



An Analysis of Urban Primacy: The Case of Kolkata

KEYWORDS

primacy, rank size rule, city size, hinterland, gravity model

Sayantani Sarkar

Senior Research Fellow, Department of Geography,
University of Calcutta, Kolkata

Sima Maji

Senior Research Fellow, Department of Geography,
University of Calcutta, Kolkata

ABSTRACT Kolkata has played a pivotal role in the economic growth of the eastern and north eastern region of India. The city with its long colonial history has emerged as the most important urban center of this region. With its excessive population growth, Kolkata has attained that level of primacy which no other city in the country has ever reached. This primacy of Kolkata has often been considered as cancerous and anti- developmental. As Munsif (1975) pointed out, "the metropolitan explosion of Calcutta has become a constant headache for all planners, sociologists and political parties". In 1971 the primacy of Kolkata was at its peak (11.6) (Das and Dutta, 1990). This paper tries to study the nature and characteristics of its primacy from 1971 to the 2001. Through various methods, this study tries to examine the nature of primacy of the city and also to relate the demographic trend with the causative factors. It shows that primacy of the city is gradually declining in the Eastern and North- Eastern region but it is still prevalent within the state of West Bengal.

Introduction:

The primacy of Kolkata has caught the attention of demographers, researchers and scholars due to its unique nature and trend. It has been considered as "cancerous" and anti developmental. Urbanization in India is mainly large city oriented. Das and Dutt (1993) have divided the entire country into four macro regions, each with a dominating urban centre. In the eastern and northeastern part of the country Kolkata has come up as the dominant urban centre. No other city has been able to match its gigantism. This paper attempts to reconsider this classic nature of primacy of the megacity and also to analyze its influence upon the Eastern and North-Eastern part of the country.

Objectives:

The primary objective of this paper is to analyze the primacy of Kolkata city and its influence upon the Eastern and North-Eastern region of the country. It shall involve

- Analysis of the demographic trend of the city.
- Study of the distribution of city size.
- Study of the influence of Kolkata upon the state of West Bengal alone.
- Study of the influence of Kolkata upon the whole of Eastern and North East India.

Study Area:

As the title suggest, the lion's share of the analysis concerns Kolkata. Besides, few urban centres within West Bengal and of North-Eastern India have been taken up as the study areas. For the urban centres other than Kolkata, mainly the capitals of the states surrounding West Bengal have been considered.

Methodology:

This paper has been completed in the following ways:

- Review of concerned literature
- Collection of data- The study is based on secondary data collected from Censuses of 1971, 1981, 1991 and 2001. Data has also been collected from available literature.
- Analysis of data- The data has been analyzed using different statistical techniques. Rank Size rule (Zipf) has been used to study the city size distribution. The trend of Primacy has been analysed by calculating the Index of Primacy. Breaking Point Analysis of Reilly is used to show the zone of influence of Kolkata upon its neighbouring region. Index of crowding of the city has also been calculated. An additional analysis has been done in the form of standardization of urban growth.

Theoretical Basis

The concept of primacy was first forwarded by Mark Jefferson in 1939. He focused on the forces of agglomeration and cumulative effects of agglomeration in the growth of large cities. According to him, "... once a city is larger than any other in its country, this mere fact gives it an impetus to grow that cannot affect any other city, and it draws away from all of them in character as well as in size" (Jefferson, 1939). Clark (1971) points out, primate cities are significant features of the Third World countries and especially those which are small (where economies of scale do not require middle size cities) and which have recently achieved independence from Colonial rule. Some good examples of such cities are Buenos Aires, Sao Paulo, Shanghai, Seoul, Kolkata, Mumbai, Casablanca and Cairo. He considered urban primacy as hypercephalism which refers to the concentration of population within the single city, which is usually the capital and invariably concentrate a large proportion of the administrative, economic, educational and cultural functions. However, this key concept has not gone without criticism. Das and Dutta (1993) criticized the theory on three grounds. Firstly, that the notion of national integrity, to be forwarded by the primate cities, is hampered by the fact of political instability. Secondly, Jefferson failed to explain the matter of occupational diversification. And finally, thirdly, he has neglected the factor of social production in different time periods to explain emergence of the city.

