure	3.0	3.0	3.2	3.4	3.7
External Resources for Health as a % of Total Expenditure on Health	0.6	0.7	0.5	1.0	1.4
Social Security Expenditure on Health as a % of General Government Expenditure on Health	5.8	5.8	5.2	4.9	17.2
Out-of-Pocket Expenditure as a % of Private Expenditure on Health	92.4	92.3	91.9	91.4	89.9
Private Prepaid Plans as a % of Private Expenditure on Health	1.0	1.0	1.1	1.1	2.1

Source: World Health Statistics

V. COVID-19

Presently, the whole world has been facing the pandemic crisis of COVID -19. More than thirty lakh people of the world have been suffering by the COVID -19 diseases. Globally, more than two lakh people have already died. Coronavirus cases are rapidly rising across the globe. According to Kaushik Basu, eminent Economist, the death rate in every one crore population is 4960 persons in Spain, 4410 persons in Italy, 3050 persons in Britain, 2170 persons in Sweeden, 1670 persons in America, 6 persons in India, 9 persons in Bangladesh, 3 persons in Sri Lanka, 10 persons in Pakistan, 3 persons in Kenya, 2 persons in Tanzania, 2 persons in Nigeria, and 0.3 persons in Ethiopia (Anandabazar Patrika, 28th April 2020). However, circumstances have been changing every day.

The condition in America, Italy, and Spain is more vulnerable. The surge in coronavirus cases has crippled health systems in many countries, primarily due to the shortage of hospital beds, manpower, equipments – personal protective equipment, ventilators, etc. However, countries affected by this severe problem responded in multiple ways.

Coronavirus disease 2019 (COVID-19) is a novel human respiratory disease caused by the SARS-CoV-2 virus. The first cases of COVID-19 disease surfaced during late December 2019 in Wuhan city, the capital of Hubei province in China. Shortly after, the virus quickly spread to several countries. On January 30, 2020 The World Health Organization (WHO) declared the virus as a public health emergency of international scope. Forty-one days later, on March 11, 2020 it was officially declared to be a global pandemic.

India confirmed its first case of COVID-19 on January 30 in Kerala. Coronavirus cases are quickly increasing across the nation. However, the rising rate is still not at an exponential rate. Fragile healthcare infrastructure is a serious concern for India. No comprehensive nationwide surveillance system was in place, testing infrastructure was inadequate, and the public awareness was minimal. The supply of essential resources is inelastic in the short run. However, this pandemic has revealed that one way to handle the increasing demand for healthcare is to flatten the curve. This is essentially achieved by social distancing which slows down the spread of disease and provides a much-needed breathing space to the health system.

With this vulnerable situation in India, policymakers sprung into action – more information is being disseminated about preventive measures. The approved containment process includes lockdown, contact tracing, isolation, and testing has started. Lockdown is almost total. The government has shut down all international flights to prevent viral spread from travelers abroad. Road and rail transport have also primarily ceased. Several foreign embassies have successfully flown out their nationals, in many cases. Internal migrants are still making their way home, however.

Improvements in the infrastructure and delivery system of health care, provision of manpower, equipments, and drugs, improved inter-sector coordination, monitoring and evaluation, and other innovative approaches have been undertaken to improve the basic indicators of healthcare too. Recognizing the need to progressively address the challenges in achieving sustainable reforms, maintaining the required quality of care, and accelerating human development, the central government has accorded priority to all three aspects of healthcare - prevention, treatment, and discovery. However, this will require financing in different forms by stakeholders involved specially from the government.

VI. Conclusion

Overall, the present paper analyzes the operation and challenges to make healthcare affordable and accessible for the people, especially for the poor section, in India. This paper also reviews the current gloomy scenario of COVID-19. It is clear that the fragile health infrastructure, inadequate government funding, and consequence of struggle to handle the recent crisis of pandemic COVID-19. Poor public health facilities are common features in India. Low government expenditure on the health sector is a normal experience. The present pandemic COVID-19 crisis has been stamped upon this fact. However, circumstances have been changing. The infant mortality rate (IMR) has declined and the percentage of allocation for the health sector against the total planned investment in the country by the central government has increased to some extent.

Public health service is vital for the nation. It is a social issue. From the normal human interactions involved in dealing with the many problems of social life, there has emerged the importance of community action in the promotion of health and the prevention and treatment of disease, and this is expressed in the concept of public health. The concept of public health is described as the art and science of preventing disease, prolonging life, and promoting physical and mental health, sanitation, personal hygiene, control of infectious diseases, and organization of health services. However, the concept of public health is not unique and has changed over the years due to changes in the health status of the population and the determining situations of health.

Historically, the concept of health accompanied by the principles of Ayurveda in India. With a population of 1.21 billion, in India, nearly 73 percent of the population lives in rural areas and 26.1 percent is below the poverty level. Providing public health services is, therefore a massive challenge. However, the government of India has taken various steps to improve the public health facilities, especially for the poor section. India's first Health Policy that was adopted in 1983 set out to provide universal, comprehensive primary health care services, relevant to the actual needs and priorities of the community.

The present paper point up the health achievements in India has been extremely modest when compared to most other developing countries, and that outcomes are linked with the level of public health spending. The data depicts that India accounted for a high percentage of deaths due to diarrhea, childhood cluster diseases, Leprosy, Japanese Encephalitis, and prenatal conditions. However, the infant mortality rate (IMR) has declined and the percentage of allocation for the health sector against the total planned investment in the country by the central government has increased to some extent when the Health Research Department was created and the NRHM schemes were started.