The form of size distribution of cities was first postulated by Auerbach in 1913. However, the best elaboration of size distribution was given by G. K. Zipf in 1949. He stated that the relationship between size and number of settlements could be explained by the following formulae:

$$P_r = P_1 / r^q$$

where, P_r is the population of the r^{th} ranking city, P_1 the population of the first ranking city and q is an exponent which can take on any value. The value of q is often assumed to be unity representing, equality.

According to Zipf, there exist two kinds of forces to determine the size and number of settlements in any country. They are forces of diversification and forces of unification. Forces of diversification are mainly raw material oriented, where numerous small autarchic communities are formed around the sources of raw material to minimize the cost of transportation. Secondly, the forces of unification are market oriented where few large settlements are formed at the point of consumption of the processed product. He also suggested that when these two forces are balanced, optimum population distribution occurs.

Berry and Garrison (1958) made a comparison among the methods of city size distribution derived by Zipf, Christaller, Rashevsky and Simon. According to their views, "City size regularities associated with Zipf have been explained by Simon using very simple probability notions. It will be noted that the city size rule of Zipf is consistent in special cases with the theories of Rashevsky and Christaller. Since Rashevsky's scheme is a contribution to the general theory of urbanization and economic opportunity and Christaller's theory is the generic base of theories of urban size, function and arrangements, city size relations are consistent with more general theories" (1958). It is to be noted that in this paper the rank size scheme of Zipf has been followed to analyze the city size distribution.

Historical Background

The efficiency of urban system in any country is largely dependent upon the distribution of size and spacing of the urban centres. It determines whether the urbanization process is uniform throughout the region or centralized. The pattern of urbanization in India has been mainly large city oriented. No single city in recent time has had the opportunity to establish itself as the dominant centre, and the process of Delhi becoming the primate city is not complete. (Ramachandran, 1989). Therefore in India the phenomenon of regional primacy is highly established. India can be divided into four macro regions each with its own centre of gravity: in North West Delhi, in eastern part Kolkata, in western part Mumbai and in southern part Chennai.

Table 1. Index of Primacy in India

Year	Index of Primacy
1911	1.002
1941	1.659
1951	1.226
1961	1.180
1971	1.178
1981	1.115
1990	1.063

Source: Das and Dutt, 1993

In the above table the Index of Primacy in India, in different years has been shown. It has been calculated by dividing the population of the largest city by the population of the second largest city. The primacy is established when the largest city is at least more than two times the size of the second largest city. The rank stability of the largest metropolises in India is shown as follows:

Table 2. Population -wise Rank of Selected Cities of India

City	Ranks/Years								
	1911	1921	1931	1941	1951	1961	1971	1981	1990
Kolkata	2	2	1	1	1	1	1	1	1
Bombay	1	1	2	3	2	2	2	2	2
Delhi	6	6	5	4	4	3	3	3	3
Madras	3	3	3	5	3	4	4	4	4
Bangalore	9	-	-	-	7	6	7	5	5

Source: Das and Dutt, 1993

From the above table it is evident that Kolkata has maintained its first position among the metropolises for the consecutive seven decades. Until 1990, it had been at least seven times larger than the second largest city in eastern India.

The British foundation of Kolkata is dated as 24 of August 1690, with the landing of Job Charnock. Kolkata is, however, considered to flourish as a settlement for this dated birth. Three villages namely, Sutanuti, Gobindapur and Kalikata, are known to have together formed the foundation of a metro city at present. Till 1911, it served as the capital of British India and became the most important urban centre of Eastern India and still holds its significance.

According to Mitra (1990), throughout the 19th century the Kolkata city area expanded in conformity with its rapidly in-

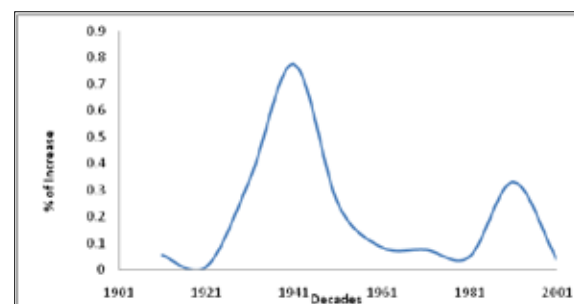
creasing population but in the first half of the 20th century it witnessed an unprecedented growth in both size and population.

Table 3. The Growth of Population in Kolkata City

Year	Total Area (Acre)	Population in thousand	% of Increase
1901	48.38	848	-
1911	48.38	896	5.66%
1921	48.38	908	1.34%
1931	81.35	1221	34.47%
1941	73.33	2167	77.48%
1951	83.71	2698	24.50%
1961	95.62	2927	8.49%
1971	98.79	3149	7.58%
1981	104.0	3305	4.95%
1991	187.33	4399	33.10%
2001	187.33	4573	3.96%

Source: a) Chatterjee (1990) b) Census of India 1991 and 2001

Figure 1. Growth of Population in Kolkata City



Based on Census data of 1971, 1981, 1991 and 2001

The tremendous population increase in the 1940's and 50's is due to political upheaval at the time of independence and subsequent partition of Bengal. The mass exodus of population from newly formed East Pakistan (now Bangladesh) added to the existing population of the then Kolkata. In the 1971 period also the same reasons led to the increase of population in the city. The sharp increase of population in 1991 is due to the annexation of South Suburban Municipality, Jadavpur Municipality and Garden Reach Municipality into the then existing Corporation area. The recent trend is towards a negative growth of population.

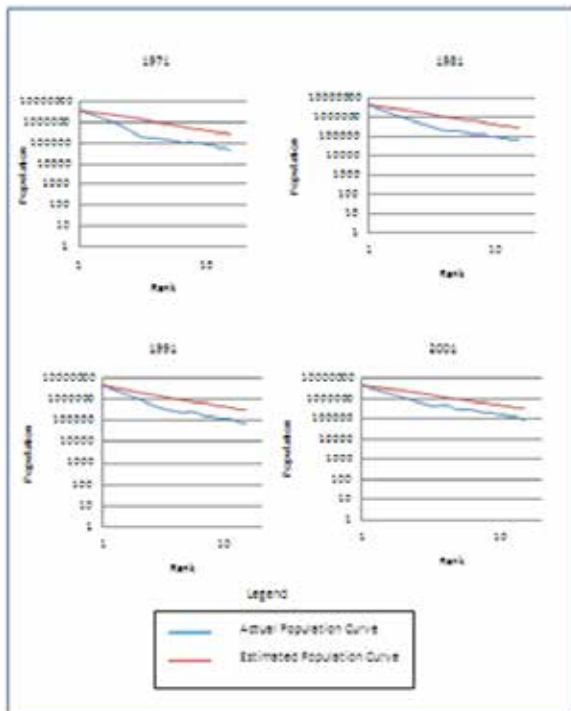
There are several factors responsible for the growth of primacy: spread of colonialism, strong centralized Government, economic factors, industrial agglomeration, migration and efficiency of modern transport. Of these factors chief two which led to the Kolkata's classic primacy are spread of colonialism and migration. "Kolkata did not originate primarily as a response to the need of the surrounding rural areas, smaller towns and cities, but it was mainly a product of the administrative and economic needs of the colonial empire of British India which was in a sense Kolkata's multifaceted hinterland and domain of influence" (Das and Dutt 1993). This overgrowth has been termed cancerous for the urban development of the entire eastern region. The city, once established, acted as a magnet. It drew people from the entire region through its increased pull factors and also eclipsed the development of the smaller urban centres. Till 1971 it held its primate position, which was highest in the said year (11.6). Then onwards, the trend of growth is slowly diminishing.

Primacy of Kolkata within West Bengal

When considered within West Bengal, there is not another centre which has able to go near Kolkata in terms of population growth or even its economic development. According to a study carried out by Prof. S. K. Munsri (1975),

Kolkata in 1971, was 32.32 times larger than the Durgapur Complex or 13.3 times greater than Durgapur, Kharagpur and Asansol put together. According to Rank Size Rule calculated of the selected urban centres of West Bengal, in 1971 the estimated population of the second largest urban centre, i.e. Haora was 1858189 while the actual population was only 737877. In 1981, it increased only by 6552, while the estimated increase was to be 205234. In 1991, however, the population increased by 206006 to 950435 but it could hardly come near to the first city with the population of 4399819. In 2001, Haora was the only centre other than Kolkata to cross the 1 lakh mark with the population of 1007532 while it was estimated that four centres shall have population above one lakh, namely Kolkata, Haora, Durgapur and Asansol. The 2001 population of Durgapur and Asansol were 493405 and 475439 respectively.