The introduction of Rashtriya Swastya Bima Yojana (RSBY) a national health insurance scheme for people below the poverty line is an important initiative by the central government. Several state governments also have come up with various insurance schemes, e.g. SHASHTYA SATHI PROKALPA, in West Bengal. Despite these initiatives, the actual public spending on health has not shown much increase. The role of the private sector, Non-Governmental Organizations (NGOs) is very much positive.

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The Application of the 74th Constitution Amendment Act (1993) in India

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Abstract

According to the recommendations of the Rural-Urban Relationship Committee, the 74th Constitutional Amendment Act (CAA74) 1992 seeks to provide more decentralized power and authority to ULBs by giving them constitutional status. The amendment has caused a revolutionary change in the administration of the country giving power to the ULBs to do their own planning and seek financial assistance from the higher level governments. The Act also prescribes a uniform local governance structure for the country as a whole. For the effective functioning of ULBs the CAA74 mandates compulsory reconstitution of municipal bodies within a specified time frame. The Twelfth Schedule of the Act suggests specific functions and responsibilities to ULBs. It not only accords constitutional status to ULBs but also provides a framework for effective functioning to ensure provision of urban services and infrastructure. It brings certain fundamental changes in local self government and provides for devolution of financial powers from the state government for strengthening of municipal finance.

In spite of the attempts made by passing CAA74, proper application of this law is far from satisfactory in most of the cases. Implementation of the Act rests in the hands of the state government. Initiative and motivation from the part of the state government can make it fruitful at the local level. Some states such as Karnataka, Kerala, Madhya Pradesh and some ULBs (Ahmedabad, Patna, Bangalore etc.) recorded great progress implementing several provisions of the Act. But even after 17 years of the passing of the Act the overall benefits of the Act are yet to be achieved in all states of the country. West Bengal has practiced many facets of the CAA74 before it was born. West Bengal is one of the few states which have successfully implemented the amendment within the deadline. The West Bengal Municipal Act, 1993 includes most of the provisions of CAA74.

Objective of this paper is to focus on the basic features of this 74th Constitutional Amendment Act (CAA74) 1992 and its application in the states of India.The method of analysis is empirical in nature.

Key Words : West Bengal, Municipalities, Constitutional Amendment Act, Municipal Act. JEL Classification Codes: O18, R28, R52.

I. Introduction

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Although urban local bodies (ULBs) play an important role in a democratic market economy. Early development economists discouraged the development of such governments because of two reasons: a) political preference for centralization in developing countries and b) development strategies were often based on central planning. Over time planners and researchers recognized the importance of local governments. ULBs are the principal catalysts for guiding urbanization. India's urban population will hit 500 million mark. In 2001 urban population in India was 286 million which increased to 377.1 million in 2011 with a growth rate of 2.74% as shown in table1.

Table 1: India's Urban Population

Year	(Urban Population (million	(%)Level of urbanization
1961	**78.9**	**17.96**
1971	**109.1**	**19.90**
1981	**159.5**	**23.40**
1991	**217.6**	**25.71**
2001	**286.1**	**27.81**
2011	**377.1**	**31.16**

Source: Census of India

The efficiency with which the ULBs will undertake and carry out their functions will determine whether India can accomplish its macroeconomic growth and poverty reduction goals. Fiscal empowerment of ULBs is not a matter of choice but it is a necessity. Decentralisation is a global movement.

According to the recommendations of the Rural Urban Relationship Committee, 74thConstitution Amendment Act(CAA), 1993 seeks to provide more decentralized power and authority to ULBs. It prescribes a uniform local governance structure.74th CAA recognized ULBs as the third tier of urban government by assigning them specific civic functions. To provide self- governance state governments are directed to amend their municipal laws in order to empower ULBs.

Objective and methodology

The Objective of this paper is to focus on the basic features of this 74th Constitutional Amendment Act (CAA74) 1992 and its application in some states of India. The method of analysis is empirical in nature.

II. Brief Literature Survey

According to Joshi (2014), urban structure of India is dependent on reforms of local governments. 74th CAA itself is not a solution for all problems. The Act needs review. Biswas (2020) examines the varied implementation of 74th CAA by states of India and contribution of the Act towards the establishment of the metropolitan governance. Prasad and Pardhasardhi (2020) mention the deficiencies of the Act. They found that states are half-hearted in implementing this Act.Sharma (2011) analysed the governance of Chandigarh with the compliance of 74th CAA. Sharma (2011) mentioned wide ranging problems faced by municipalities. He analysed the governance of Chandigarh with the compliance of 74th CAA. Vidyarthi (2004) highlighted the deficiencies of the Act mentioning the potentialities of the Act in improving urban governance.

III. Features of the Act

Prior to 74th CAA, the constitution recognized only states as sub-national governments. ULBs were under the jurisdiction of state government. The 74th CAA gives constitutional status to ULBs. The Act provides the functional and financial powers to the ULBs with legitimacy through regular elections.

The objectives of the 74th CAA are firstly to strengthen democracy, decentralization of power at the grass root level through ULBs. Secondly CAA was passed to increase the participation of public representatives. The provision in the Act is that all members of municipalities are to be elected by the people. Reservations of seats for SC, ST and OBC and 33% for women candidates are introduced to include all levels of population in decision making process of ULBs.In that sense the 74th CAA is a revolutionary change in the governance of ULBs.