Figure 2. Rank Size Distribution of Population of Selected Urban Centres of West Bengal (after Zipf)



Source: Calculated from Census Data of 1971, 1981, 1991 & 2001

Primacy of Kolkata within Eastern and North Eastern India

According to Munsii (1975), in 1971 Kolkata in comparison was 14.29 times larger than Patna, the second biggest city of North East India. From this fact, it can be stated that Kolkata holds centrality within North East India when compared to the other urban centres of the region. The zone of influence of Kolkata has been calculated and shown with the help of Breaking Point analysis after Reilly (1931). The law is called Reilly's law of retail gravitation and says that large cities have larger sphere of influence than smaller cities. That means people will travel longer distances to reach a large city (Wikipedia).

The formula used is

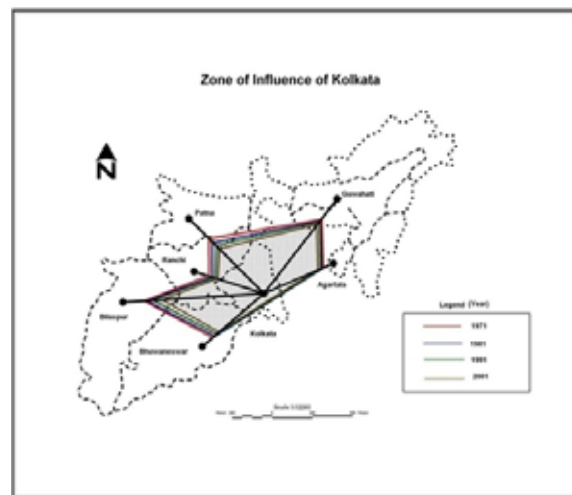
where,

- dix= distance of the boundary of the hinterland from the urban centre i,
- dij= shortest or straight line distance between ith and jth centres
- Pj= population of jth centre
- Pi= population of ith centre

Figure 3. Major Urban Centres of Eastern and North Eastern India



Figure 4. Zone of Influence of Kolkata upon Eastern and North Eastern India



Maps prepared by authors

The hinterland or zone of influence of Kolkata has been delineated on the basis of six surrounding urban centres, namely Agartala, Guwahati, Patna, Ranchi, Bilaspur and Bhubaneswar. From the map it appears that the shape of the hinterland is almost regular, that is a hexagon. Its area has been calculated which amounts to be 2106.25 sq. Km. in 1971, 2090sq. Km. in 1981, 1926.25 sq. Km. in 1991 and 1486.25 sq. Km. in 2001

Table 4. Decade Wise Areal Variation in the Zone of Influence of Kolkata

Year	Actual area in Sq. Km.	Area Change in Sq. Km.
1971	2106.25	-
1981	2090	16.25
1991	1926.25	163.75
2001	1486.25	440

Source: Calculated by authors

The results show that the hinterland of Kolkata is shrinking day by day. From this it can be said that as other small towns are given more priorities for development to reduce the over burden of Kolkata, the influence zone of Kolkata has been reduced.

Index of Primacy

The Index of Primacy for the study area has been calculated. It is found from the respective Census data of each year that in the study area the second largest urban centre, after Kolkata, has been Patna.

Index of primacy = Population of the largest city/ population of the second largest city.

Table 5. Index of Primacy of Kolkata upon Eastern and North-Eastern India

Year	Index of Primacy
1971	7.82
1981	5.07
1991	4.6
2001	3.35

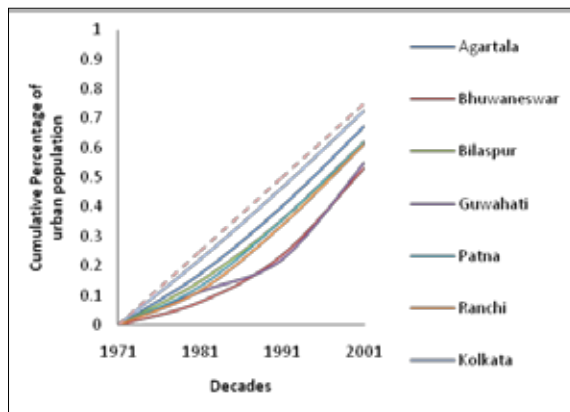
Calculated from Census data of 1971, 1981, 1991 and 2001

The calculation shows that in respective four decades the level of primacy of Kolkata has been decreasing.