The basic provisions of the Act are:

i) Article 243-Q of the Act states that there will be three types of institutions, Nagar panchayats for transitional areas, Municipal Councils for small urban areas and Municipal Corporations for big urban areas.

ii) The 12th schedule of 243W of the Act defines 18 functions of ULBs.

iii) Article 243 R defines the composition of municipalities mentioning that all the seats shall be filled by direct elections.

iv) The 243-I of the Act proposes the constitution of Finance Commission which will rec ommend the sharing of finances between state and municipality and will review the financial position of the ULBs.

v) 3C into Article 280 requires Finance Commission to make recommendation on the measures needed to augment the consolidated fund of a state to supplement the resources of the municipalities in the state on the basis of recommendation made by Finance Commission of the state.

vi) Article 243-ZA states that the State Election Commission is responsible for conducting municipal election.States should conduct regular election of ULBs

vii) Article 243 S provides for constitution of Ward Committees in all municipalities with a population of 3 lakh or more

viii) Article 243T provides the reservation of seats for women, scheduled castes, scheduled tribes and backward classes

ix) Article 243 U mentions that the duration of municipality is 5 years

x) Article 243 X provides the power to municipalities to impose taxes

Functions specified in the Twelfth Schedule are:

- Urban planning including Town Planning
- Regulation of land use
- Planning for economic and social development
- Roads and bridges
- Water supply for domestic, industrial and commercial purposes
- Public health, sanitation, conservancy and solid waste management
- Fire services
- Urban forestry, protection of the environment and promotion of ecological aspects
- Safeguarding the interests of the weaker sections of the society
- Burials and burial grounds
- Cattle pounds, prevention of cruelty to animals
- Vital statistics including registration of births and deaths
- Public amenities including street lighting, parking lots, bus stops and public convenience
- Regulation of slaughter houses and tanneries
- Slum improvement and upgrading
- Urban poverty alleviation
- Provision of urban amenities such as parks and playgrounds
- Promotion of cultural, educational and aesthetic aspects

IV. Application of 74th CAA in the States of India

The 74th Constitution Amendment Act aims to decentralize power and strengthen democracy at the local level. It not only accords constitutional status to ULBs but also provides a framework for effective functioning to ensure provision of urban services and infrastructure. It brings certain fundamental changes in local self- government and provides for devolution of financial powers from the state government for strengthening of municipal finance. Even after 28 years of passing of the 74thCAA, only eleven states have managed to devolve municipal functions to ULBs.

In spite of the attempts made by passing CAA74, proper application of this law is far from satisfactory in most of the cases. Implementation of the Act rests in the hands of the state government. Initiative and motivation from the part of the state government can make it fruitful at the local level. Some states such as Karnataka, Kerala, Madhya Pradesh and some ULBs (Ahmedabad, Patna, Bangalore etc.) recorded great progress implementing several provisions of the Act. But even after 27 years of the passing of the Act the overall benefits of the Act are yet to be achieved in all states of the country. The Table 2 shows the implementation of the legislation in forming Municipal Council, Nagar Palika, Ward Committee and Finance Committee in some selected states of India. All the above mentioned institutions are formed in Andhra Pradesh, Karnataka, West Bengal, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu and Uttar Pradesh. Gujarat, Haryana, Rajasthan and Orissa have formed all the above mentioned institutions except Ward Committees. In most of the cases ward committees do not meet the intention of the 74th CAA in forming a unit of self governance. In many cases Ward Committees are unable to link with existing local bodies. In many cases powerful state governments are reluctant to share power with lower level governments. Ward Committees have not given autonomy by state governments. West Bengal is pioneer in forming Ward Committees in all municipal bodies. It has been found that where there is political will and unity Ward Committees can perform better as in West Bengal and Kerala.

At a glance it appears that most of the states have adopted the 74thCAA but closer inspection shows that the application of the law is far from satisfactory. The election commissions have been formed in certain states but they have not taken an active part in the municipal elections. There also exits wide diversity in conducting municipal elections in different states. State Election Commission issues notification of election in the states like Assam, Madhya Pradesh, Maharastra, Andhra Pradesh and Gujarat. But the State Government issues notification of elections in states like Uttar Pradesh, Rajasthan, West Bengal, Kerala and Orissa. The model of Mayor-in Council in West Bengal was followed by Madhya Pradesh which is a new system of administration of local bodies. In Kerala peoples plan method is applied where 40% of the planned budget is allocated to ULBs. In Haryana bureaucracy controls the cities. The Mayor is directly elected in Uttar Pradesh, Uttarakhand, Madhya Pradesh, Himachal Pradesh and Rajasthan. Rajasthan and Himachal Pradesh now converted into indirect form of election. Disparity is also found in the case of tenure of municipality. The mayor is elected after five years in Rajasthan, Uttar Pradesh

and Bihar. In Bengaluru and Delhi mayors are elected indirectly for one year. The tenure of Mayor in Mumbai is two and a half years. Again Chennai gave more power to Mayor but the power of Mayor is less in Bangaluru.

The State Finance Commissions have remained as advisory bodies in all the states of India. The power and devolution of fund still remains with the state government. ULBs are dependent on state governments for grants and state governments depend on Central Government. ULBs get only 0.6% of National Gross Domestic Product which is of course a very small number. Formation of Metropolitan Planning Committees(MPC) as suggested by the Act is nonexistent in most of the states. Karnataka, Tamil Nadu Punjab and Rajasthan have provided for the constitution of MPC in their respective Municipal Acts but did not constitute it. There are no such provisions in the Acts of Andhra Pradesh, Gujarat and Haryana. Bihar, Gujarat, Himachal Pradesh and Haryana did not form District Planning Committee and Metropolitan Planning Committee. No municipal elections took place in Bihar, Pondicherry until 2001.Table 2 highlights the formation of different institutions related toULBs bodies in some major states of India.

In West Bengal District Planning Committee Act and West Bengal Metropolitan Planning Committee Act have been enacted in 1994. These Acts give provision of forming District Planning Committee and Metropolitan Planning Committee. Government of West Bengal was first to constitute Kolkata Metropolitan Planning Committee. According to the West Bengal Municipal Act 1993,West Bengal has practiced many facets of the CAA74 before it was born. West Bengal is one of the few states which have successfully implemented the amendment within the deadline. The West Bengal Municipal Act, 1993 includes most of the provisions of CAA74.

Devolution of funds to the ULBs has been done according to the recommendations of the Tenth / Eleventh Finance Commission and the State Finance Commissions. The First State Finance Commission was set up in 1994 and submitted its report in 1995. The Second State Finance Commission was set up in 2000 and submitted its report in 2002. The Third and Fourth State Finance Commissions submitted its report in 2008 and 2016 respectively. Apart from these four State Finance Commissions Two Municipal Finance Commissions were established by government of West Bengal. They submitted their reports in 1982 and 1993 respectively. No ULBs are found in Dadra and Nagar Haveli and Lakswadeep. In Mizoram, the implementation of the Act is under consideration of the state government.

Table II: Status of Implementation of legislation in some major states of India

Institutions	States
Municipal Corporation	Andhra Pradesh (1994)Gujarat (1993)Haryana(1994) Karnataka(1994)Kerala (1994) Madhya Pradesh (1994)Maharastra Punjab(1994) Rajasthan (1994) Tamil Nadu ((1994) 1994) Uttar Pradesh (1994) West Bengal (1994)Goa ((1994)Orissa (1994
Municipal Councils	Andhra Pradesh (1994) Gujarat (1993) Haryana(1994) Karnataka(1994) Kerala (1994) Madhya Pradesh (1994) Maharastra Rajasthan (1994) Rajasthan (1994) Tamil Nadu (1994) (1994) Uttar Pradesh (1994) West Bengal (1994) Oris-(sa (1994
Nagar Panchayats	Andhra Pradesh (1994) Gujarat (1993) Karnataka(1994) Kerala (1994) Madhya Pradesh (1994) Maharastra Rajasthan (1994) Rajasthan (1994) Tamil Nadu (1994) (1994) Uttar Pradesh (1994) West Bengal (1994) Oris-(sa (1994)Haryana (1994
Ward Committees	Andhra Pradesh (1994) Haryana(1994) Karnataka(1994) Kerala (1994) Madhya Pradesh (1994) Maharastra Punjab(1994) Tamil Nadu (1994) Uttar (1994) (Pradesh (1994) West Bengal (1994
Finance Commissions	Andhra Pradesh (1994) Gujarat (1993) Haryana(1994) Karnataka(1994) Kerala (1994) Madhya Pradesh (1994) Maharastra Punjab(1994) Rajasthan (1994) Tamil Nadu (1994) (1994) West Bengal (1994)Himachal Pradesh (1994) (Orissa (1994) Bihar (1994

Election Commissions	**Gujarat (1993) Haryana(1994) Karnataka(1994) Kerala (1994) Madhya Pradesh (1994) Maharastra(1994) Rajasthan (1994) Tamil Nadu (1994) West Bengal (1994)Assam (1994) Himachal Pradesh (1994) Orissa ((1994**
District Planning Committees	**Haryana(1994) Karnataka(1994) Kerala (1994) Madhya Pradesh (1994) Maharastra Rajasthan (1994) Tamil Nadu (1994) West Ben- (1994) (gal (1994)Gujarat (1993)Orissa (1994**
Municipal Planning Committees	**Karnataka(1994) Kerala (1994) Maharastra Tamil Nadu (1994) West Bengal (1994)Gujarat (1994) ((1993)Orissa (1994)Haryana (1994) Rajasthan (1994**

Source : Author Calculation

V. Impediments in implementation of 74th CAA

74th CAA paves the way for introducing decentralization in Indian federal structure but in practice the implementation of the Act appears to be far from satisfactory. Some of the factors are firstly the Indian federal structure is highly centralized creating impediments in devolving fiscal and administrative powers to ULBs. Secondly the states are reluctant to confer independent political power to ULBs. States should enact legislations to devolve power to ULBs. Thirdly the fiscal responsibility is given to ULBs but not the devolution of fiscal revenue by the states, which limit their capabilities to perform independently. This also hampers the provisioning of basic services of ULBs to their population. Fourthly, there exists significant variation in distribution of functions across the states. The implementation of the Act is optional and therefore states and ULBs are not penalized for the no application of the provisions of the Act. Fifthly the Act does not permit to establish ULBs in industrial townships and Special economic zones. Sixthly the Central government does not have direct relation with local governments .Everything is done via state governments. Seventhly ULBs in India also suffer from the problem of lack of capacity and technical expertise. Finally the absence of municipal finance data is also a serious limitation in proper implementation of the provisions of 74th CAA These factors must be taken into consideration for the effective implementation of the Act. Otherwise the objective of decentralization will not be successful.