Standardization of Urban Population

An attempt has been made here to compare the decadal growth of urban population of the selected urban centres of North- East India. It is assumed in the beginning that throughout the four decades of 1971, 1981, 1991 and 2001, the growth of urban population has been uniform. This has been designated by the straight line curve in the graph. The percentage of urban population growth of the selected urban centres have been cumulated and plotted. The amount of deviation from the straight line curve signifies the amount of deviation from uniformity.

Figure 5. Trend of Growth of Selected Urban Centres of Eastern and North-Eastern India



Calculated from the Census data of 1971, 1981, 1991 and 2001

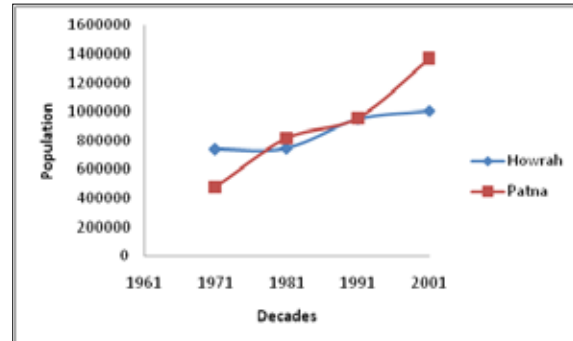
From the graph it is found that Kolkata had a uniform growth as it lies nearest to the line of uniformity. It is followed by Agartala. Guwahati and Bhubaneswar are the two centres farthest from the line of Uniformity. It is to be noted here that since the Census for the year 1981 was not carried out in Assam, the urban population for the year has been assumed to be same as the year 1971.

Conclusion:

From the analysis done above, it is found that the dominance of Kolkata upon Eastern and North Eastern part of India is slowly diminishing. The impact of the mega city is lessening as newer urban centres, like Patna, Ranchi and Bhubaneswar are gaining more importance. Within the state of West Bengal, the prominence of Kolkata is still high. It is the prime city of the state and the most important economic centre. According to Ramachandran (1989), "West Bengal is an

example par excellence of primacy at the state level". He also compared the primacy of Kolkata with that of the U.K. or other countries with primate city characteristics. There has been a sole dominance of this urban centre upon the whole of the Eastern and North Eastern region.

Figure 6. Comparison of Urban Growth of Howrah and Patna



Calculated from the Census data of 1971, 1981, 1991 and 2001

Here a comparison has been made between the second largest urban centre of the Eastern and North Eastern Region, i.e. Patna, with Howrah which is the second largest town in West Bengal. The comparison shows that Patna has encountered a swift increase of population through the decades while Howrah has been facing a slow growth. Till 1971 Patna had remained below Howrah. After that it has faced sudden increase and since then has climbed the ladder to gain the second position after Kolkata in the entire region. Perhaps this growth of Patna can be attributed to the impetus given to it for being the capital of Bihar. But being closest to the largest city of the region, Howrah did not get the same effects. The same is true about the other towns. As Das and Dutta (1993) have pointed out, perhaps the need for the emergence of other large towns and cities was not felt and existing towns and cities got bypassed.

As the above analysis show that the primacy level of Kolkata is diminishing, it should have positive impact upon the development of the region. But its impacts are not positive for the state of West Bengal. Here the loss of primacy is not the influence of the emergence of equitable second order urban centers; rather it may be an impact of the inability of the State to generate good investments in the developmental sector. People are keener to migrate to places like Mumbai, Delhi and Ahmadabad where job opportunities are more and even varied. The reason behind this shift of migration trend may be the inability of the State to generate better investments for growth of the secondary and tertiary, and even the quaternary and quinary sectors. Besides, due to improvement in transportation across the nation, the trend of migration, which was initially almost solely centered on Kolkata, has also scattered throughout the country.

Therefore, decentralization is mandatory for uniform development of West Bengal as well as the entire region concerned in the study. Impetus must be provided to generate newer growth centres and the existing ones must be revived. It can only be done through proper investments in various sectors like infrastructure, education, occupation and development.

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