VI. Conclusion

The provisions of the 74th CAA seek to provide autonomy to the ULBs of the country. The paradox of the 74th CAA is that it aims to decentralize power but it is to be implemented through State Governments. Proper implementation of the 74th CAA is also influenced by the political relationship between central and local government. The ULBs being a state subject, the decision of the state becomes important in urban governance.

States such as Karnataka, Kerala, Madhya Pradesh and some ULBs (Ahmedabad, Patna, Bangalore etc.) successfully implemented several provisions of the Act. Following CAA74 all the functions are assigned to ULBs of West Bengal but inefficiency in administration of ULBs are clearly evident in poor and insufficient provisioning of municipal services. Effective functioning of municipal services requires trained and efficient municipal administration. Although CAA74 has brought revolutionary changes in urban local governance in legal sense but its application in different states is far from satisfactory. Following the objective of the Act increasing the resource availability at the local level is very difficult. It depends on many factors such as willingness of the state government to devolve powers, willingness of the ULBs to utilize these opportunities. Actual assignment of the powers as proposed in the act rests on the state governments. Levying of new taxes or revision of old rates and also introducing user charges need state government approval. In West Bengal the provisions of the CAA74 are needed to be implemented with sufficient administrative reforms. Most of the suggested measures of CAA74 have already been incorporated in municipal laws but implementation of these provisions is far from satisfactory levels. Some specific measures are needed to be implemented with efficiency to increase own source revenue income of ULBs as well as improving the functional capabilities of ULBs

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MIGRANT LABOURERS IN INDIA'S COVID ECONOMY : WHICH WAY NOW?

Biswajit Chatterjee*

Abstract

The massive displacement of migrant workforce of the country following the announcements of lockdowns in the covid-19 affected economy of India, has exposed the inadequacies associated with the levels of living of these workforce and called for immediate and urgent invention of the Government. The paper outlines the nature of crisis and the vulnerabilities involved, and called for a judicious mix of macroeconomic and microeconomic policies to deal with the crisis and put the economy back to the path of sustained growth and welfare.

Keywords : Labour Migration, covid economy, macro and micro policies.

JEL Classification Codes :J08, J 21, E 62,H 53.

I. Introduction

One of the critical challenges that the ongoing Carona pandemic has posed to our policy makers is to redirect and resettle the plights of migrant labourers in different parts of the country , and to chart out a new path of development of the economy where the so-called migrant workers shall not vulnerable to parametric shocks like the Covid-19 virus which has engulfed the entire world. Since the process is an ongoing one, it is difficult to obtain precise estimates of migrant labourers in our country and to carry out policy simulations under alternative postulated scenarios. In fact, such estimates do not exist at the level of both the central and the state governments, and the announced programme of conducting a survey of migrant workers/labourers had to be shelved in view of the sprawling epidemic in different parts of the country.

Perhaps the worst plight that this expansive pandemic has exposed to the Indian economy and to the Indian people, is the case of migrant workers, mostly in the informal sector , who work and live in a state other than their own i.e., interstate migration. There are also international migration of both skilled and unskilled workers , most of the internal migrants are engaged in activities that are characterized as belonging to the informal or unorganized sector, and most of whom are casualised workforce. Such migrant workers were hit by the lockdown that were announced by the Government of India towards the close of March 2020 to prevent the spread of the covid-19 virus. The nation was assured

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that the announced lockdown would not harm its people's living and livelihood because there was a promised wage support to all the workers at their respective place of work, but were taken aback when nothing of that sort was forthcoming. The migrant workers knew they had no job, no pay, but would have to pay rent, buy food and had little saving. Without finding any solution after a few days, they started walking for home with the family including children and carrying some essential items. And this propelled the disaster. Norms of social distancing and lockdown were violated, and in many cases, police atrocities on-the – road migrant workers in different parts of the country continued unabated. Some state governments, already handicapped by the spread of Covid at differential rates, came forward to provide temporary shelter and food and although the railways came forward to arrange for *sramik express trains* between different states, and debates on who would bear the cost continued for some time at the political spheres, and spread of virus through migrant population became a source of scare in different parts of the country. The efforts of both the central and the state governments to contain the flow of migrants or to reduce the incidences of their vulnerability, actually failed. Sub-human sufferings for most of these migrant workers and their families became the focal point of discussions in the post Covid scenario of the Indian economy. Such human procession started from all parts of the country and all workers wanted to go back home. Much later the government thought of arranging buses or trains. But thousands of workers were already walking for more than a thousand kilometres. And after few weeks, many of them thought of going back to their place of work, without knowing whether they would be able to get back to their original jobs or not, mainly because they realized that in their native places, scope of getting job and earning livelihoods were already destroyed by the pandemic and its associated fall outs.

II. Migration of Labour

In the literature on development economics, enunciated by classic works of Arthur Lewis(1954), Harris, John and Todaro(1970) and others , labour migration , particularly from low productivity rural economy to supposedly high productivity driven modern urban sector particularly in developing economies of Asia ,Africa and Latin America , was viewed as the outcome of wage differentials between the place of residence and the prospective place of work. Lack of productive job at the native places and prevalence of lower wage rates compared to modern urban sectors, prompt the poor surplus labourers to migrate in search of better paid jobs. In countries like India, apart from these basic factors, a set of structural factors emerged during the process of its development, leading to uneven or unequal patterns of growth in different states. This has resulted in large scale migration of labourers seeking jobs in other states, and even beyond national boundaries. As Srivatsava (2020) writes, " *During the colonial era, the large movements of people were structured by the pattern of colonial demand for labour in agriculture, mines, industry, armed forces, and infrastructure development . In the postcolonial period, the pattern*

of rural-urban migration has been structured by the nature of unequal development promoted by the pattern of capitalist development in India. Unequal development has become significantly more pronounced in the post-liberalisation phase, exacerbating the gap between rural and urban areas, and between laggard and rapidly growing regions, with the most pronounced growth occurring in agglomerated growth centres, in and around, large urban centres, mostly located in the North, West, and Southern regions of India. These growth centres, around urban centres, along with the persistent lack of livelihood growth in hinterlands, are the major drivers of labour migration.. Migrants are also stratified in terms of types of migration and job status in destination areas, depending upon their initial physical, educational and social attributes."

It may be noted that migrants differ from non-migrants in as much as they have experienced mobility and change in location. Some internal migrants, like most of the international migrants, are with high skills, education, or other resource endowments, and the difficulties they face while migrating, are of relatively temporary nature . But the bulk of the internal migrants in India are from rural to urban areas with meager means and networks, and they are often at the lower end of the labour market. Among these migrants we may further distinguish between semi-permanent migrants or long term circular migrants, and seasonal or short term circular migrants. Semi-permanent or long term circular migrants are usually rural-urban migrants although, in industries like quarrying, agriculture and rice mills, they could also be rural-rural migrants. These migrants enter the labour market through contractors, or on their own, or through networks. In urban areas, they are principally employed in the informal sector as casual or "regular" wage workers, but gradually they could be self-employed, using hired or owned assets, or take up informal employment in the organised sector. It has been estimated (vide Srivastava 2011) that nearly half of our rural-urban migrants are in the bottom six consumption deciles and work mainly as casual wage employed or as self-employed in the informal sector . These migrants face absence of civic identity and citizenship at destination, poor access to housing and basic amenities, poorer entitlements, poor working conditions and labour market discrimination.

Seasonal or short duration migrants , on the other hand, return to their place of origin after brief periods, at the most, after a few months. They resume migration, but not necessarily to same workplace or destination. Seasonal migrants are usually poorer, more likely to belong to the Scheduled Caste or Scheduled Tribes and a large proportion , work in seasonal industries such as agriculture, manufacture of bricks, quarrying, construction and so on. Construction, manufacturing and agriculture employ the largest percentage of seasonal migrants. But there are a large number of other industries which also employ large numbers of seasonal migrants. These migrants could participate in several short migration cycles or just one in a year-they could migrate to diverse locations, relatively distant or close, rural or urban. The migration streams could consist of men only, women only, or men and women with children and even the elderly. Such seasonal or short-term circular migrants differ from the first two categories because they have no footing in the destinations of their

work. In most of the cases, they reside at work-sites or in the open, while small percentages live in crowded tenanted places. These migrants are a part of the informal economy and form the underbelly of the labour market, mostly as casual or contract workers. They are also heterogeneous in terms of their characteristics, with a stratum of semi-skilled and self-employed workers. In many cases, they are denied access to the PDS and even to the banking system. An overwhelming majority of these migrants also work in the informal economy as informal wage workers or self-employed. These migrants periodically or cyclically revert to their areas of origin, particularly in times of distress, and send regular remittances to their families in villages.

III. Estimates of Migrant Workers

Alternative estimates of the number of migrants in the work force are periodically available in India, but no recent estimates were made available by the central or the state governments. When the migrant crisis erupted at the end of March 2020, no official estimates were available to gauge the numbers of migrant workers affected by the lockdown.Population Census in India are conducted in every ten years , and it identifies people as migrants when they are enumerated in a place other than the Place of Birth (PoB) or have changed their Usual Place of Residence (PoLR). Missing out migrants living on the fringes or moving out of their place of origin only temporarily , it is possible to arrive at estimates of actual interstate migrants by combining the Census and the NSS data. The Census provides a satisfactory measure of of permanent migration, and imperfectly measures long-term semi-permanent circular migration but it is not designed to measure short-term circular migration.. However, the NSS Employment-Unemployment and Migration Surveys in 1999-00 (55th Round) and 2007-08 (64th Round) have attempted to estimate persons migrating out for short-durations for employment. But it has been pointed out that efforts by the National Sample Survey did not capture the magnitude of short- term seasonal or circular migrants (Srivastava, 2011a, 2012a). This was principally due to the fact most seasonal and circular migrants, other than those in agriculture, migrate for longer periods than six months which was taken in these surveys as the upper limit for the duration of short-term migration. Srivastava (2018) has estimated that there are about 51 million short-term circular migrants , and further just over one-third of all migrant workers enumerated in the NSS and the Census were long-term circular migrants. Their numbers were estimated at about 66 million in 2011 and 81 million in 2018. According to his estimates, about 56 million workers in 2011 and 69 million in 2018 were estimated as being vulnerable long-term circular migrant workers. Long-term out-migration was also primarily from low income states, with UP having the highest share, followed by Bihar, Rajasthan, West Bengal and Odisha.Uttar Pradesh and Bihar comprised nearly fifty percent of both short-duration and long-duration circular migrants. The share of low income states was also high in total inter-state out-migration but here middle and high income states also have a higher share.

When the covid crisis erupted and the subsequent lockdowns were announced by the Government of India at the end of March 2020, no official estimates of inter-state migrants were made available to gauge the numbers of migrant workers affected by the lockdown. It was also announced that people should not be panicky, keep social distancing and follow the health protocols issued by the government. Further, it was emphasized that every worker shall be provided wage-support at the respective places of work, with no need to move out.But that was not done. The migrant workers, who had been employed in some form in different states even before the outbreak of the pandemic , lost their livelihood supports from their employers, were forced to face tremendous uncertainty , and naturally tried to go back their respective homes in other parts of India. Large-scale distress and exodus after the lockdown were experienced by short-term and long-term circular migrants i.e. those who still considered their areas of origin as their primary or secondary homes. That is the migrant workers crisis that the Indian economy and society witnessed, with very pathetic consequences. But neither the Central nor the State governments could provide correct estimates of such displaced migrant workers, and therefore supports that were announced turned out to be meager and inadequate. The EPW , in its 8th August, 2020 edition, reported that "*Several districts in Bihar and UP, receiving a majority of migrants workers returned from high containment zones in the states in the western and northern parts of the country, have a sudden jump in the number of COVID-19 cases per 1,00,000 population during 30 days. A significant increase was observed in Azamgarh (from 0.0 to 2.0), Agra (9.7 to 17.2), Basti (0.9 to 6.1), Jaunpur (0.2 to 3.5), Lucknow (4.0 to 7.3), Kushinagar (0.0 to 2.0), Varanasi (1.4 to 4.4). Similarly, in about 11 districts of Bihar, which are traditionally famous as out-migrating districts, the prevalence of COVID-19 cases on 1 May 2020, was less than one which increased to around 10 or more per 1,00,000 population. Some of these districts are Arwal, Begusarai, Bhagalpur, Jehanabad, Khagaria, Madhubani, Munger, Kishanganj, etc. Similarly, there has been a substantial increase in the number of COVID-19 cases in Burhanpur (0.1 to 35.2), Khandwa (3.1 to 16.2), Indore (14.9 to 94.1), and Ujjain (6.5 to 29.8) districts of MP. In Odisha, the major increase in COVID-19 cases due to reverse migration of labourers has been reported in Ganjam (0.0 to 11.3) and Jajpur (2.1 to 14.1). Another migrant-receiving state, Jharkhand, has two districts with sudden spurts in the number of COVID-19 cases after reverse migration are Garhwa (0.2 to 4.2) and Koderma (0.1 to 5.4). The increasing number of COVID-19 cases in the rural-dominated districts are likely to increase the tremendous burden on the already suppressed health system... The standards of public health facilities of these districts are questionable, without proper infrastructure facilities, vacant positions, and non-availability of medicine. Besides, the health workers in the public health facilities have not been adequately aware of the COVID-19 situation and strategies to deal with the cases. Lack of oxygen facilities and ventilators are another major challenge in those resource-poor*

public hospitals."[EPW , 8th August, 2020].

The above figures are not exhaustive, but indicative of the problem. But one should note that the genesis of migrant workers in different parts of the country and their informal nature was not contributed by the pandemic or the lockdowns, but by the factors governing Indian economy even prior to the outbreak of such pandemic and lockdowns. What the Covid-19 crisis and the subsequent measures announced by the Government did is to bring these migrants to the streets and made them displaced distressed, and vulnerable. The crisis further revealed the fact that the existing health infrastructure, mainly, in predominantly rural districts of states (where a majority of migrant labourers returned) had been inadequate in dealing with the increasing number of COVID-19 cases. Additionally, problems of household crowding, in the households of migrant workers, belonging to socially deprived and economically marginalised sections, lack of hand sanitizers and loss of job and wages, - all had pushed the returnees to a highly vulnerable position at the place of origin.

IV. Which Way Now?

It is clear that the migrant workers' crisis that erupted in the post formal lockdown period , and showed the failure of governance by the government machinery at the Central and State levels , resulted in inhuman living conditions for these poor vulnerable informal workers and their families, and even starvation deaths in some parts of the country. But the genesis of migrant workforce in the Indian economy was to be traced to the pre-Corona economic performances and the policies thereof. Corona pandemic displaced these workers and made them more vulnerable than before. Therefore, to argue that only adequate social protection policies be adopted to cover them would be missing the issue, because the prevailing social protection policies were not effective enough to prevent the displacement and misery of such migrant workers. There was an associated macro problem of augmentation of unemployment for all types of workers. Such acceleration in unemployment was due to the interplay of number of factors, the most prominent being the paucity of aggregate demand. There have been switching of occupations by some of the semi-skilled migrant workers in the informal sector, and some of them, who survived the initial Covid surge, have tried return to their places of work, because of no additional work possibility at their home state or regions. They decided to return with the tremendous uncertainty about whether they would get back to the original work that they used to perform before their forced departure about three months before. Therefore, one should try to initiate macro-economic policies to supplement the micro- economic measures , and in this context, the debate between the State governments and the Central government regarding who would own up the initiation of such reforms in policies, be better avoided.

The package announced by the union finance minister on 14 May 2020 as a relief from the COVID-19 impact, tried to broaden support for micro-, small- and medium-scale industries, strengthen the agriculture infrastructure and creation of COVID-19 detection cen-

tre in the civil hospitals in the rural areas. But none of the schemes outlined in the said package addressed the need of immediate expansion of aggregate demand in the economy. There was no mention of the need for direct cash transfer to the poor as a means for not only their survival or sustenance, but also to augment domestic demand base for mass consumption goods sector in the economy. Marginal expansion of the amount allocated under the MGNREGA schemes are likely to be unproductive because the different state governments , by and large have not prepared the detailed schemes of work that the additional workforce could be effectively engaged under this scheme. There is an urgent need for the skill mapping of the migrant men and women workforce – both new and old types- and register them for skill-based job opportunity, both in rural and urban areas in different states. Further, there is a need to expand public investment in creating infrastructure – rural roads, school building, health centers in rural areas – so as to create immediate employment opportunities for these displaced migrant workers on a large scale , while at the same time creating the base for a growing healthy India in the medium to longer runs.

V. Conclusion.

The crisis faced by a large segment of the migrant workers in the country following the imposition of series of lockdown after the outbreak of the covid-19 virus in India, is indeed very large and require important policy interventions at the macro-level besides the different micro measures taken by the Central and the States' government from time to time. . The earlier the central government takes them , the better. These measures include immediate augmentation of domestic demand among the poor households, expansion of the fiscal space of the government, and planning for growth creation and asset expansion at the micro level supported by public investment at the macro level. Only when such complementarities between the micro and macro policies could be worked out, we could find ways for moving ahead with a *humane face.*

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Book Review

Virtual trade and Comparative Advantage –The Fourth Dimension , by Sugata Marjit, Biswajit Mandal &Noritsugu Nakanishi, Kobe University Monograph Series in Social Science Research, Springer Nature, 2020.

Asymmetry and heterogeneity constitute the basis of comparative advantage, which has long been recognized as the factor that provides the basis of international trade. Adding a fourth dimension –time zone asymmetry – is the novel contribution of the authors,**Marjit, Mandal & Nakanishi (** MMN), and definitely in this context, we look for robust theorems like the famous Factor-Price Equalisation theorem of Paul Samuelson. Similar theorems or propositions could be subject to empirical scrutiny, and of course availability of data in the required format, would be essential ingredients of such empirical exercises. The interesting theoretical point is that within time zone asymmetry, there could exist asymmetry with respect to technology, endowments, market structure and/ or firm level heterogeneity as the basis of comparative cost calculations. The authors in this book made an elegant attempt to broaden the dimensions of trade theory, and nicely integrated these complexities that govern international exchange of goods and services. The novelty of their approach lies in splitting the general equilibrium into time zones, and not between time periods, although combination of time zones and time sequencing could be a possibility of future research. In short , the book contains path breaking contributions in the domain of international trade theory.

Different chapters of the book outline and develop the theoretical dimensions of the bases for comparative advantages. Chapters 3 and 4 focus on the Ricardian and the Heckscher Ohlin framework within the dimension of time zone differences to analyse the effects on comparative costs, technology transfer ,transport costs, factor prices and output patterns and growth in a general equilibrium framework. Chapter 5, on the other hand, develops a simple monopolistically competitive model of trade drawing on the works of Krugman, Marjit and Kikuchi to analyse the implications of time zone differences and to show gains from international trade arising out of international virtual division of labor and early delivery of the final product implying a comparative cost advantage in producing business services in any two of the three nations. Chapter 6 reviews the impact of physical distance in time-zone difference model on international trade of goods and services. Part III of the book focuses on the link between growth and trade and the implications of this relation on international inequality of the factors of production. Here in chapters 7 , 8 &9 , the authors focused on induced technological progress, virtual labour mobility and trade in services .Chapter 10 explicitly discusses the implications of services trade in a time-zone differentiated world economy , while in Part IV, chapters 11, 12 , & 13, the authors have

brought in the implications of firm level heterogeneity to study the implications of virtual trade through communication technology , movement of financial capital , and that of the FDI on the pattern of trade, factor prices and distribution of income between factors in time-zone differentiated world economy. Chapter 14 summarises the main results of this book.

On the whole, this book by MMN is the first elegant exercise in trade theory based on virtual platforms and lower information and communication costs. When people do not have to move physically to consume or use chosen goods, international exchange and transactions are also undertaken in digital or virtual form and the present book contributes to our understanding of such virtual transactions as substitutes for physical transactions in a world of time zone differences or pandemic affected world economy where virtual transactions occupy crucial .The originality and innovative treatment by MMN in the domain of pure theory of international trade in its fourth dimension , makes the book a pioneering landmark in the researches on general equilibrium theory of international trade .We eagerly look for empirically verifiable propositions that this fourth dimension of comparative advantage would lead to . The implications for various trade and non-trade policy shocks, we were assured, would be taken up by future research in this framework. The authors are complimented for their brilliant original pieces of research work that constitute the basis of the book and the publishers for flawless printing and publication of the monograph.

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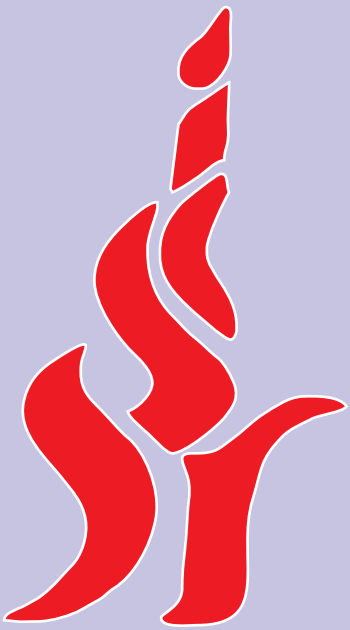

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